

# ENGINE CONTROL SYSTEM

## SECTION EC

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Alphabetical & P No. Index for DTC

## Alphabetical & P No. Index for DTC

NCEC0001

NCEC0001S01

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\*1: 1st trip DTC No. is the same as DTC No.

\*2: This DTC is displayed with CONSULT-II only.

\*3: When the fail-safe operation occurs, the MIL illuminates.

\*4: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

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\*4: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

## PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

### Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

NCEC0002

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to INFINITI G20 is as follows:

- For a frontal collision  
The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision  
The Supplemental Restraint System consists of side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS** section of this Service Manual.

#### **WARNING:**

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the RS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. Spiral cable and wiring harnesses (except "SEAT BELT PRE-TENSIONER") covered with yellow insulation tape either just before the harness connectors or for the complete harness are related to the SRS.

### Precautions for On Board Diagnostic (OBD) System of Engine and A/T

NCEC0003

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

#### **CAUTION:**

- Be sure to turn the ignition switch "OFF" and disconnect the negative battery terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector.  
For description and how to disconnect, refer to EL section, "Description", "HARNESS CONNECTOR".
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EGR system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission Control Module) before returning the vehicle to the customer.

# PRECAUTIONS

Engine Fuel & Emission Control System

## Engine Fuel & Emission Control System

NCEC0004

### BATTERY

- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.

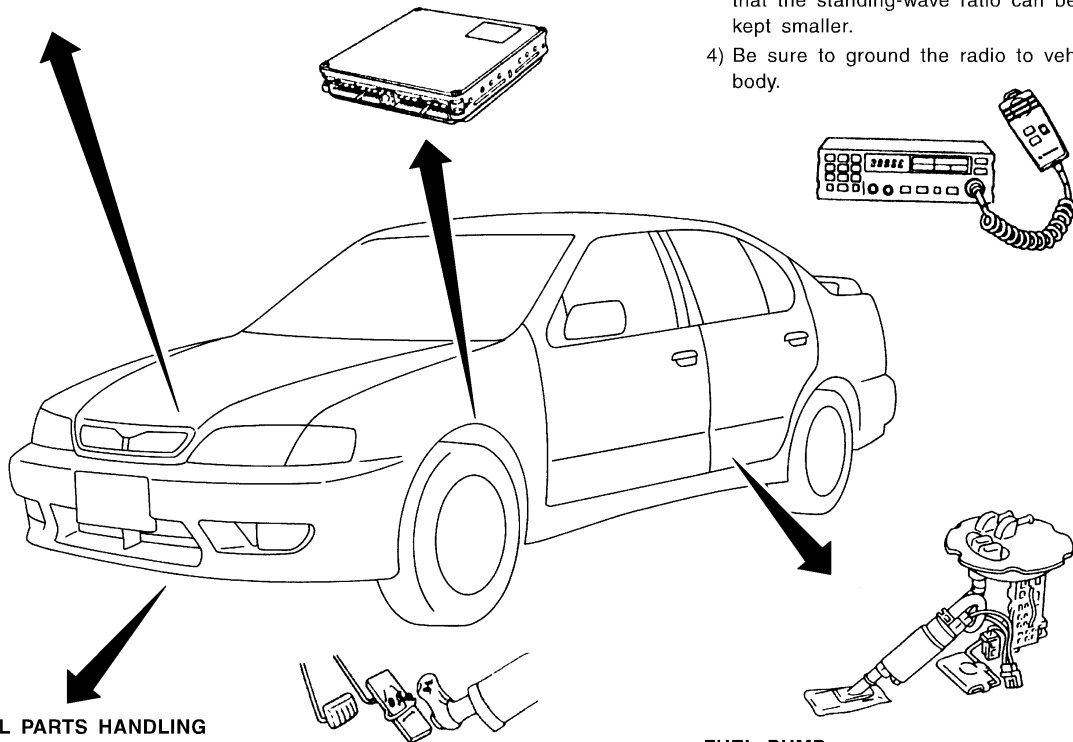
### ECM

- Do not disassemble ECM.
- Do not turn diagnosis test mode selector forcibly.
- If a battery terminal is disconnected, the memory will return to the ECM value.

The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a problem. Do not replace parts because of a slight variation.

### WIRELESS EQUIPMENT

- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
  - 1) Keep the antenna as far as possible from the electronic control units.
  - 2) Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls. Do not let them run parallel for a long distance.
  - 3) Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
  - 4) Be sure to ground the radio to vehicle body.



### ENGINE CONTROL PARTS HANDLING

- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble IAC valve-AAC valve.
- Even a slight leak in the air intake system can cause serious problems.
- Do not shock or jar the camshaft position sensor.

### WHEN STARTING

- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.

### FUEL PUMP

- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.

### ECM HARNESS HANDLING

- Securely connect ECM harness connectors. A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep ECM harness at least 10 cm (4 in) away from adjacent harness, to prevent an ECM system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep ECM parts and harness dry.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.

GI

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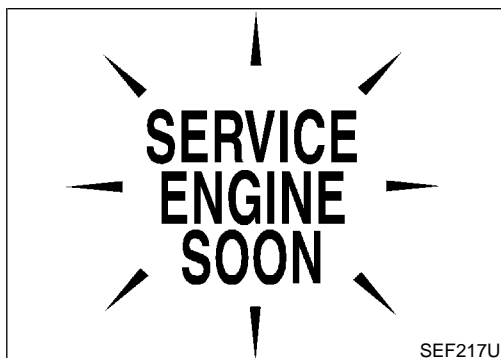
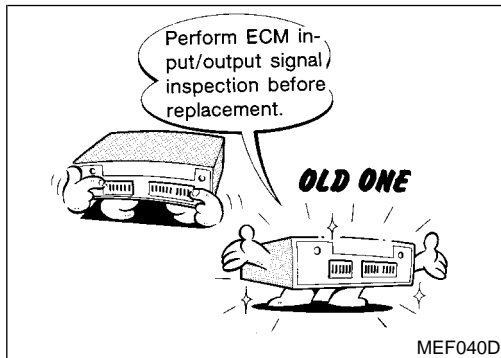
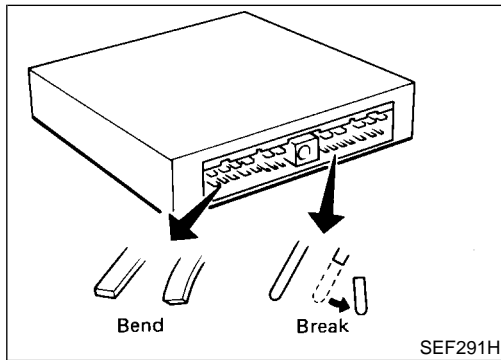
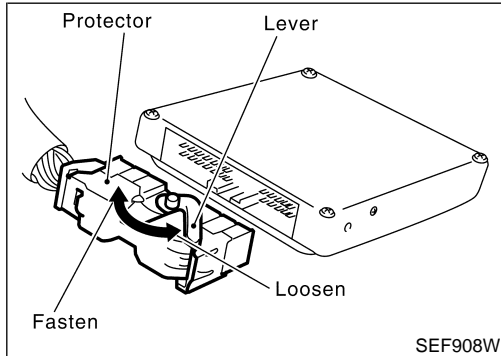
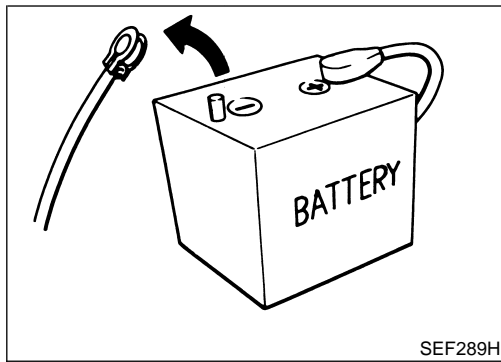
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# PRECAUTIONS

## Precautions



## Precautions

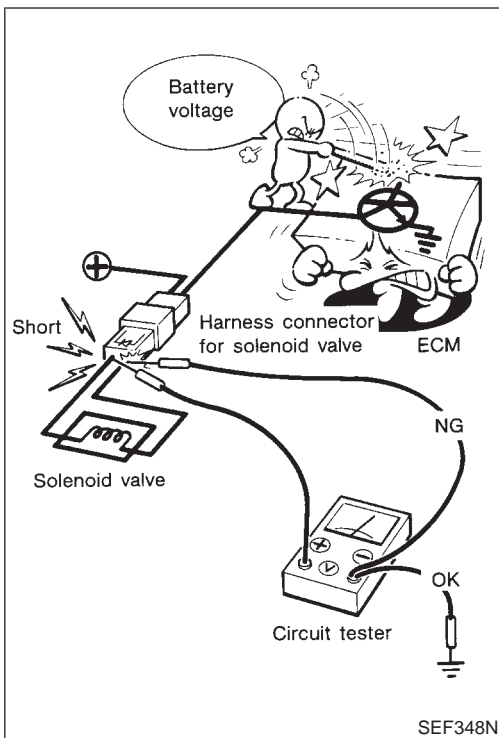
NCEC0005

- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off.
- When connecting ECM harness connector, fasten it securely with a lever as far as it will go as shown at left.
- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break). Make sure that there are not any bends or breaks on ECM pin terminals when connecting pin connectors.
- Before replacing ECM, perform Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-134.
- After performing each TROUBLE DIAGNOSIS, perform "Overall Function Check" or "DTC Confirmation Procedure". The DTC should not be displayed in the "DTC Confirmation Procedure" if the repair is completed. The "Overall Function Check" should be a good result if the repair is completed.



# PRECAUTIONS

Precautions (Cont'd)



- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

GI

MA

EM

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EC

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## Wiring Diagrams and Trouble Diagnosis

NCEC0006

When you read Wiring diagrams, refer to the following:

- GI-11, "HOW TO READ WIRING DIAGRAMS"
- EL-9, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- GI-35, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-24, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"

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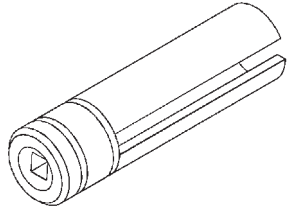
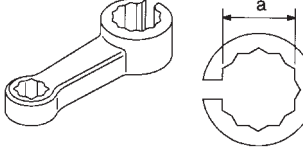
# PREPARATION

## Special Service Tools

### Special Service Tools


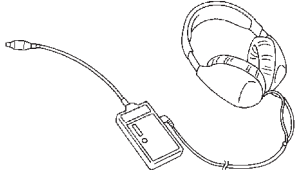
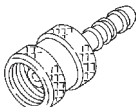
NCEC0007

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

| Tool number<br>(Kent-Moore No.)<br>Tool name               | Description                                                                                                                |                                                                                     |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| KV10117100<br>(J36471-A)<br>Heated oxygen sensor<br>wrench |  <p>NT379</p> | Loosening or tightening front heated oxygen sensor with 22 mm (0.87 in) hexagon nut |
| KV10114400<br>(J-38365)<br>Heated oxygen sensor<br>wrench  |  <p>NT636</p> | Loosening or tightening rear heated oxygen sensor<br><b>a: 22 mm (0.87 in)</b>      |

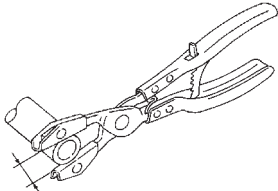
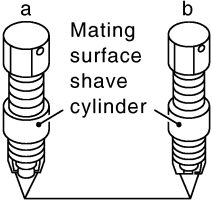
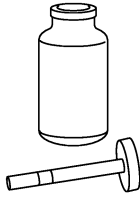
### Commercial Service Tools

NCEC0008

| Tool name                                    | Description                                                                                                                    |                                                         |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Fuel filler cap adapter                      |  <p>NT653</p> | Checking fuel tank vacuum relief valve opening pressure |
| Leak detector<br>(J41416)                    |  <p>NT703</p> | Locating the EVAP leak                                  |
| EVAP service port<br>adapter<br>(J41413-OBD) |  <p>NT704</p> | Applying positive pressure through EVAP service port    |

# PREPARATION

Commercial Service Tools (Cont'd)

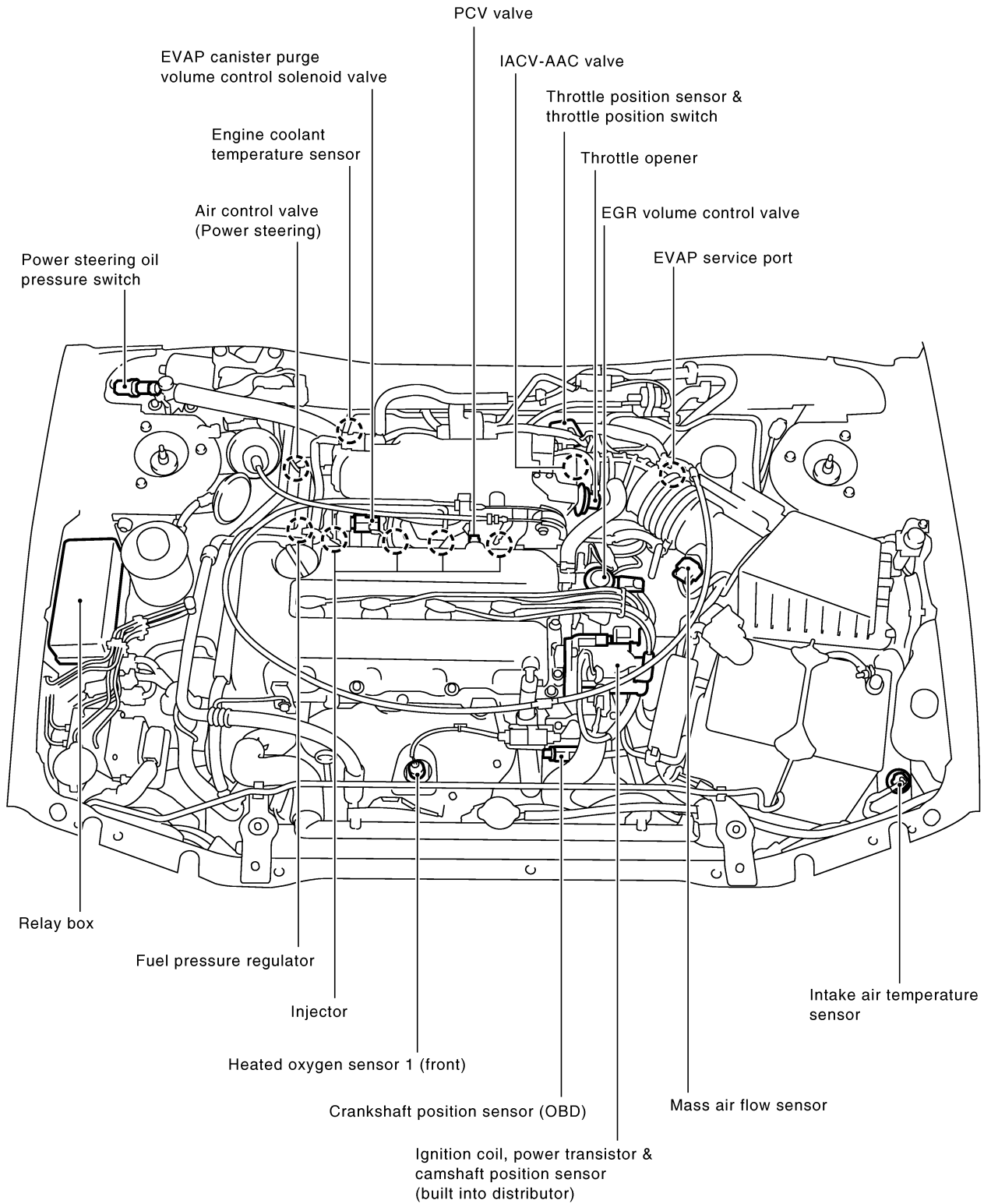
| Tool name                                                                                   | Description                                                                                                                         |                                                                       |
|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Hose clipper<br><br><br><br><br>                                                            |  <p>Approx. 20 mm (0.79 in)</p> <p>NT720</p>       | GI<br>MA<br>EM<br>LC                                                  |
| Oxygen sensor thread cleaner<br>(J-43897-18)<br>(J-43897-12)                                |  <p>Mating surface shave cylinder</p> <p>NT778</p> | EC<br>FE<br>CL                                                        |
| Anti-seize lubricant<br>(Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907) |  <p>NT779</p>                                      | MT<br>AT<br>AX<br>SU<br>BR<br>ST<br>RS<br>BT<br>HA<br>SC<br>EL<br>IDX |

# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Engine Control Component Parts Location

## Engine Control Component Parts Location

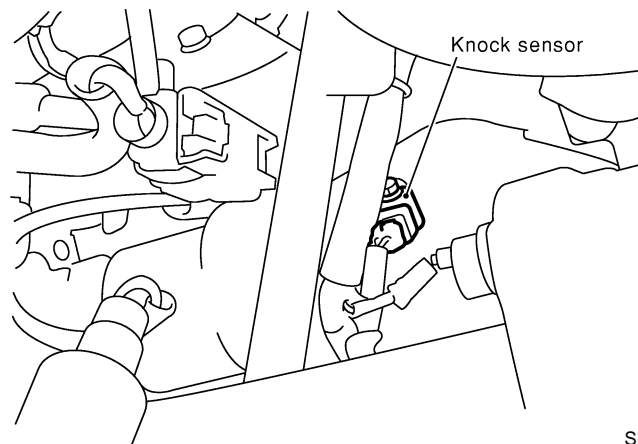
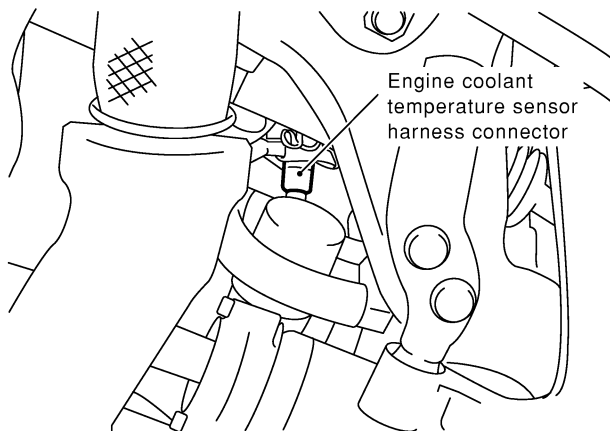
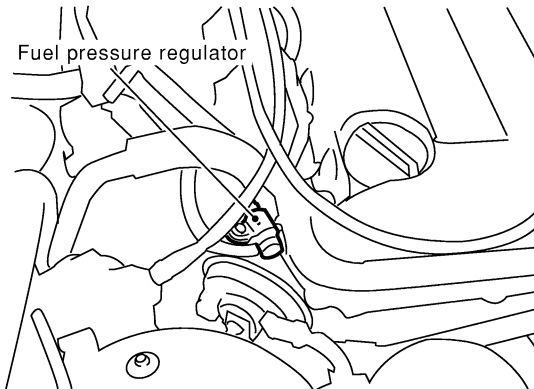
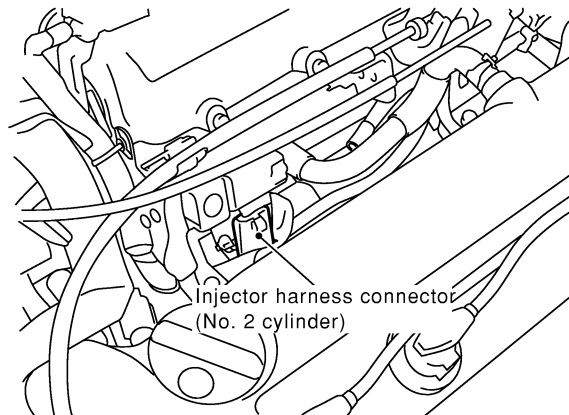
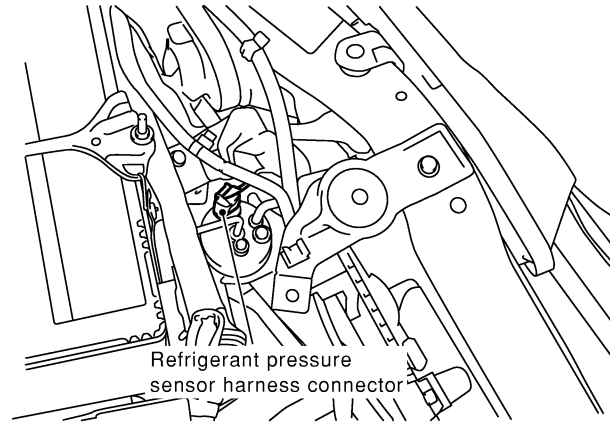
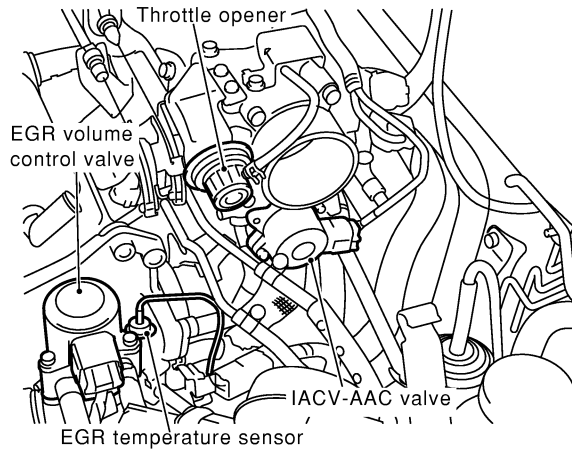
NCEC0009



SEF912Z

# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Engine Control Component Parts Location (Cont'd)

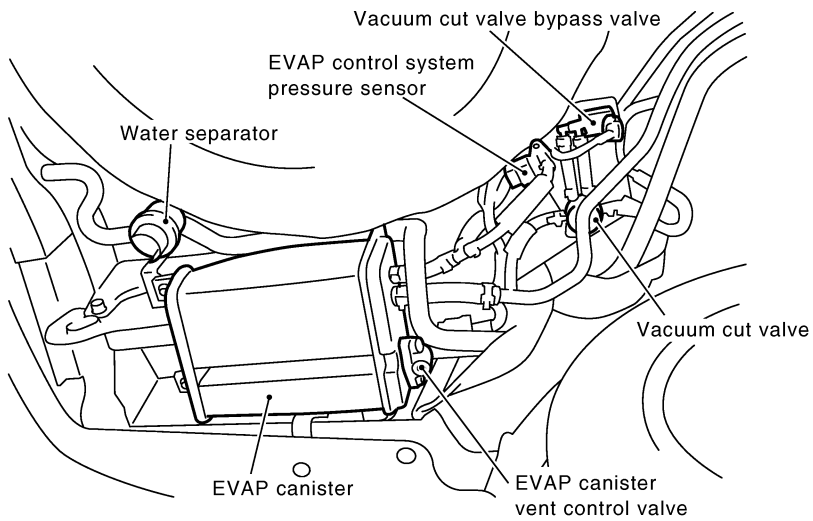
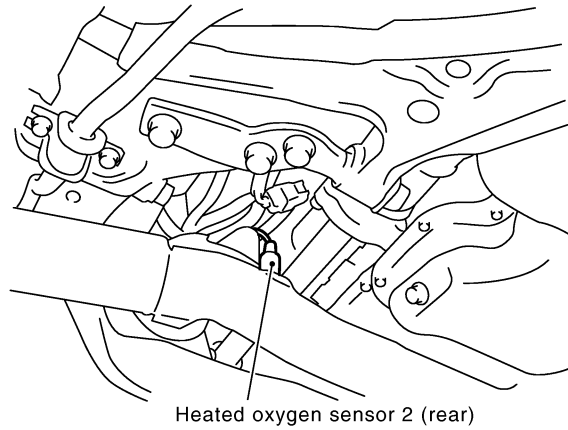
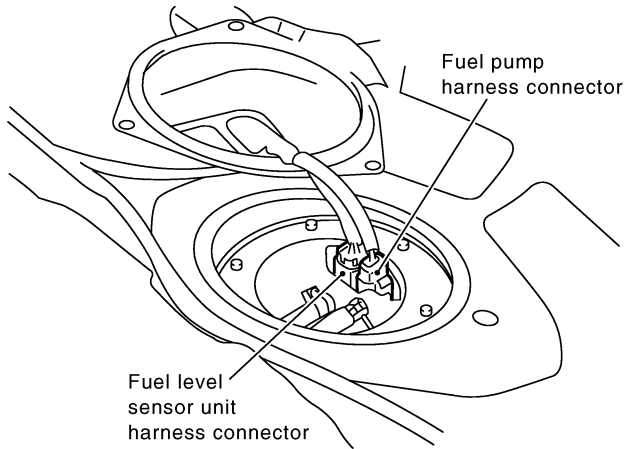
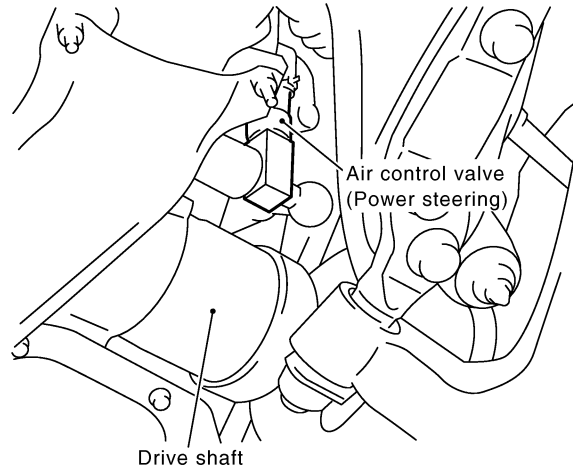
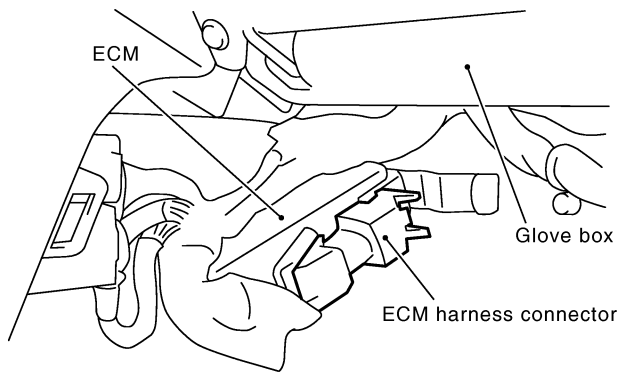


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SEF835X

# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Engine Control Component Parts Location (Cont'd)



SEF913Z

# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

*Engine Control Component Parts Location (Cont'd)*

**NOTE:**

GI

MA

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LC

**EC**

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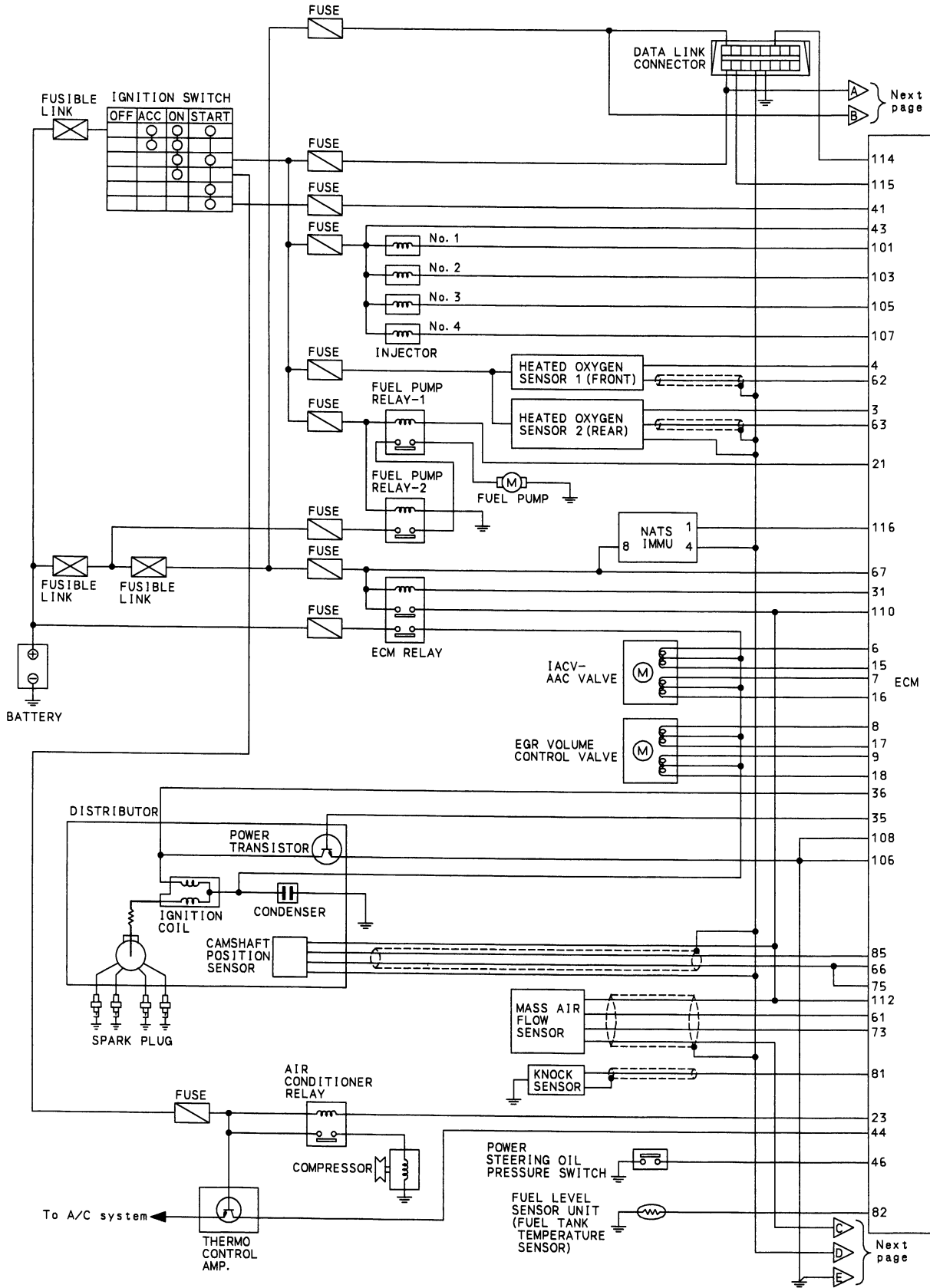
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# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Circuit Diagram

## Circuit Diagram

NCEC0010

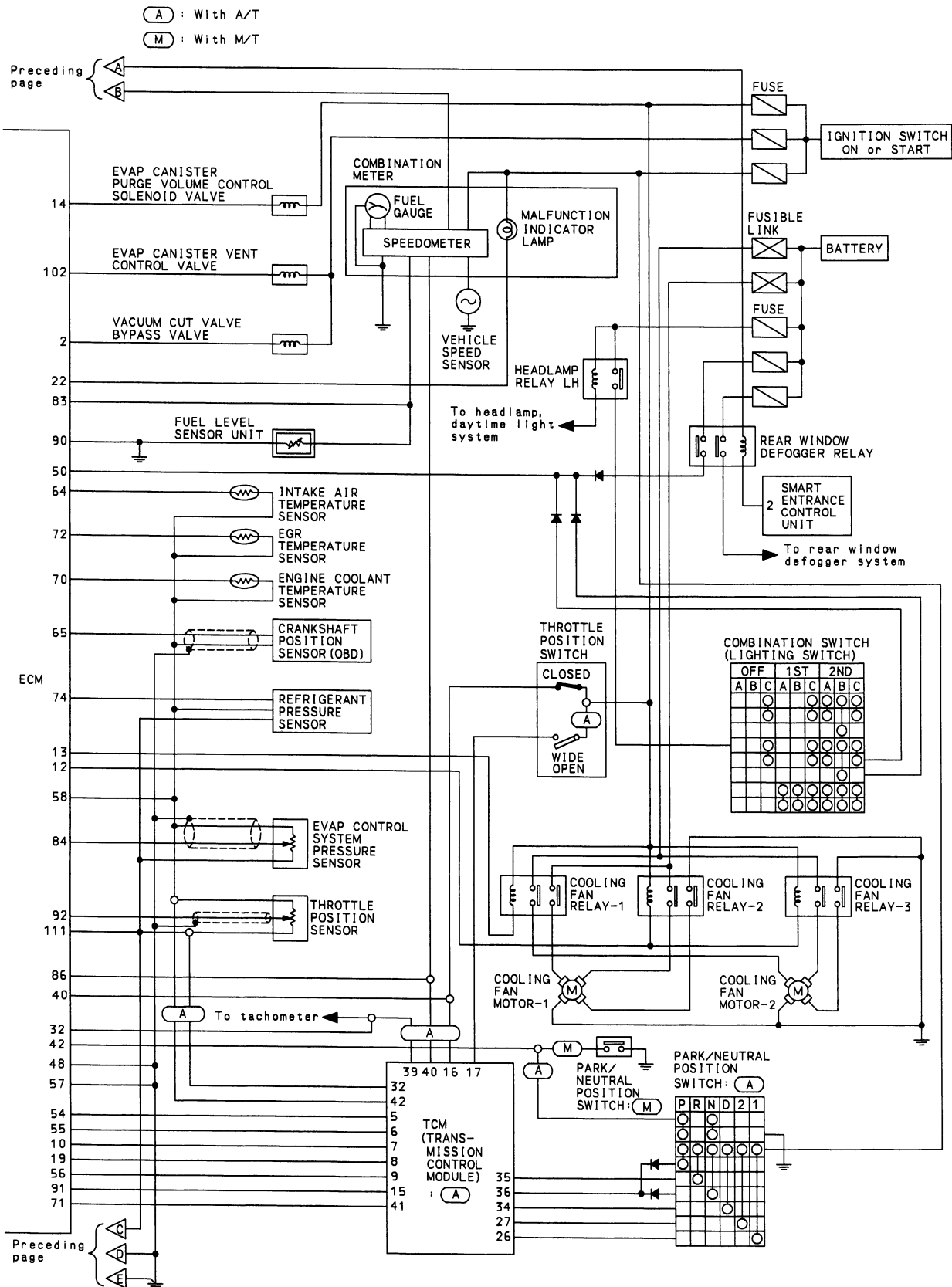


TEC776



# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Circuit Diagram (Cont'd)



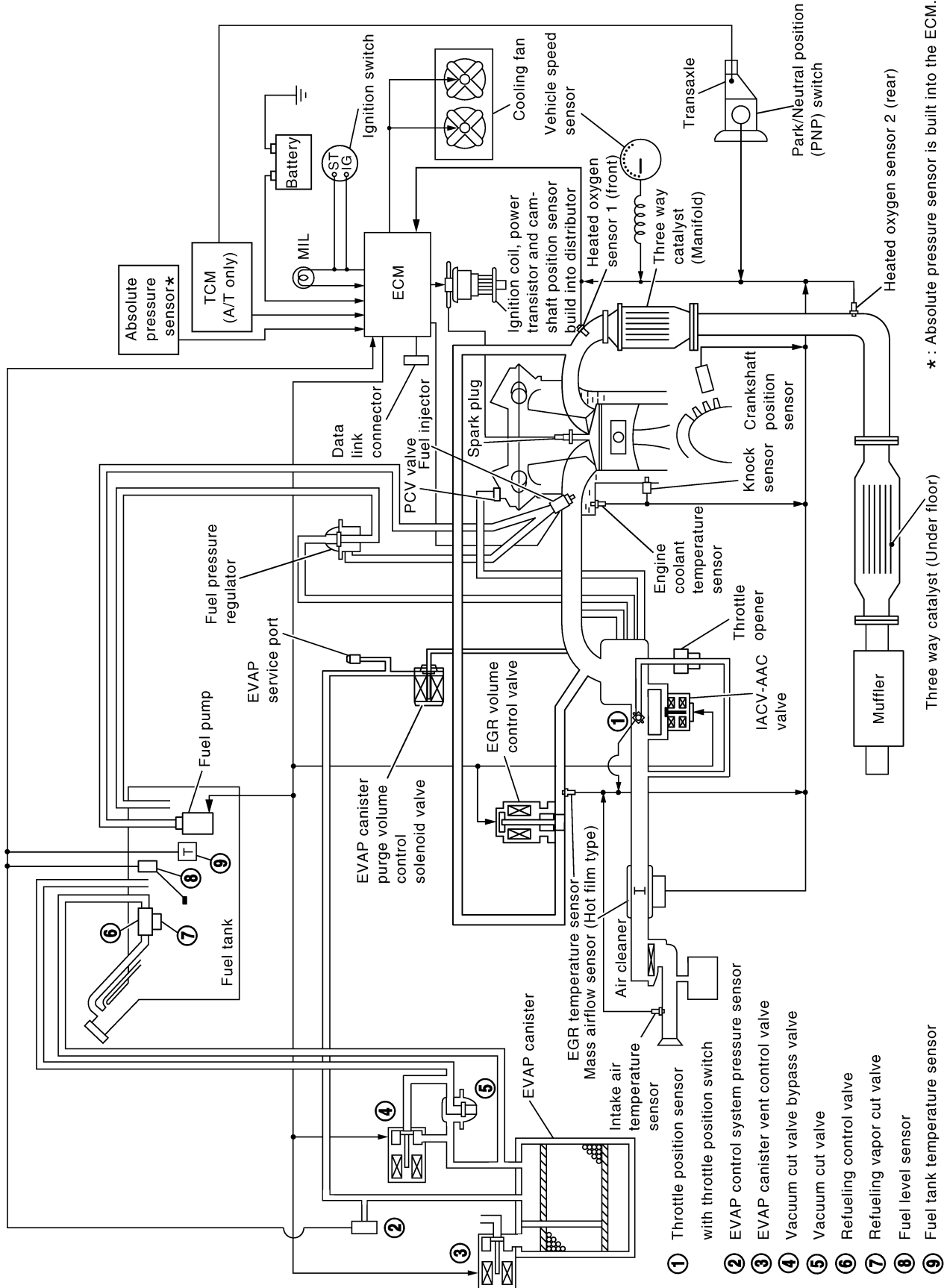
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# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

System Diagram

## System Diagram

NCEC0011



SEF907Z

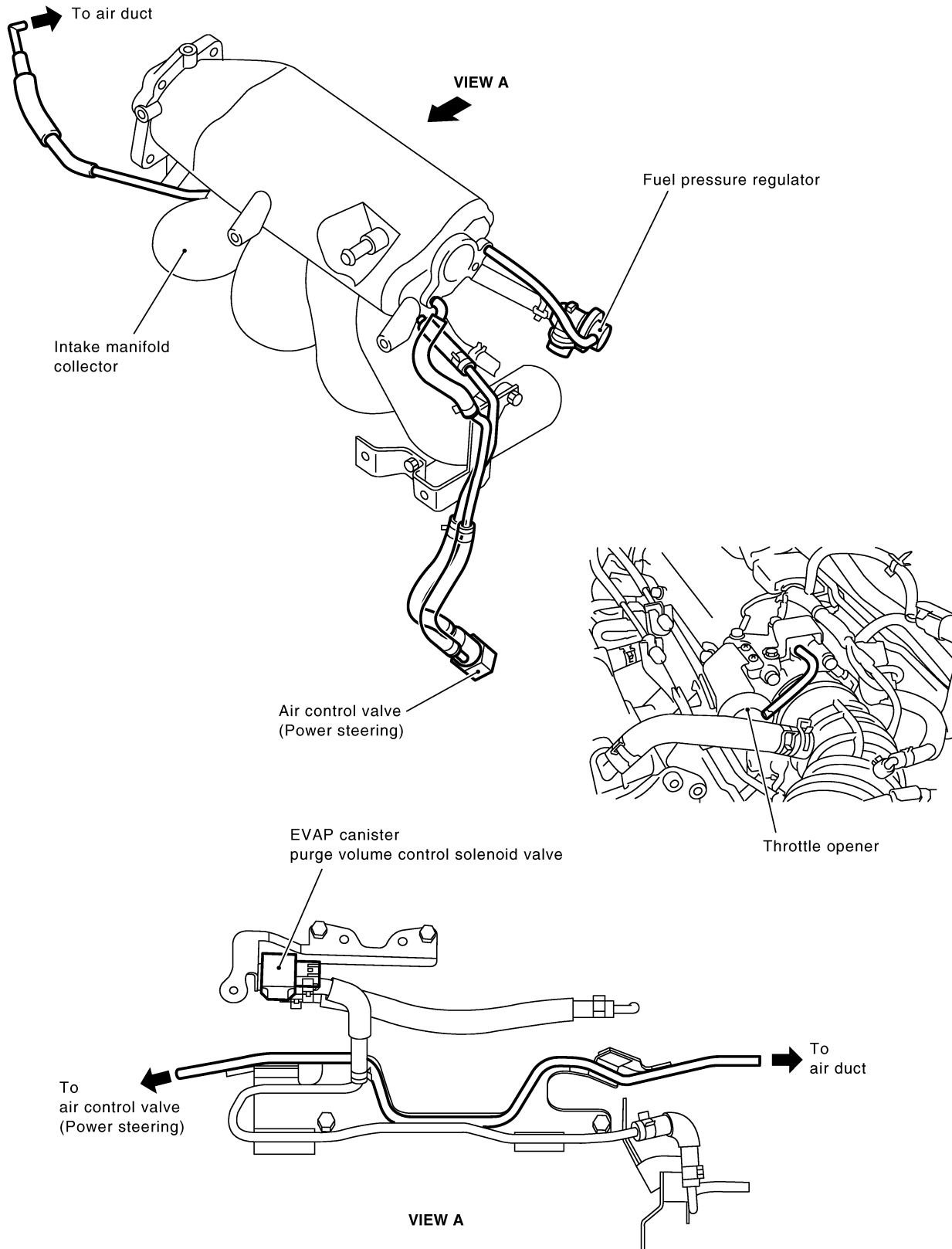
# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Vacuum Hose Drawing

## Vacuum Hose Drawing

NCEC0012

Refer to "System Diagram" on EC-26 for vacuum control system.



- GI
- MA
- EM
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- EC**
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- BT
- HA
- SC
- EL
- IDX

NOTE: Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.

SEF914Z

# ENGINE AND EMISSION CONTROL OVERALL SYSTEM

System Chart

## System Chart

NCEC0013

| Input (Sensor)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ECM Function                                  | Output (Actuator)                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>● Camshaft position sensor</li> <li>● Mass air flow sensor</li> <li>● Engine coolant temperature sensor</li> <li>● Heated oxygen sensor 1 (front)</li> <li>● Ignition switch</li> <li>● Throttle position sensor</li> <li>● PNP switch</li> <li>● Air conditioner switch</li> <li>● Knock sensor</li> <li>● EGR temperature sensor*1</li> <li>● Crankshaft position sensor (OBD)*1</li> <li>● EVAP control system pressure sensor*1</li> <li>● Fuel tank temperature sensor*1</li> <li>● Battery voltage</li> <li>● Power steering oil pressure switch</li> <li>● Vehicle speed sensor</li> <li>● Intake air temperature sensor</li> <li>● Heated oxygen sensor 2 (rear)*3</li> <li>● TCM (Transmission control module)*2</li> <li>● Closed throttle position switch*4</li> <li>● Electrical load</li> <li>● Fuel level sensor*1</li> <li>● Refrigerant pressure sensor</li> </ul> | Fuel injection & mixture ratio control        | Injectors                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Distributor ignition system                   | Power transistor                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Idle air control system                       | IACV-AAC valve                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Fuel pump control                             | Fuel pump relay                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | On board diagnostic system                    | Malfunction indicator lamp (On the instrument panel)                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | EGR control                                   | EGR volume control valve                                                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Heated oxygen sensor 1 heater (front) control | Heated oxygen sensor 1 heater (front)                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Heated oxygen sensor 2 heater (rear) control  | Heated oxygen sensor 2 heater (rear)                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | EVAP canister purge flow control              | EVAP canister purge volume control solenoid valve                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Cooling fan control                           | Cooling fan relays                                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Air conditioning cut control                  | Air conditioner relay                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ON BOARD DIAGNOSIS for EVAP system            | <ul style="list-style-type: none"> <li>● EVAP canister vent control valve</li> <li>● Vacuum cut valve bypass valve</li> </ul> |

\*1: These sensors are not used to control the engine system. They are used only for the on board diagnosis.

\*2: The DTC related to A/T will be sent to ECM.

\*3: Under normal conditions, this sensor is not for engine control operation.

\*4: This switch will operate in place of the throttle position sensor to control EVAP parts if the sensor malfunctions.

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Multiport Fuel Injection (MFI) System

## Multiport Fuel Injection (MFI) System

### DESCRIPTION

#### Input/Output Signal Chart

NCEC0014

GI

NCEC0014S01

| Sensor                             | Input Signal to ECM                               | ECM function                           | Actuator |
|------------------------------------|---------------------------------------------------|----------------------------------------|----------|
| Camshaft position sensor           | Engine speed and piston position                  | Fuel injection & mixture ratio control | Injector |
| Mass air flow sensor               | Amount of intake air                              |                                        |          |
| Engine coolant temperature sensor  | Engine coolant temperature                        |                                        |          |
| Heated oxygen sensor 1 (front)     | Density of oxygen in exhaust gas                  |                                        |          |
| Throttle position sensor           | Throttle position<br>Throttle valve idle position |                                        |          |
| PNP switch                         | Gear position                                     |                                        |          |
| Vehicle speed sensor               | Vehicle speed                                     |                                        |          |
| Ignition switch                    | Start signal                                      |                                        |          |
| Air conditioner switch             | Air conditioner operation                         |                                        |          |
| Knock sensor                       | Engine knocking condition                         |                                        |          |
| Electrical load                    | Electrical load signal                            |                                        |          |
| Battery                            | Battery voltage                                   |                                        |          |
| Power steering oil pressure switch | Power steering operation                          |                                        |          |
| Heated oxygen sensor 2 (rear)*     | Density of oxygen in exhaust gas                  |                                        |          |

MA

EM

LC

EC

FE

CL

MT

AT

AX

\* Under normal conditions, this sensor is not for engine control operation.

### Basic Multiport Fuel Injection System

NCEC0014S02

SU

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from both the camshaft position sensor and the mass air flow sensor.

BR

### Various Fuel Injection Increase/Decrease Compensation

NCEC0014S03

ST

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from "N" to "D" (A/T models only)
- High-load, high-speed operation

RS

BT

HA

<Fuel decrease>

- During deceleration
- During high engine speed operation
- During high vehicle speed operation (M/T models)
- Extremely high engine coolant temperature

SC

EL

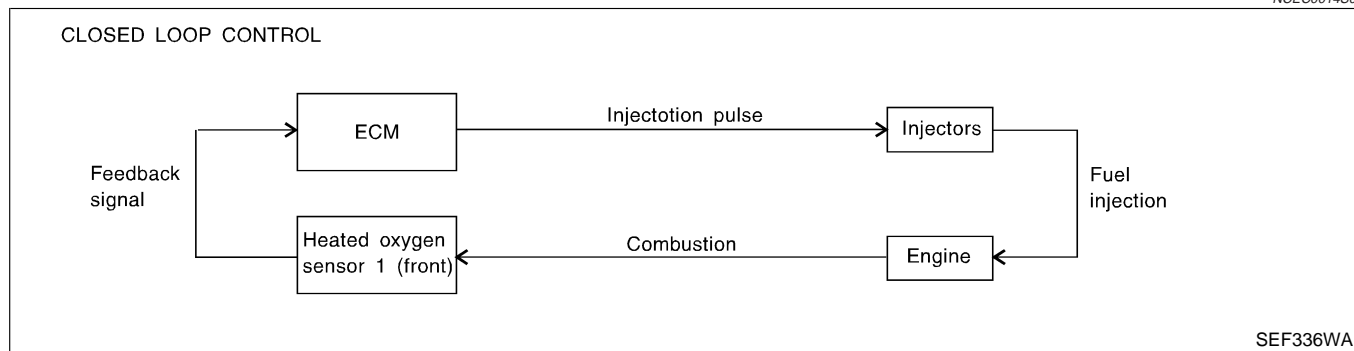
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# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

*Multiport Fuel Injection (MFI) System (Cont'd)*

## Mixture Ratio Feedback Control (Closed loop control)

NCEC0014S04



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst can then better reduce CO, HC and NOx emissions. This system uses a heated oxygen sensor 1 (front) in the exhaust manifold to monitor if the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about the heated oxygen sensor 1 (front), refer to EC-196. This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

This stage is referred to as the closed loop control condition.

Heated oxygen sensor 2 (rear) is located downstream of the three way catalyst. Even if the switching characteristics of the heated oxygen sensor 1 (front) shift, the air-fuel ratio is controlled to stoichiometric by the signal from the heated oxygen sensor 2 (rear).

## Open Loop Control

NCEC0014S05

The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 (front) or its circuit
- Insufficient activation of heated oxygen sensor 1 (front) at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- When starting the engine

## Mixture Ratio Self-learning Control

NCEC0014S06

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from the heated oxygen sensor 1 (front). This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot film) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.

Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"Fuel trim" refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.

"Short term fuel trim" is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from the heated oxygen sensor 1 (front) indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.

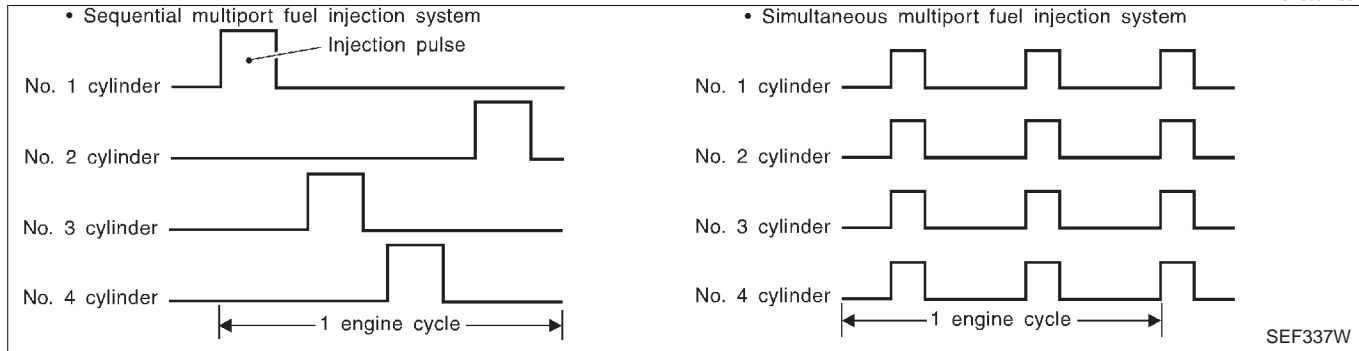
"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Multiport Fuel Injection (MFI) System (Cont'd)

## Fuel Injection Timing

NCEC0014S07



SEF337W

Two types of systems are used.

### Sequential Multiport Fuel Injection System

NCEC0014S0701

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

### Simultaneous Multiport Fuel Injection System

NCEC0014S0702

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

The four injectors will then receive the signals two times for each engine cycle.

This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

### Fuel Shut-off

NCEC0014S08

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

## Distributor Ignition (DI) System

### DESCRIPTION

NCEC0015

### Input/Output Signal Chart

NCEC0015S01

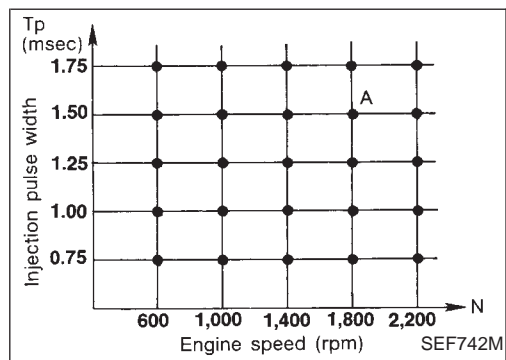
| Sensor                            | Input Signal to ECM                               | ECM function            | Actuator         |
|-----------------------------------|---------------------------------------------------|-------------------------|------------------|
| Camshaft position sensor          | Engine speed and piston position                  | Ignition timing control | Power transistor |
| Mass air flow sensor              | Amount of intake air                              |                         |                  |
| Engine coolant temperature sensor | Engine coolant temperature                        |                         |                  |
| Throttle position sensor          | Throttle position<br>Throttle valve idle position |                         |                  |
| Vehicle speed sensor              | Vehicle speed                                     |                         |                  |
| Ignition switch                   | Start signal                                      |                         |                  |
| Knock sensor                      | Engine knocking                                   |                         |                  |
| PNP switch                        | Gear position                                     |                         |                  |
| Battery                           | Battery voltage                                   |                         |                  |

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Distributor Ignition (DI) System (Cont'd)

## System Description

NCEC0015S02



The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM. This data forms the map shown above.

The ECM receives information such as the injection pulse width and camshaft position sensor signal. Computing this information, ignition signals are transmitted to the power transistor.

e.g., N: 1,800 rpm, Tp: 1.50 msec

A°BTDC

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions.

If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

## Air Conditioning Cut Control

### DESCRIPTION

#### Input/Output Signal Chart

NCEC0016

NCEC0016S01

| Sensor                            | Input Signal to ECM          | ECM function                | Actuator              |
|-----------------------------------|------------------------------|-----------------------------|-----------------------|
| Air conditioner switch            | Air conditioner "ON" signal  | Air conditioner cut control | Air conditioner relay |
| PNP switch                        | Neutral position             |                             |                       |
| Throttle position sensor          | Throttle valve opening angle |                             |                       |
| Camshaft position sensor          | Engine speed                 |                             |                       |
| Engine coolant temperature sensor | Engine coolant temperature   |                             |                       |
| Ignition switch                   | Start signal                 |                             |                       |

### System Description

NCEC0016S02

This system improves engine operation when the air conditioner is used.

Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.



# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Fuel Cut Control (at no load & high engine speed)

## Fuel Cut Control (at no load & high engine speed)

### DESCRIPTION

#### Input/Output Signal Chart

NCEC0017

NCEC0017S01

| Sensor                            | Input Signal to ECM        | ECM function     | Actuator  |
|-----------------------------------|----------------------------|------------------|-----------|
| Vehicle speed sensor              | Vehicle speed              | Fuel cut control | Injectors |
| PNP switch                        | Neutral position           |                  |           |
| Throttle position sensor          | Throttle position          |                  |           |
| Engine coolant temperature sensor | Engine coolant temperature |                  |           |
| Camshaft position sensor          | Engine speed               |                  |           |

If the engine speed is above 3,950 rpm with no load, (for example, in Neutral and engine speed over 4,000 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed. Fuel cut will operate until the engine speed reaches 1,150 rpm, then fuel cut is cancelled.

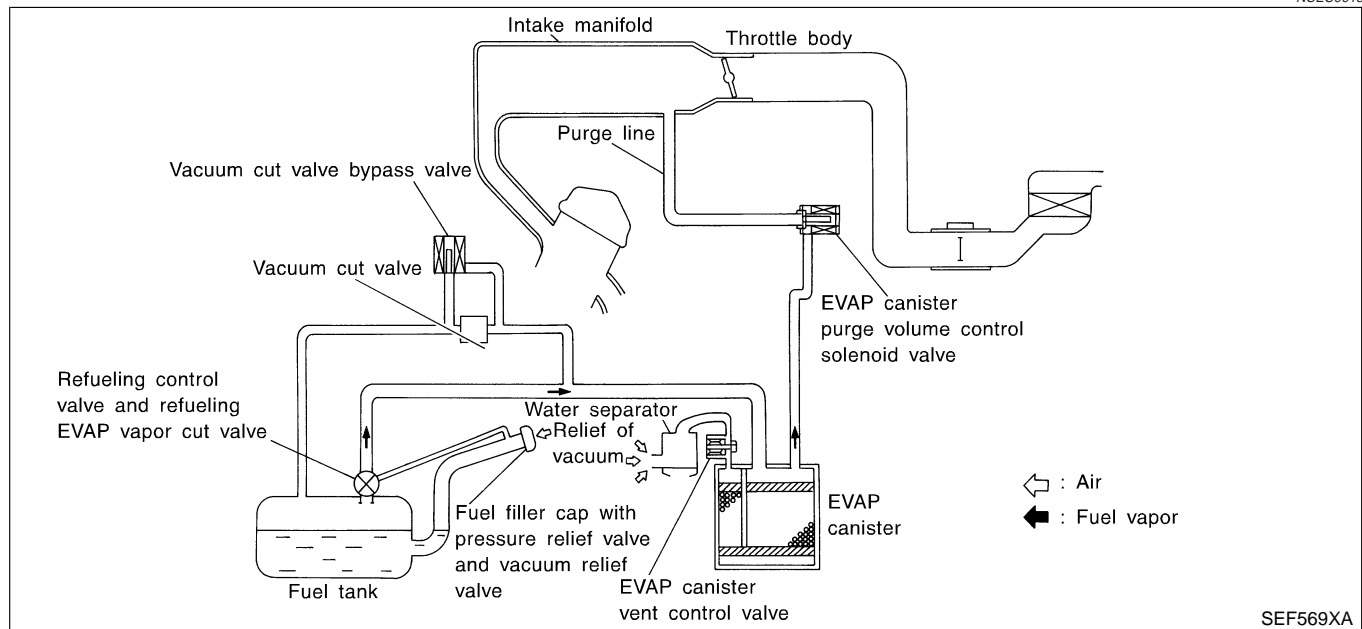
#### NOTE:

This function is different from deceleration control listed under “Multiport Fuel Injection (MFI) System”, EC-29.

## Evaporative Emission System

### DESCRIPTION

NCEC0018



SEF569XA

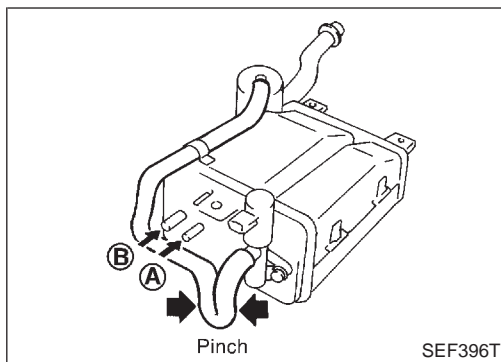
The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank. The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating.

EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.

EVAP canister purge control solenoid valve also shuts off the vapor purge line during decelerating and idling.

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

## Evaporative Emission System (Cont'd)



### INSPECTION

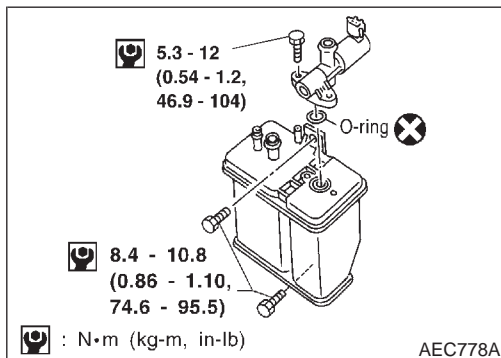
#### EVAP Canister

NCEC0019

NCEC0019S01

Check EVAP canister as follows:

1. Pinch the fresh air hose.
2. Blow air into port A and check that air flows freely through port B.

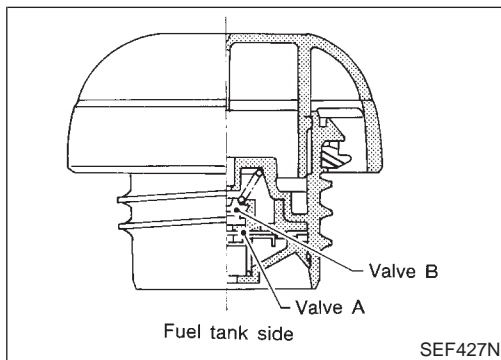


### Tightening Torque

NCEC0019S02

Tighten EVAP canister as shown in the figure.

**Make sure new O-ring is installed properly between EVAP canister and EVAP canister vent control valve.**



### Fuel Tank Vacuum Relief Valve (Built into fuel filler cap)

NCEC0019S03

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.

#### Pressure:

15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)

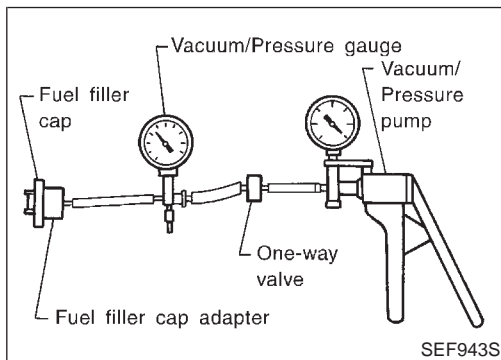
#### Vacuum:

-6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm<sup>2</sup>, -0.87 to -0.49 psi)

3. If out of specification, replace fuel filler cap as an assembly.

### CAUTION:

**Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**



### Vacuum Cut Valve and Vacuum Cut Valve Bypass Valve

NCEC0019S05

Refer to EC-544.

### Evaporative Emission (EVAP) Canister Purge Volume Control Solenoid Valve

NCEC0019S06

Refer to EC-369.

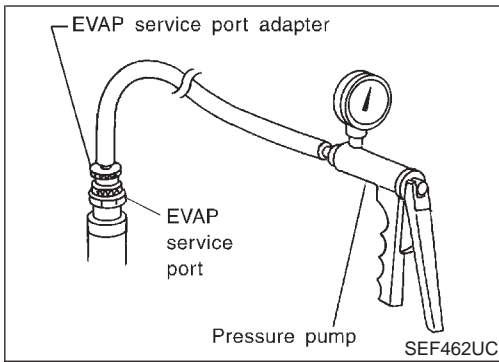
### Fuel Tank Temperature Sensor

NCEC0019S08

Refer to EC-286.

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)



## EVAP Service Port

Positive pressure is delivered to the EVAP system through the EVAP service port. <sup>NCEC0019S09</sup> If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.

GI

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)

NCEC0019S10

**EVAP SYSTEM CLOSE**

APPLY PRESSURE TO EVAP SYSTEM FROM SERVICE PORT USING HAND PUMP WITH PRESSURE GAUGE AT NEXT SCREEN.  
NEVER USE COMPRESSED AIR OR HIGH PRESSURE PUMP!  
DO NOT START ENGINE. TOUCH START.

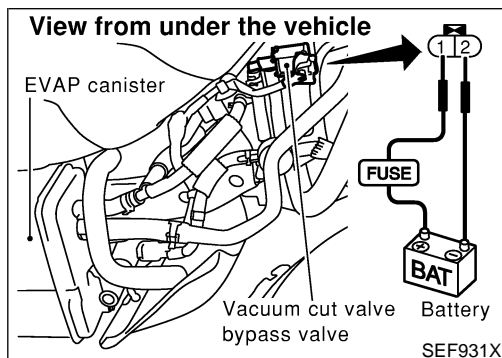
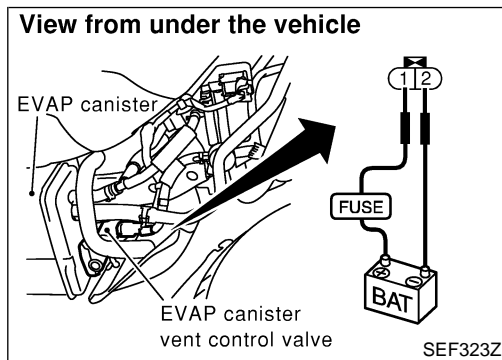
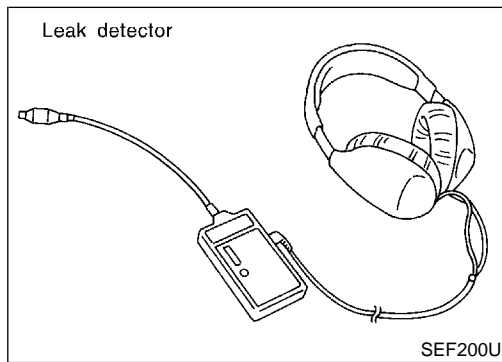
PEF838U

**EVAP SYSTEM CLOSE**

APPLY PRESSURE TO SERVICE PORT TO RANGE BELOW.  
DO NOT EXCEED 0.6psi.

0.2 0.4

PEF917U



## How to Detect Fuel Vapor Leakage

### CAUTION:

- Never use compressed air or a high pressure pump.
- Do not start engine.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in EVAP system.

### NOTE:

Improper installation of adapter to the service port may cause a leak.

#### With CONSULT-II

- 1) Attach the EVAP service port adapter securely to the EVAP service port.
- 2) Also attach the pressure pump and hose.
- 3) Turn ignition switch "ON".
- 4) Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT-II.
- 5) Touch "START". A bar graph (Pressure indicating display) will appear on the screen.
- 6) Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
- 7) Remove the EVAP service port adapter and hose with pressure pump.
- 8) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.

#### Without CONSULT-II

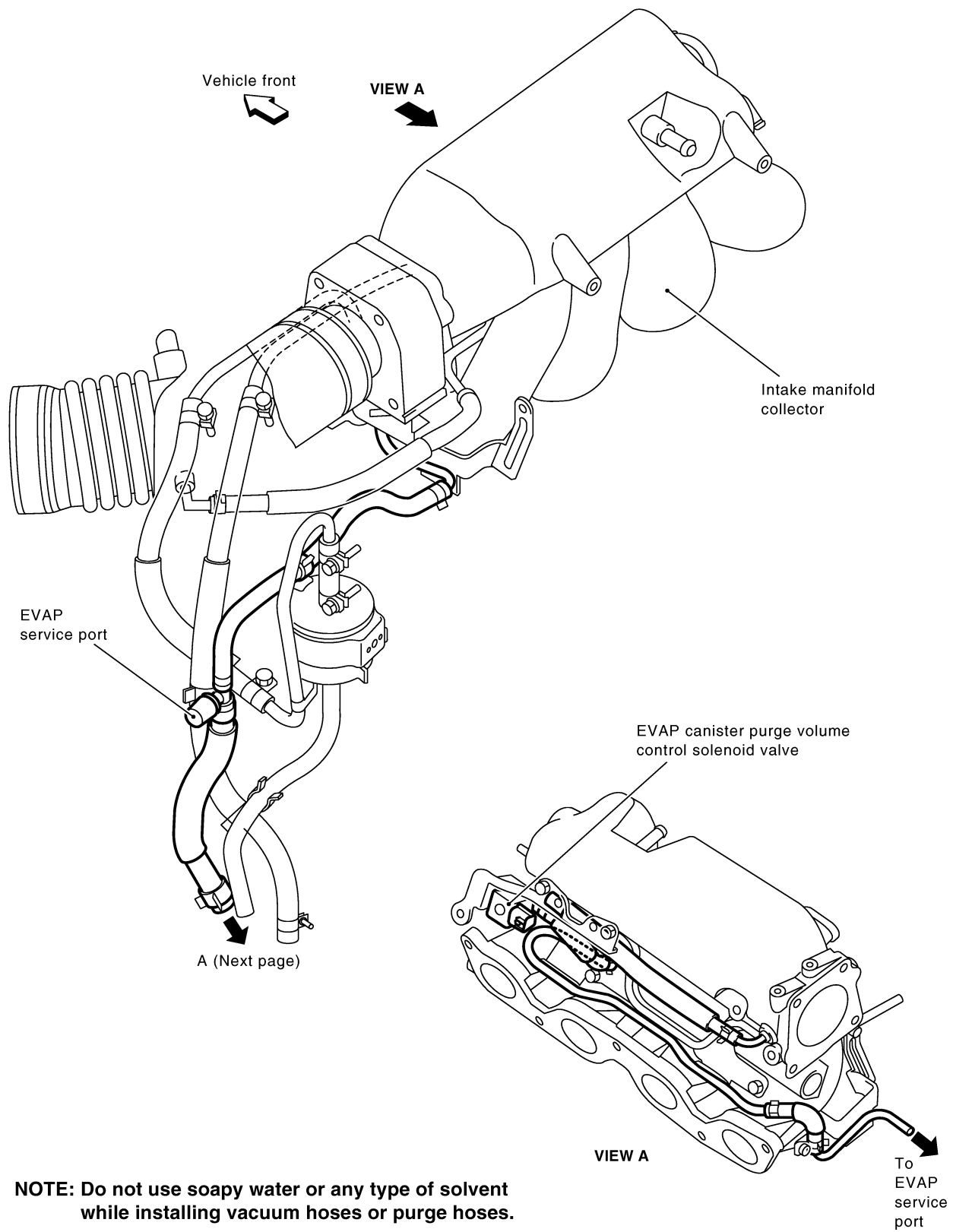
- 1) Attach the EVAP service port adapter securely to the EVAP service port and pressure pump with pressure gauge to the EVAP service port.
- 2) Apply battery voltage to between the terminals of both EVAP canister vent control valve and vacuum cut valve bypass valve to make a closed EVAP system.
- 3) To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm<sup>2</sup>, 0.2 to 0.4 psi).
- 4) Remove the EVAP service port adapter and hose with pressure pump.
- 5) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)

## EVAPORATIVE EMISSION LINE DRAWING

NCEC0020



**NOTE: Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.**

- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX

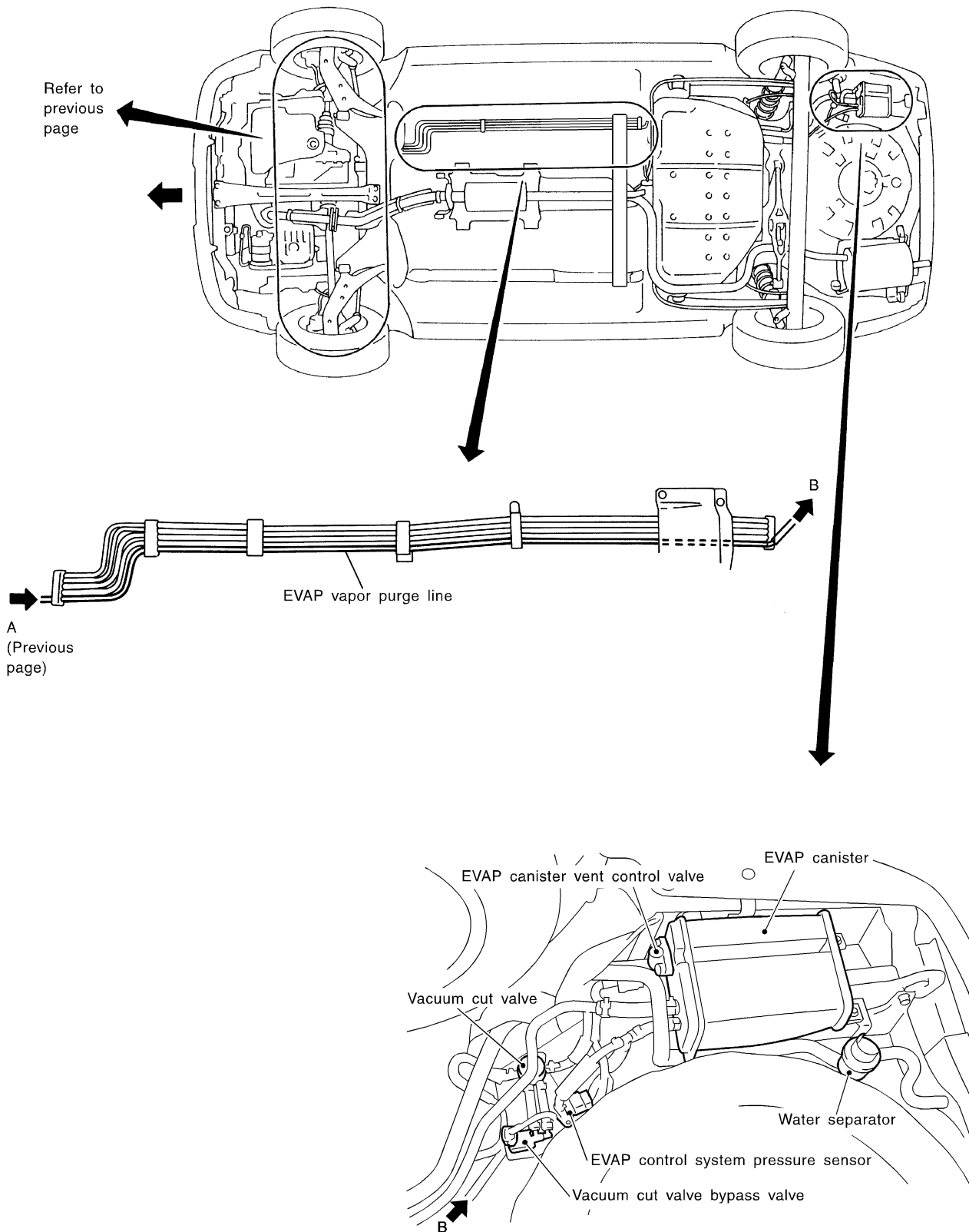
SEF915Z

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)

## NOTE:

Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.



SEF832X

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

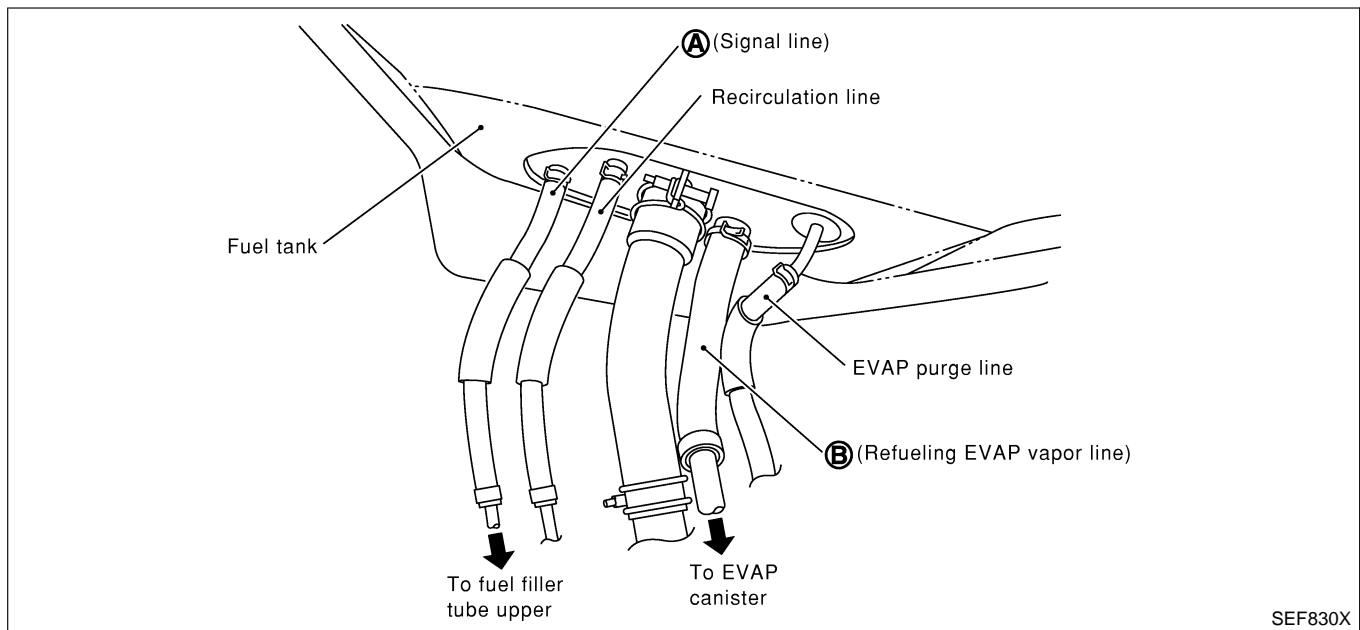
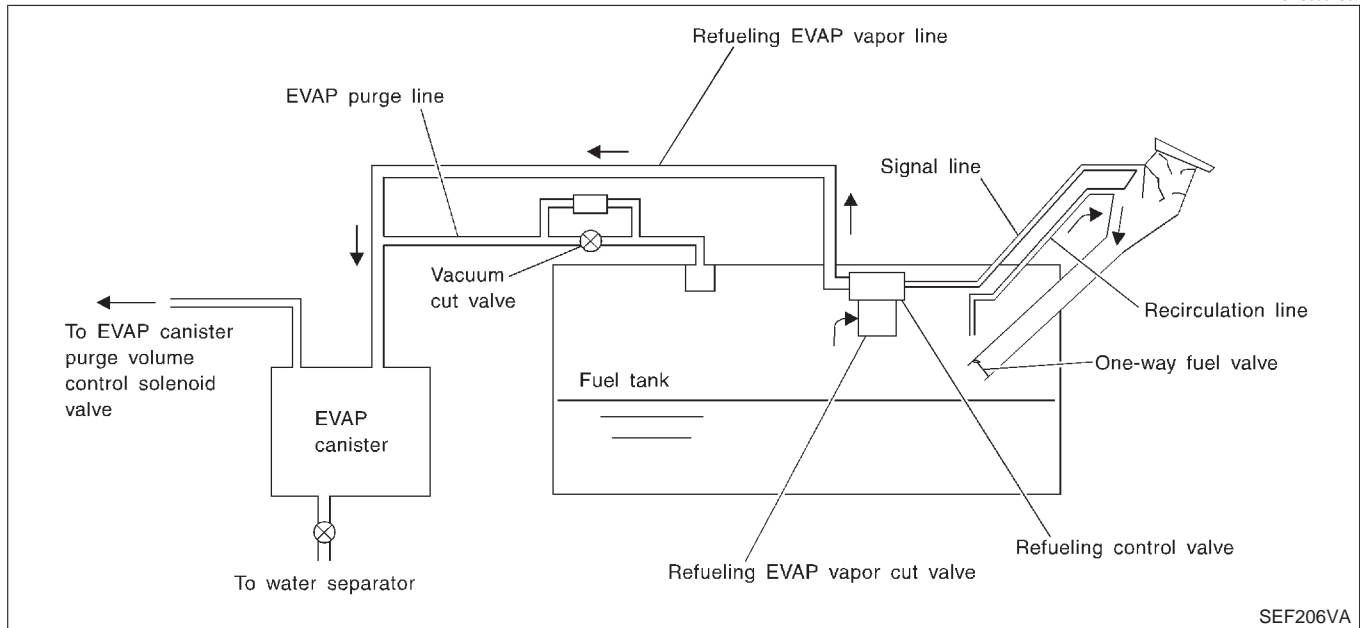
On Board Refueling Vapor Recovery (ORVR)

## On Board Refueling Vapor Recovery (ORVR)

NCEC0502

### SYSTEM DESCRIPTION

NCEC0502S01



From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and refueling vapor line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere. When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

The RCV is always closed during driving and the evaporative emission control system is operated the same as conventional system.

#### **WARNING:**

When conducting inspections below, be sure to observe the following:

- Put a "CAUTION: INFLAMMABLE" sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO<sub>2</sub> fire extinguisher.

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

## CAUTION:

- Before removing fuel line parts, carry out the following procedures:
  - a) Put drained fuel in an explosion-proof container and put lid on securely.
  - b) Release fuel pressure from fuel line. Refer to “Fuel Pressure Release”, EC-50.
  - c) Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

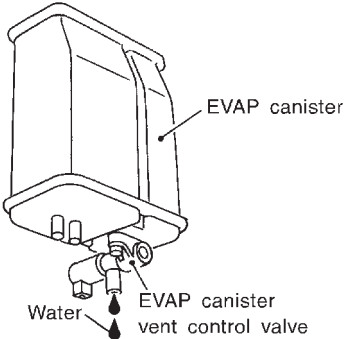
## DIAGNOSTIC PROCEDURE

Symptom: Fuel Odor from EVAP Canister Is Strong.

NCEC0502S02

NCEC0502S0201

|                                                                                                                                                                                                          |                            |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>1</b>                                                                                                                                                                                                 | <b>CHECK EVAP CANISTER</b> |          |
| 1. Remove EVAP canister with EVAP canister vent control valve attached.<br>2. Weigh the EVAP canister with EVAP canister vent control valve attached.<br>The weight should be less than 1.8 kg (4.0 lb). |                            |          |
| <b>OK or NG</b>                                                                                                                                                                                          |                            |          |
| OK                                                                                                                                                                                                       | ▶                          | GO TO 2. |
| NG                                                                                                                                                                                                       | ▶                          | GO TO 3. |

|                                                                                     |                                                    |          |
|-------------------------------------------------------------------------------------|----------------------------------------------------|----------|
| <b>2</b>                                                                            | <b>CHECK IF EVAP CANISTER SATURATED WITH WATER</b> |          |
| Does water drain from the EVAP canister?                                            |                                                    |          |
|  |                                                    |          |
| <b>Yes or No</b>                                                                    |                                                    |          |
| Yes                                                                                 | ▶                                                  | GO TO 3. |
| No (With CONSULT-II)                                                                | ▶                                                  | GO TO 6. |
| No (Without CONSULT-II)                                                             | ▶                                                  | GO TO 7. |

SEF596U

|                                       |                              |          |
|---------------------------------------|------------------------------|----------|
| <b>3</b>                              | <b>REPLACE EVAP CANISTER</b> |          |
| Replace EVAP canister with a new one. |                              |          |
|                                       | ▶                            | GO TO 4. |



# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                          |                              |                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                                                                 | <b>CHECK WATER SEPARATOR</b> |                                                                 |
| <ol style="list-style-type: none"> <li>1. Check visually for insect nests in the water separator air inlet.</li> <li>2. Check visually for cracks or flaws in the appearance.</li> <li>3. Check visually for cracks or flaws in the hose.</li> <li>4. Check that <b>A</b> and <b>C</b> are not clogged by blowing air into <b>B</b> with <b>A</b>, and then <b>C</b> plugged.</li> </ol> |                              | GI<br>MA<br>EM<br>LC<br>EC<br>FE<br>CL<br>MT                    |
| <p style="text-align: center;">* <b>A</b> : Bottom hole (To atmosphere)<br/> <b>B</b> : Emergency tube (From EVAP canister)<br/> <b>C</b> : Inlet port (To member)</p>                                                                                                                                                                                                                   |                              | SEF829T                                                         |
| <p>5. In case of NG in items 2 - 4, replace the parts.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Do not disassemble water separator.</li> </ul>                                                                                                                                                                                                                   |                              | AT<br>AX<br>SU<br>BR<br>ST<br>RS<br>BT<br>HA<br>SC<br>EL<br>IDX |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                          |                              |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                                       | ▶                            | GO TO 5.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                                                       | ▶                            | Replace water separator.                                        |

|                                                                                                |                                   |                              |
|------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------|
| <b>5</b>                                                                                       | <b>DETECT MALFUNCTIONING PART</b> |                              |
| Check the EVAP hose between EVAP canister and water separator for clogging or poor connection. |                                   |                              |
|                                                                                                | ▶                                 | Repair or replace EVAP hose. |

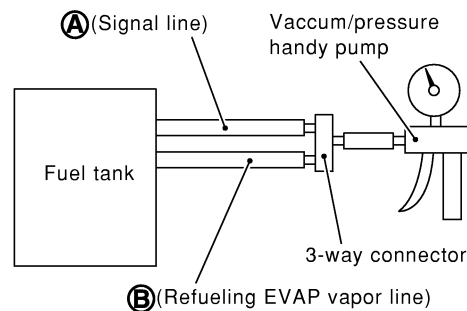
# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

## 6 CHECK REFUELING EVAP VAPOR CUT VALVE

### Ⓟ With CONSULT-II

1. Remove fuel tank. Refer to FE-5, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:
  - a. Remove fuel feed hose located on the fuel level sensor unit retainer.
  - b. Connect a spare fuel hose, one side to fuel level sensor unit retainer where the hose was removed and the other side to a fuel container.
  - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.  
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows:
  - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
  - b. Remove fuel gauge retainer with fuel level sensor unit.  
**Always replace O-ring with new one.**
  - c. Put fuel tank upside down.
  - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.



SEF968X

OK or NG

|    |   |                                                        |
|----|---|--------------------------------------------------------|
| OK | ▶ | GO TO 8.                                               |
| NG | ▶ | Replace refueling EVAP vapor cut valve with fuel tank. |

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CHECK REFUELING EVAP VAPOR CUT VALVE                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <p>⊗ <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Remove fuel tank. Refer to FE-5, "FUEL SYSTEM".</li> <li>2. Drain fuel from the tank as follows:               <ol style="list-style-type: none"> <li>a. Remove fuel level sensor unit retainer.</li> <li>b. Drain fuel from the tank using a hand pump into a fuel container.</li> </ol> </li> <li>3. Check refueling EVAP vapor cut valve for being stuck to close as follows.<br/>Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.</li> <li>4. Check EVAP vapor cut valve for being stuck to open as follows.               <ol style="list-style-type: none"> <li>a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.</li> <li>b. Remove fuel level sensor unit retainer with fuel level sensor unit.<br/><b>Always replace O-ring with new one.</b></li> <li>c. Put fuel tank upside down.</li> <li>d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.</li> </ol> </li> </ol> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF968X</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                          |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 8.                                               |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ Replace refueling EVAP vapor cut valve with fuel tank. |

| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CHECK REFUELING CONTROL VALVE                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Remove fuel filler cap.</li> <li>2. Check air continuity between hose ends A and B.<br/>Blow air into the hose end B. Air should flow freely into the fuel tank.</li> <li>3. Blow air into hose end A and check there is no leakage.</li> <li>4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.</li> </ol> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF968X</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                   |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶ <b>INSPECTION END</b>                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶ Replace refueling control valve with fuel tank. |

GI  
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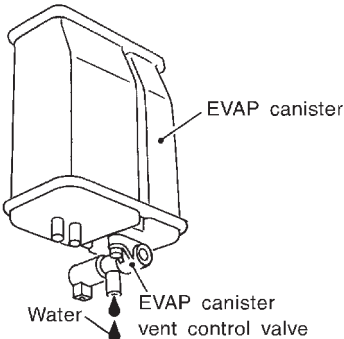
# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

**Symptom: Cannot Refuel/Fuel Odor From The Fuel Filler Opening Is Strong While Refueling.**

NCEC0502S0202

|                                                                                                                                                                                                                                                                                                        |                            |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>1</b>                                                                                                                                                                                                                                                                                               | <b>CHECK EVAP CANISTER</b> |          |
| <p>1. Remove EVAP canister with EVAP canister vent control valve attached.<br/>                 2. Weigh the EVAP canister with EVAP canister vent control valve attached.<br/>                 The weight should be less than 1.8 kg (4.0 lb).</p> <p style="text-align: center;"><b>OK or NG</b></p> |                            |          |
| OK                                                                                                                                                                                                                                                                                                     | ▶                          | GO TO 2. |
| NG                                                                                                                                                                                                                                                                                                     | ▶                          | GO TO 3. |

|                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------|
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>CHECK IF EVAP CANISTER SATURATED WITH WATER</b> |          |
| <p>Does water drain from the EVAP canister?</p> <div style="text-align: center;">  <p style="text-align: right; margin-right: 50px;">EVAP canister</p> <p style="text-align: center;">EVAP canister<br/>vent control valve</p> </div> <p style="text-align: right; margin-right: 50px;">SEF596U</p> <p style="text-align: center;"><b>Yes or No</b></p> |                                                    |          |
| Yes                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                                                  | GO TO 3. |
| No                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶                                                  | GO TO 6. |

|                                              |                              |          |
|----------------------------------------------|------------------------------|----------|
| <b>3</b>                                     | <b>REPLACE EVAP CANISTER</b> |          |
| <p>Replace EVAP canister with a new one.</p> |                              |          |
|                                              | ▶                            | GO TO 4. |

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                   |                              |                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                                                          | <b>CHECK WATER SEPARATOR</b> |                          |
| <p>1. Check visually for insect nests in the water separator air inlet.<br/>                 2. Check visually for cracks or flaws in the appearance.<br/>                 3. Check visually for cracks or flaws in the hose.<br/>                 4. Check that <b>A</b> and <b>C</b> are not clogged by blowing air into <b>B</b> with <b>A</b>, and then <b>C</b> plugged.</p> |                              |                          |
|                                                                                                                                                                                                                                                                                                                                                                                   |                              |                          |
| <p>* <b>(A)</b> : Bottom hole (To atmosphere)<br/> <b>(B)</b> : Emergency tube (From EVAP canister)<br/> <b>(C)</b> : Inlet port (To member)</p>                                                                                                                                                                                                                                  |                              |                          |
| SEF829T                                                                                                                                                                                                                                                                                                                                                                           |                              |                          |
| <p>5. In case of NG in items 2 - 4, replace the parts.<br/> <b>NOTE:</b><br/>                 • Do not disassemble water separator.</p>                                                                                                                                                                                                                                           |                              |                          |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                   |                              |                          |
| OK                                                                                                                                                                                                                                                                                                                                                                                | ▶                            | GO TO 5.                 |
| NG                                                                                                                                                                                                                                                                                                                                                                                | ▶                            | Replace water separator. |

|                                                                                                |                                   |  |
|------------------------------------------------------------------------------------------------|-----------------------------------|--|
| <b>5</b>                                                                                       | <b>DETECT MALFUNCTIONING PART</b> |  |
| Check the EVAP hose between EVAP canister and water separator for clogging or poor connection. |                                   |  |
| ▶ Repair or replace EVAP hose.                                                                 |                                   |  |

|                                                                                                                                |                                        |                                    |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------|
| <b>6</b>                                                                                                                       | <b>CHECK VENT HOSES AND VENT TUBES</b> |                                    |
| Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection. |                                        |                                    |
| <b>OK or NG</b>                                                                                                                |                                        |                                    |
| OK                                                                                                                             | ▶                                      | GO TO 7.                           |
| NG                                                                                                                             | ▶                                      | Repair or replace hoses and tubes. |

|                                                                          |                               |                           |
|--------------------------------------------------------------------------|-------------------------------|---------------------------|
| <b>7</b>                                                                 | <b>CHECK FILLER NECK TUBE</b> |                           |
| Check signal line and recirculation line for clogging, dents and cracks. |                               |                           |
| <b>OK or NG</b>                                                          |                               |                           |
| OK                                                                       | ▶                             | GO TO 8.                  |
| NG                                                                       | ▶                             | Replace filler neck tube. |

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# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   | CHECK REFUELING CONTROL VALVE                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Remove fuel filler cap.</li> <li>2. Check air continuity between hose ends A and B.<br/>Blow air into the hose end B. Air should flow freely into the fuel tank.</li> <li>3. Blow air into hose end A and check there is no leakage.</li> <li>4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.</li> </ol> |   |                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |                                                 |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |                                                 |
| OK (With CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶ | GO TO 9.                                        |
| OK (Without CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                                                                                             | ▶ | GO TO 10.                                       |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶ | Replace refueling control valve with fuel tank. |

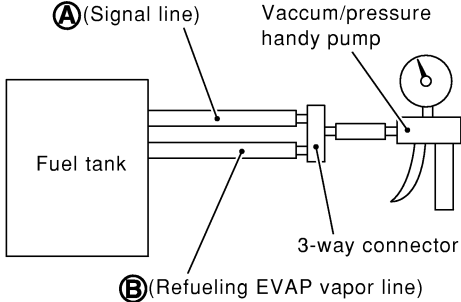
SEF968X

| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   | CHECK REFUELING EVAP VAPOR CUT VALVE                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------------------------------|
| <p><b>(B) With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Remove fuel tank. Refer to FE-5, "FUEL SYSTEM".</li> <li>2. Drain fuel from the tank as follows: <ol style="list-style-type: none"> <li>a. Remove fuel feed hose located on the fuel level sensor unit retainer.</li> <li>b. Connect a spare fuel hose, one side to fuel level sensor unit retainer where the hose was removed and the other side to a fuel container.</li> <li>c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.</li> </ol> </li> <li>3. Check refueling EVAP vapor cut valve for being stuck to close as follows.<br/>Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.</li> <li>4. Check EVAP vapor cut valve for being stuck to open as follows. <ol style="list-style-type: none"> <li>a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.</li> <li>b. Remove fuel level sensor unit retainer with fuel level sensor unit.<br/><b>Always replace O-ring with new one.</b></li> <li>c. Put fuel tank upside down.</li> <li>d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.</li> </ol> </li> </ol> |   |                                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |                                                        |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |                                                        |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶ | GO TO 11.                                              |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶ | Replace refueling EVAP vapor cut valve with fuel tank. |

SEF968X

# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CHECK REFUELING EVAP VAPOR CUT VALVE                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <p>⊗ <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Remove fuel tank. Refer to FE-5, "FUEL SYSTEM".</li> <li>2. Drain fuel from the tank as follows:               <ol style="list-style-type: none"> <li>a. Remove fuel level sensor unit retainer.</li> <li>b. Drain fuel from the tank using a hand pump into a fuel container.</li> </ol> </li> <li>3. Check refueling EVAP vapor cut valve for being stuck to close as follows.<br/>Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.</li> <li>4. Check EVAP vapor cut valve for being stuck to open as follows:               <ol style="list-style-type: none"> <li>a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.</li> <li>b. Remove fuel level sensor unit retainer with fuel level sensor unit.<br/><b>Always replace O-ring with new one.</b></li> <li>c. Put fuel tank upside down.</li> <li>d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.</li> </ol> </li> </ol> |                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                          |
| <p><b>OK or NG</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                          |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶ GO TO 11.                                              |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶ Replace refueling EVAP vapor cut valve with fuel tank. |

SEF968X

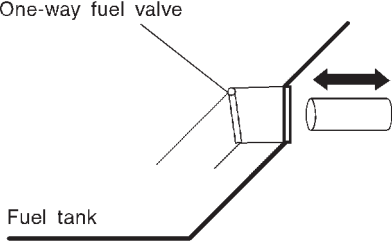
| 11                                                                                                | CHECK FUEL FILLER TUBE      |
|---------------------------------------------------------------------------------------------------|-----------------------------|
| <p>Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.</p> |                             |
| <p><b>OK or NG</b></p>                                                                            |                             |
| OK                                                                                                | ▶ GO TO 12.                 |
| NG                                                                                                | ▶ Replace fuel filler tube. |

| 12                                       | CHECK ONE-WAY FUEL VALVE-I                             |
|------------------------------------------|--------------------------------------------------------|
| <p>Check one-way valve for clogging.</p> |                                                        |
| <p><b>OK or NG</b></p>                   |                                                        |
| OK                                       | ▶ GO TO 13.                                            |
| NG                                       | ▶ Repair or replace one-way fuel valve with fuel tank. |

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# ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

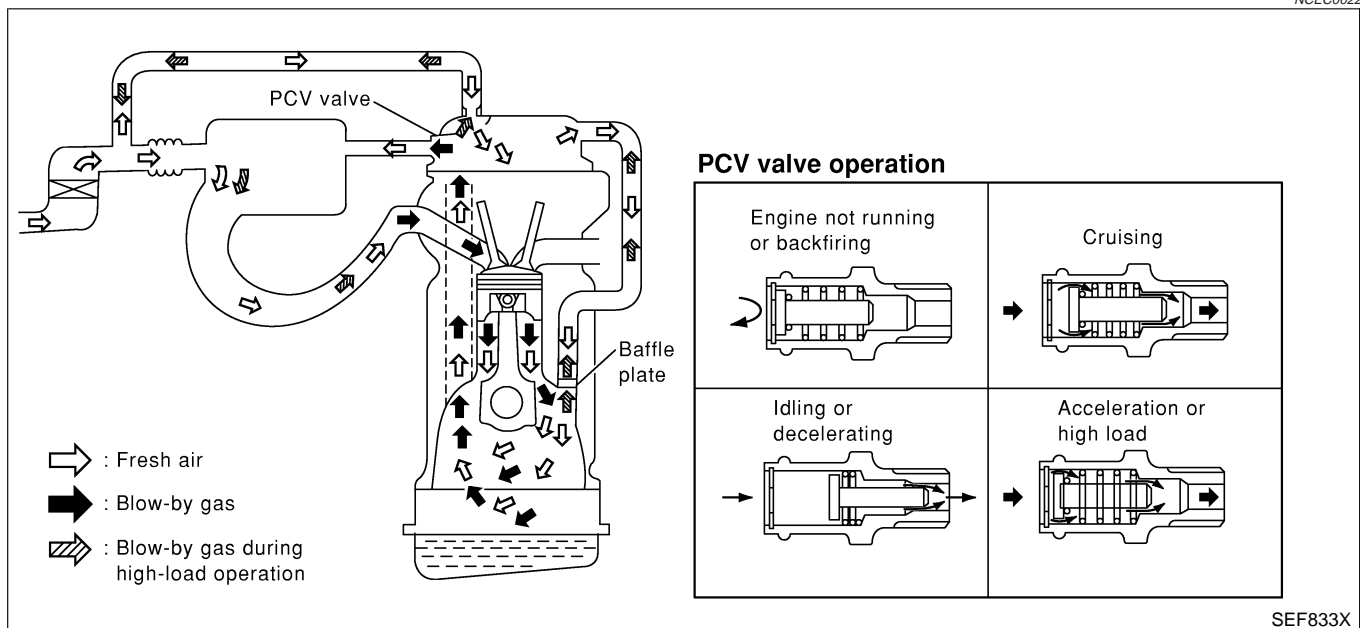
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>13</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>CHECK ONE-WAY FUEL VALVE-II</b>                                       |
| <p>1. Make sure that fuel is drained from the tank.<br/>                 2. Remove fuel filler tube and hose.<br/>                 3. Check one-way fuel valve for operation as follows.<br/>                 When a stick is inserted, the valve should open, when removing stick it should close.</p> <p style="text-align: center;">After removing filler tube</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF665U</p> |                                                                          |
| <b>Do not drop any material into the tank.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                          |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                          |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶ <b>INSPECTION END</b>                                                  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶ Replace fuel filler tube or replace one-way fuel valve with fuel tank. |

## Positive Crankcase Ventilation

### DESCRIPTION

NCEC0022



This system returns blow-by gas to the intake collector.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

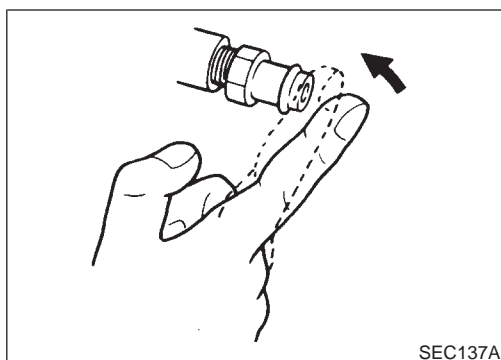
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is then drawn from the air duct into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the intake collector under all conditions.





## INSPECTION

### PCV (Positive Crankcase Ventilation) Valve

NCEC0023

NCEC0023S01

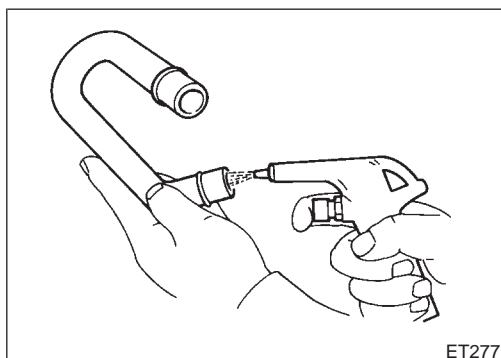
With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over the valve inlet.

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### Ventilation Hose

NCEC0023S02

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.

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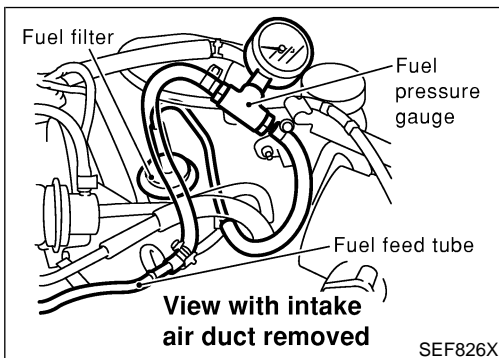
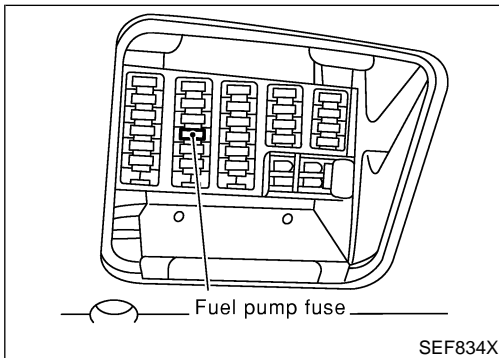
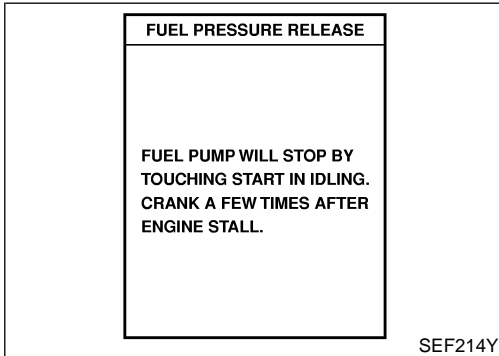
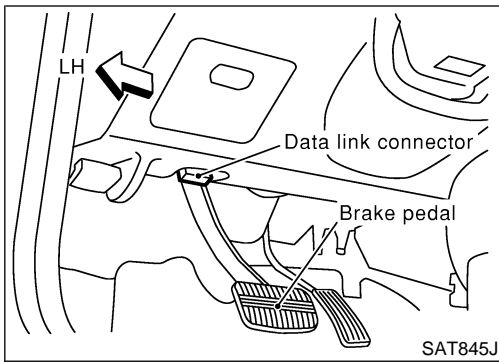
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# BASIC SERVICE PROCEDURE

## Fuel Pressure Release



## Fuel Pressure Release

NCEC0024

**Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.**

### WITH CONSULT-II

NCEC0024S01

1. Start engine.
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-II.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.

### WITHOUT CONSULT-II

NCEC0024S02

1. Remove fuse for fuel pump.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF and reconnect fuel pump fuse.

## Fuel Pressure Check

NCEC0025

- When reconnecting fuel line, always use new clamps.
- Make sure that clamp screw does not contact adjacent parts.
- Use a torque driver to tighten clamps.
- Use Pressure Gauge to check fuel pressure.
- Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.

1. Release fuel pressure to zero.
2. Disconnect fuel hose from fuel feed tube (engine side).
3. Install pressure gauge between fuel hose and fuel feed tube.
4. Start engine and check for fuel leakage.
5. Read the indication of fuel pressure gauge.

### At idle speed:

With vacuum hose connected

Approximately 235 kPa (2.4 kg/cm<sup>2</sup>, 34 psi)

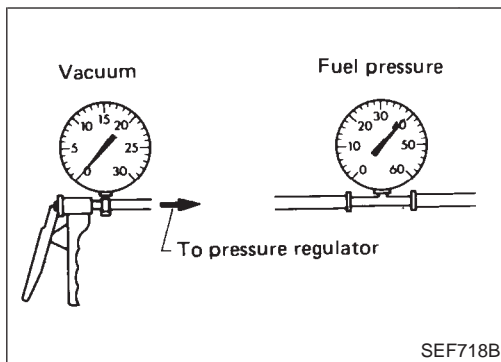
With vacuum hose disconnected

Approximately 294 kPa (3.0 kg/cm<sup>2</sup>, 43 psi)

If results are unsatisfactory, perform Fuel Pressure Regulator Check, EC-51.

# BASIC SERVICE PROCEDURE

Fuel Pressure Regulator Check



## Fuel Pressure Regulator Check

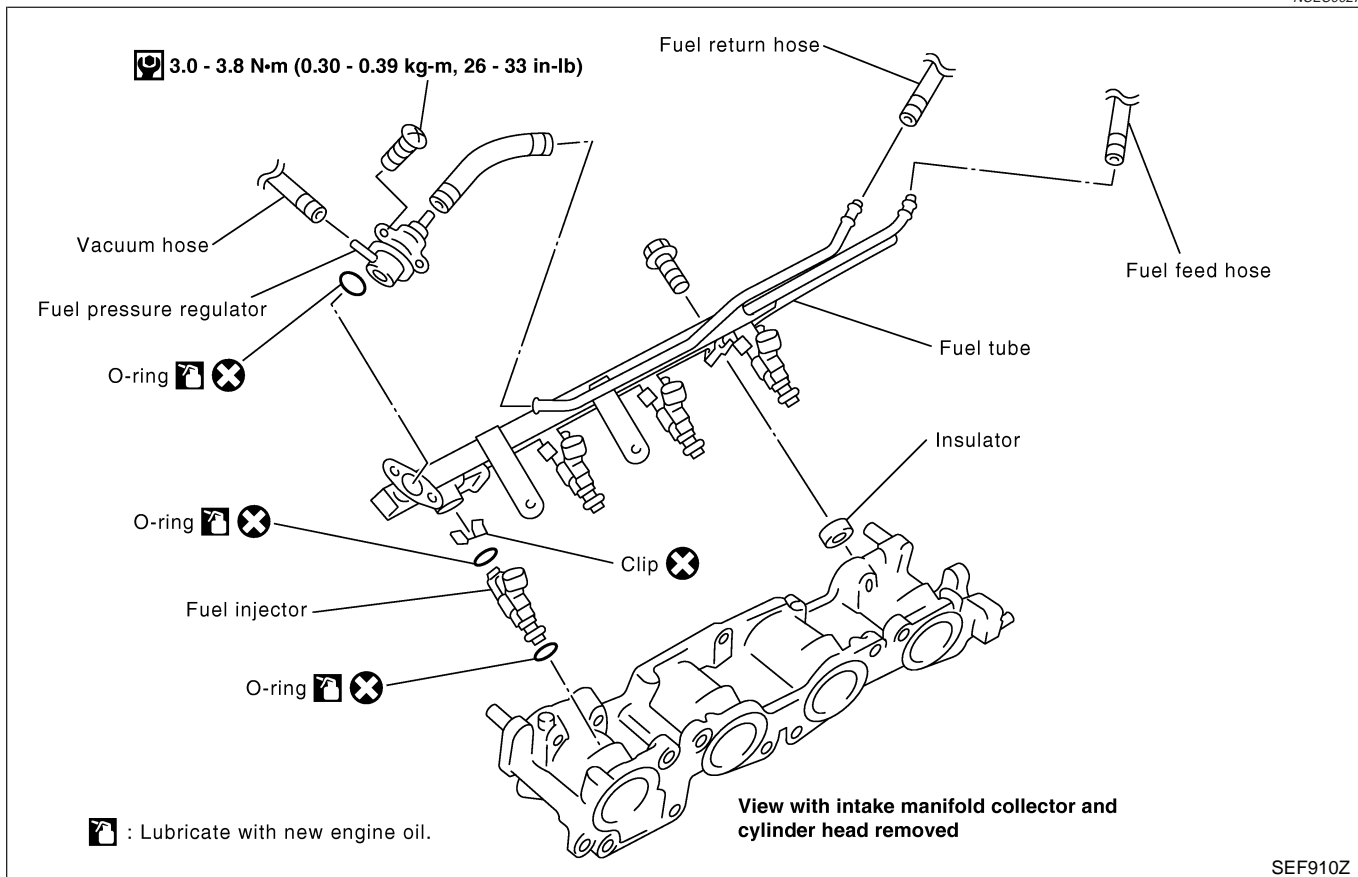
NCEC0026

1. Stop engine and disconnect fuel pressure regulator vacuum hose from intake manifold collector.
2. Plug intake manifold collector with a rubber cap.
3. Connect variable vacuum source to fuel pressure regulator.
4. Start engine and read indication of fuel pressure gauge as vacuum is changed.

**Fuel pressure should decrease as vacuum increases. If results are unsatisfactory, replace fuel pressure regulator.**

## Injector REMOVAL AND INSTALLATION

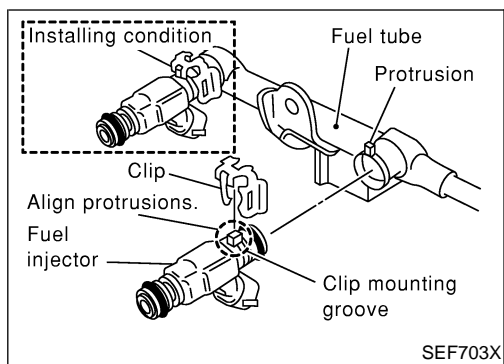
NCEC0027



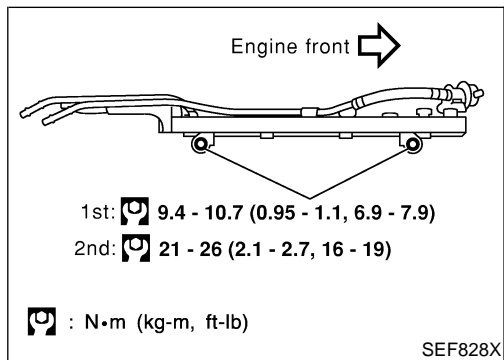
1. Release fuel pressure to zero.
2. Remove accelerator wire bracket.
3. Remove EVAP canister purge volume control solenoid valve and the bracket.
4. Remove ventilation hose.
5. Disconnect injector harness connectors.
6. Disconnect fuel pressure regulator vacuum hose from intake manifold collector.
7. Disconnect fuel hoses from fuel tube assembly.
8. Remove injectors with fuel tube assembly.

# BASIC SERVICE PROCEDURE

## Injector (Cont'd)



9. Expand and remove clips securing fuel injectors.
10. Extract fuel injectors straight from fuel tubes.
  - **Be careful not to damage injector nozzles during removal.**
  - **Do not bump or drop fuel injectors.**
11. Carefully install O-rings, including the one used with the pressure regulator.
  - **Lubricate O-rings with a smear of engine oil.**
  - **Be careful not to damage O-rings with service tools or finger nails or clips. Do not expand or twist O-rings.**
  - **Discard old clips; replace with new ones.**
12. Position clips in grooves on fuel injectors.
  - **Make sure that protrusions of fuel injectors are aligned with cutouts of clips after installation.**
13. Align protrusions of fuel tubes with those of fuel injectors.
14. After properly inserting fuel injectors, check to make sure that fuel tube protrusions are engaged with those of fuel injectors, and that flanges of fuel tubes are engaged with clips.



15. Tighten fuel tube assembly mounting nuts in two stages.

: Tightening torque N·m (kg-m, ft-lb)

1st stage:

9.4 - 10.7 (0.95 - 1.1, 6.9 - 7.9)

2nd stage:

21 - 26 (2.1 - 2.7, 16 - 19)

16. Install all removed parts in the reverse order of removal.

### CAUTION:

After properly connecting fuel tube assembly to injector and fuel hose, check connection for fuel leakage.

# BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

## Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

=NCEC0028

NCEC0028S01

### PREPARATION

- Make sure that the following parts are in good order.
- a) Battery
- b) Ignition system
- c) Engine oil and coolant levels
- d) Fuses
- e) ECM harness connector
- f) Vacuum hoses
- g) Air intake system  
(Oil filler cap, oil level gauge, etc.)
- h) Fuel pressure
- i) Engine compression
- j) EGR valve operation
- k) Throttle valve
- l) EVAP system
- On models equipped with air conditioner, checks should be carried out while the air conditioner is "OFF".
- On models equipped with automatic transaxle, when checking idle speed, ignition timing and mixture ratio, checks should be carried out while shift lever is in "P" or "N" position.
- When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
- Turn off headlamps, heater blower, rear window defogger.
- Keep front wheels pointed straight ahead.
- Make the check after the cooling fan has stopped.

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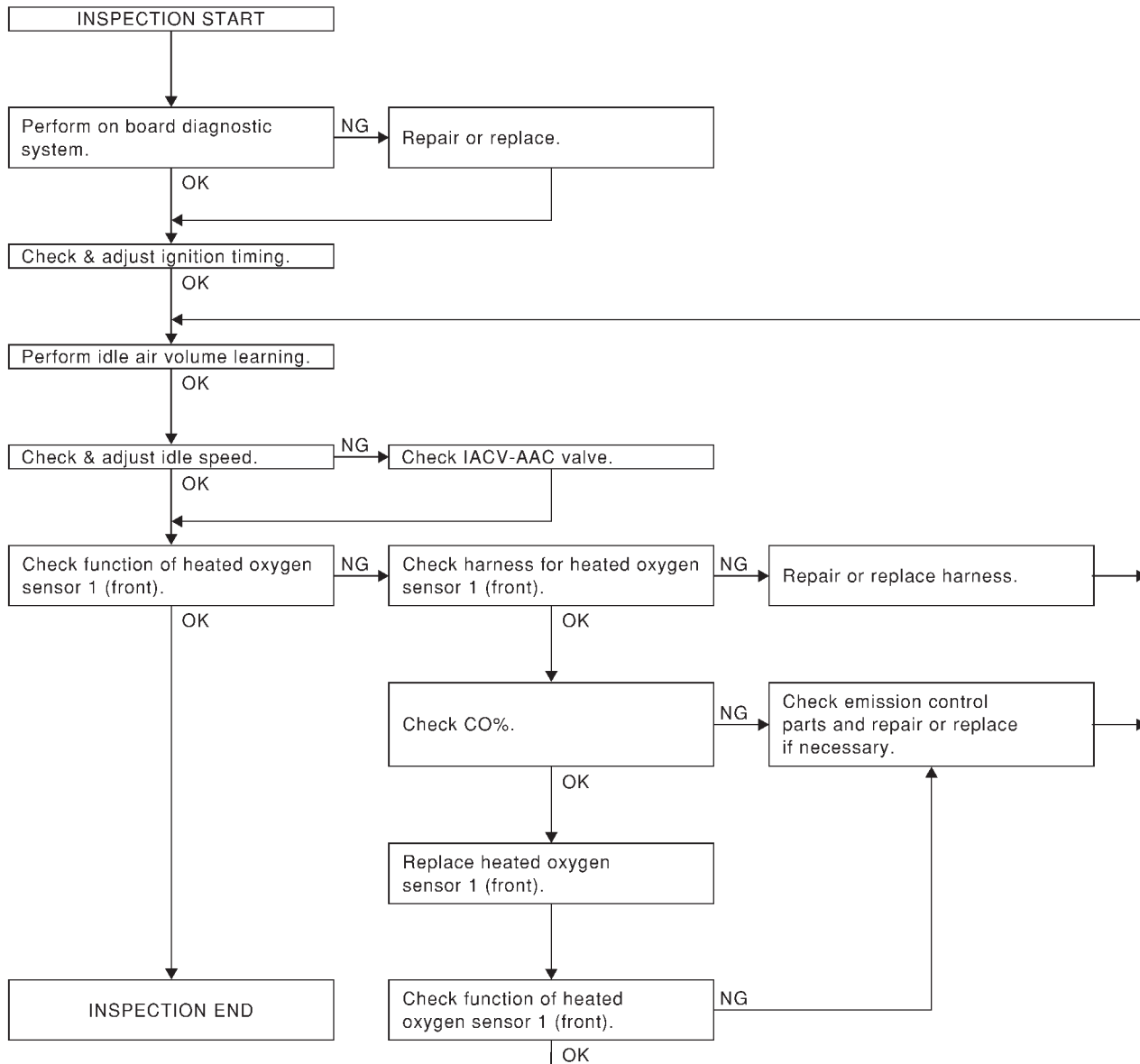
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# BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

## Overall Inspection Sequence

NCEC0028S0101



SEF906XA

# BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

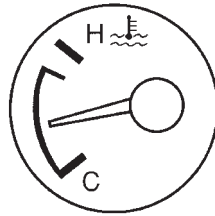
## INSPECTION PROCEDURE

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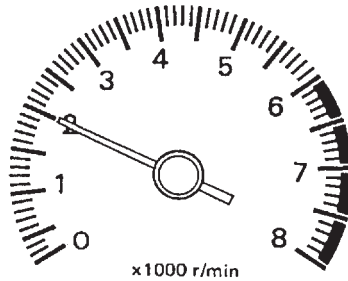
### 1 INSPECTION START

1. Visually check the following:
  - Air cleaner clogging
  - Hoses and ducts for leaks
  - EGR valve operation
  - Electrical connectors
  - Gasket
  - Throttle valve and throttle position sensor operation
2. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge. Ensure engine stays below 1,000 rpm.



AEC692

3. Open engine hood and run engine at about 2,000 rpm for about 2 minutes under no-load.



SEF977U

4. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

|                         |   |          |
|-------------------------|---|----------|
| OK (With CONSULT-II)    | ▶ | GO TO 3. |
| OK (Without CONSULT-II) | ▶ | GO TO 4. |
| NG                      | ▶ | GO TO 2. |

### 2 REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding "Diagnostic Procedure".

|                    |   |          |
|--------------------|---|----------|
| With CONSULT-II    | ▶ | GO TO 3. |
| Without CONSULT-II | ▶ | GO TO 4. |

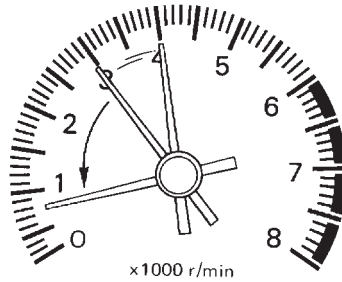
# BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

## 3 CHECK IGNITION TIMING

 With CONSULT-II

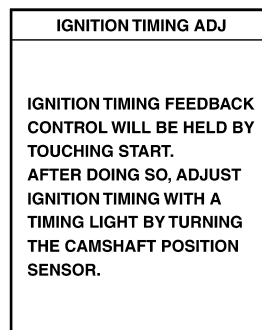
1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



x1000 r/min

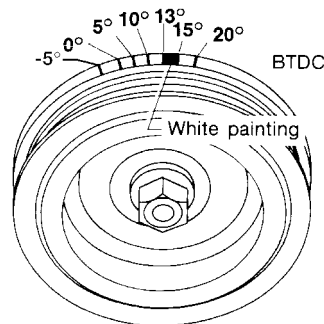
SEF978U

3. Select "IGNITION TIMING ADJ" in WORK SUPPORT mode.
4. Touch "START".



PEF546N

5. Start and rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run at idle speed.
6. Check ignition timing with a timing light.



AEC804

**M/T: 15°±2° BTDC**

**A/T: 15°±2° BTDC (in "P" or "N" position)**

**OK or NG**

|    |   |          |
|----|---|----------|
| OK | ▶ | GO TO 6. |
| NG | ▶ | GO TO 5. |



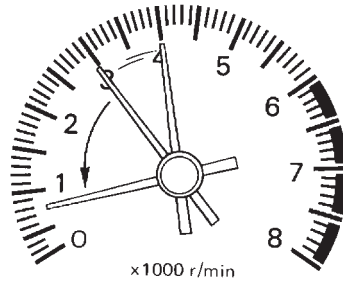
# BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

## 4 CHECK IGNITION TIMING

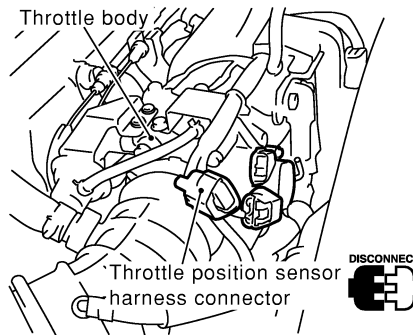
⊗ Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



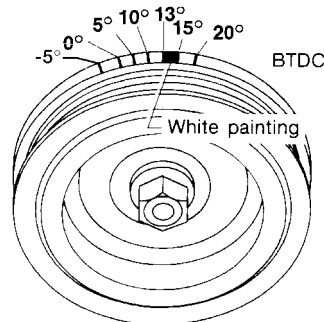
SEF978U

3. Turn off engine and disconnect throttle position sensor harness connector.



SEF863X

4. Start and rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run at idle speed.
5. Check ignition timing with a timing light.



AEC804

**M/T: 15°±2° BTDC**

**A/T: 15°±2° BTDC (in "P" or "N" position)**



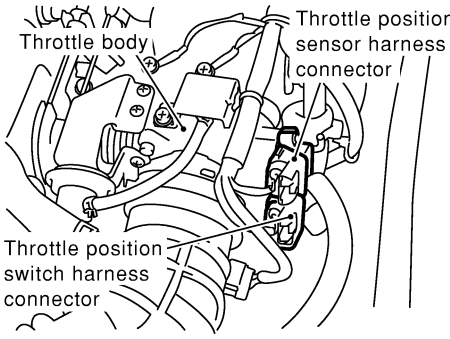
OK or NG



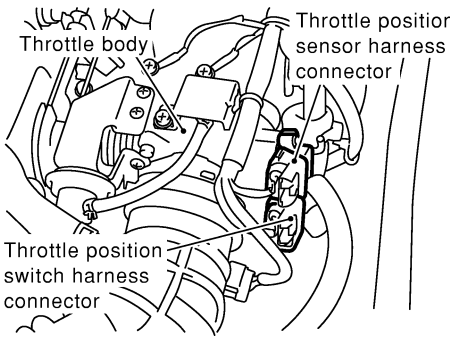
|    |   |          |
|----|---|----------|
| OK | ▶ | GO TO 6. |
| NG | ▶ | GO TO 5. |

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IDX

# BASIC SERVICE PROCEDURE



Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

|                                                                                                                                                                                                             |                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                    | <b>ADJUST IGNITION TIMING</b>                                                                                                                                                                                                     |
|  <b>With CONSULT-II</b>                                                                                                    | 1. Adjust ignition timing to the specified value by turning distributor after loosening bolts which secure distributor.                                                                                                           |
|  <b>Without CONSULT-II</b>                                                                                                 | 1. Adjust ignition timing to the specified value by turning distributor after loosening bolts which secure distributor.<br>2. Turn off engine and connect throttle position sensor harness connector to throttle position sensor. |
|  <p>Throttle body</p> <p>Throttle position sensor harness connector</p> <p>Throttle position switch harness connector</p> |                                                                                                                                                                                                                                   |
| SEF837X                                                                                                                                                                                                     |                                                                                                                                                                                                                                   |
| With CONSULT-II                                                                                                                                                                                             | ▶ GO TO 3.                                                                                                                                                                                                                        |
| Without CONSULT-II                                                                                                                                                                                          | ▶ GO TO 4.                                                                                                                                                                                                                        |

|                                                                                                                                                                                                               |                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>6</b>                                                                                                                                                                                                      | <b>PERFORM IDLE AIR VOLUME LEARNING</b>                                                                                                                    |
|  <b>With CONSULT-II</b>                                                                                                      | 1. Start and rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run it at idle speed.<br>2. Perform "Idle Air Volume Learning", EC-65. |
|  <b>Without CONSULT-II</b>                                                                                                 | 1. Turn off engine and connect throttle position sensor harness connector.                                                                                 |
|  <p>Throttle body</p> <p>Throttle position sensor harness connector</p> <p>Throttle position switch harness connector</p> |                                                                                                                                                            |
| SEF837X                                                                                                                                                                                                       |                                                                                                                                                            |
|                                                                                                                                                                                                               | ▶ GO TO 7.                                                                                                                                                 |

# BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)


| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CHECK TARGET IDLE SPEED |              |  |         |        |           |         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------|--|---------|--------|-----------|---------|
| <p> <b>With CONSULT-II</b><br/>                     1. Read idle speed in "DATA MONITOR" mode with CONSULT-II.</p> <div style="text-align: center; border: 1px solid black; width: fit-content; margin: 10px auto; padding: 5px;"> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th style="width: 50%;">MONITOR</th> <th style="width: 50%;">NO DTC</th> </tr> </thead> <tbody> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> </tbody> </table> </div> <p style="text-align: right; margin-top: 20px;">SEF058Y</p> <p style="margin-top: 10px;"><b>M/T: 800±50 rpm</b><br/> <b>A/T: 800±50 rpm (in "P" or "N" position)</b></p> |                         | DATA MONITOR |  | MONITOR | NO DTC | ENG SPEED | XXX rpm |
| DATA MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                         |              |  |         |        |           |         |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | NO DTC                  |              |  |         |        |           |         |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | XXX rpm                 |              |  |         |        |           |         |
| <p> <b>Without CONSULT-II</b><br/>                     1. Check idle speed.</p> <p style="margin-left: 20px;"><b>M/T: 800±50 rpm</b><br/> <b>A/T: 800±50 rpm (in "P" or "N" position)</b></p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>                                                                                                                                                                                                                                                                                                                                                                                                                                         |                         |              |  |         |        |           |         |
| OK (With CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶ GO TO 9.              |              |  |         |        |           |         |
| OK (Without CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ GO TO 10.             |              |  |         |        |           |         |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ GO TO 8.              |              |  |         |        |           |         |


| 8                                                                                                                                                                                                                                                                                                                                                                                                  | DETECT MALFUNCTIONING PART |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Check IACV-AAC valve and replace if necessary. Refer to EC-423.</li> <li>● Check IACV-AAC valve harness and repair if necessary. Refer to EC-423.</li> <li>● Check ECM function by substituting another known-good ECM.<br/>                     (ECM may be the cause of a problem, but this is rarely the case.)</li> </ul> |                            |
| With CONSULT-II                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 9.                 |
| Without CONSULT-II                                                                                                                                                                                                                                                                                                                                                                                 | ▶ GO TO 10.                |

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# BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

| 9                                                                                                                                                                                                                                                                                                                                                                                                                               | CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL |              |  |         |        |           |         |                 |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------|--|---------|--------|-----------|---------|-----------------|------|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode.</li> <li>Maintaining engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.</li> </ol> |                                             |              |  |         |        |           |         |                 |      |
| <table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>RICH</td> </tr> </tbody> </table>                                                                                                                                                   |                                             | DATA MONITOR |  | MONITOR | NO DTC | ENG SPEED | XXX rpm | HO2S1 MNTR (B1) | RICH |
| DATA MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                    |                                             |              |  |         |        |           |         |                 |      |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                         | NO DTC                                      |              |  |         |        |           |         |                 |      |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                       | XXX rpm                                     |              |  |         |        |           |         |                 |      |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                 | RICH                                        |              |  |         |        |           |         |                 |      |
| SEF820Y                                                                                                                                                                                                                                                                                                                                                                                                                         |                                             |              |  |         |        |           |         |                 |      |
| <p><b>1 time: RICH → LEAN → RICH</b><br/> <b>2 times: RICH → LEAN → RICH → LEAN → RICH</b></p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                                                                                                               |                                             |              |  |         |        |           |         |                 |      |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ <b>INSPECTION END</b>                     |              |  |         |        |           |         |                 |      |
| NG (Monitor does not fluctuate.)                                                                                                                                                                                                                                                                                                                                                                                                | ▶ GO TO 13.                                 |              |  |         |        |           |         |                 |      |
| NG (Monitor fluctuates less than 5 times.)                                                                                                                                                                                                                                                                                                                                                                                      | ▶ GO TO 11.                                 |              |  |         |        |           |         |                 |      |

| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <p> <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Set voltmeter probe between ECM terminal 62 and ground.</li> <li>Make sure that the voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm.</li> </ol> <p><b>1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</b><br/> <b>2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</b></p> <p style="text-align: center;"><b>OK or NG</b></p> |                                             |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶ <b>INSPECTION END</b>                     |
| NG (Voltage does not fluctuate.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶ GO TO 13.                                 |
| NG (Voltage fluctuates less than 5 times.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ GO TO 11.                                 |

# BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                    |                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------|
| <b>11</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL</b> |                         |
| <p><b>Ⓟ With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Stop engine.</li> <li>Replace heated oxygen sensor 1 (front).</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load.</li> <li>See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode.</li> <li>Maintaining engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.<br/> <b>1 time: RICH → LEAN → RICH</b><br/> <b>2 times: RICH → LEAN → RICH → LEAN → RICH</b></li> </ol>                        |                                                    |                         |
| <p><b>ⓧ Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Stop engine.</li> <li>Replace heated oxygen sensor 1 (front).</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load.</li> <li>Set voltmeter probe between ECM terminal 62 and ground.</li> <li>Make sure that the voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm.<br/> <b>1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</b><br/> <b>2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</b></li> </ol> <p style="text-align: center;"><b>OK or NG</b></p> |                                                    |                         |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                    | ▶ <b>INSPECTION END</b> |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                    | ▶ GO TO 12.             |

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                   |            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------|
| <b>12</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>DETECT MALFUNCTIONING PART</b> |            |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Check fuel pressure regulator. Refer to EC-51.</li> <li>● Check mass air flow sensor and its circuit. Refer to EC-154.</li> <li>● Check injector and its circuit. Refer to EC-574.<br/>Clean or replace if necessary.</li> <li>● Check engine coolant temperature sensor and its circuit. Refer to EC-171.</li> <li>● Check ECM function by substituting another known-good ECM.<br/>(ECM may be the cause of a problem, but this is rarely the case.)</li> </ul> |                                   |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                   | ▶ GO TO 6. |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------|
| <b>13</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>CHECK HEATED OXYGEN SENSOR 1 (FRONT) HARNESS</b> |             |
| <ol style="list-style-type: none"> <li>Turn off engine and disconnect battery ground cable.</li> <li>Disconnect ECM harness connector.</li> <li>Disconnect heated oxygen sensor 1 (front) harness connector.</li> <li>Check harness continuity between ECM terminal 62 and heated oxygen sensor 1 (front) harness connector terminal 2.<br/>Refer to Wiring Diagram, EC-199.<br/><b>Continuity should exist.</b></li> </ol> <p style="text-align: center;"><b>OK or NG</b></p> |                                                     |             |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     | ▶ GO TO 15. |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     | ▶ GO TO 14. |

|                                                                           |                          |            |
|---------------------------------------------------------------------------|--------------------------|------------|
| <b>14</b>                                                                 | <b>REPAIR OR REPLACE</b> |            |
| Repair or replace harness between ECM and heated oxygen sensor 1 (front). |                          |            |
|                                                                           |                          | ▶ GO TO 6. |

# BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

## 15 PREPARATION FOR "CO" % CHECK

### With CONSULT-II

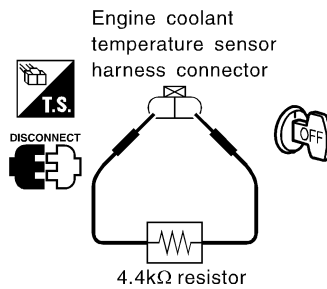
1. Reconnect ECM harness connector.
2. Turn ignition switch "ON".
3. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
4. Set "ENG COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd".

| ACTIVE TEST      |          |
|------------------|----------|
| ENG COOLANT TEMP | XXX °C   |
| MONITOR          |          |
| ENG SPEED        | XXX rpm  |
| INJ PULSE-B1     | XXX msec |
| IGN TIMING       | XXX BTDC |
|                  |          |
|                  |          |
|                  |          |
|                  |          |

SEF172Y

### Without CONSULT-II

1. Disconnect ECM harness connector.
2. Disconnect engine coolant temperature sensor harness connector.
3. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.

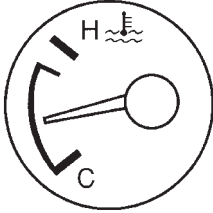
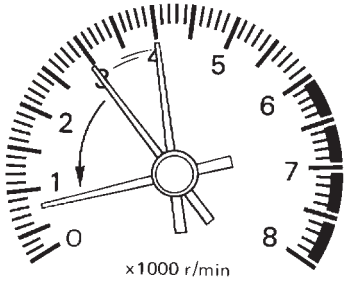


SEF982UA

▶ GO TO 16.

# BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

|                                                                                                                                                                                                                                                                                    |                     |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------|
| <b>16</b>                                                                                                                                                                                                                                                                          | <b>CHECK "CO" %</b> | GI        |
| 1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.                                                                                                                                                                           |                     | MA        |
|                                                                                                                                                                                                   |                     | EM        |
| 2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.                                                                                                                                                                                |                     | LC        |
|                                                                                                                                                                                                   |                     | AEC692    |
| 3. Check "CO" %.<br><b>Idle CO: Less than 11%</b>                                                                                                                                                                                                                                  |                     | <b>EC</b> |
| 4. <input checked="" type="checkbox"/> <b>Without CONSULT-II</b><br>After checking CO%,<br>a. Disconnect the resistor from terminals of engine coolant temperature sensor.<br>b. Connect engine coolant temperature sensor harness connector to engine coolant temperature sensor. |                     | FE        |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                    |                     | CL        |
| OK                                                                                                                                                                                                                                                                                 | ▶                   | GO TO 17. |
| NG                                                                                                                                                                                                                                                                                 | ▶                   | GO TO 18. |
|                                                                                                                                                                                                                                                                                    |                     | MT        |
|                                                                                                                                                                                                                                                                                    |                     | SEF978U   |
|                                                                                                                                                                                                                                                                                    |                     | AT        |
|                                                                                                                                                                                                                                                                                    |                     | AX        |
|                                                                                                                                                                                                                                                                                    |                     | SU        |
|                                                                                                                                                                                                                                                                                    |                     | BR        |
|                                                                                                                                                                                                                                                                                    |                     | ST        |
|                                                                                                                                                                                                                                                                                    |                     | RS        |
|                                                                                                                                                                                                                                                                                    |                     | BT        |
|                                                                                                                                                                                                                                                                                    |                     | HA        |
|                                                                                                                                                                                                                                                                                    |                     | SC        |
|                                                                                                                                                                                                                                                                                    |                     | EL        |
|                                                                                                                                                                                                                                                                                    |                     | IDX       |

# BASIC SERVICE PROCEDURE

*Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)*

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                    |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------|
| <b>17</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL</b> |           |
| <p><b>Ⓟ With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Stop engine.</li> <li>2. Replace heated oxygen sensor 1 (front).</li> <li>3. Start engine and warm it up to normal operating temperature.</li> <li>4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load.</li> <li>5. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode.</li> <li>6. Maintaining engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.<br/> <b>1 time: RICH → LEAN → RICH</b><br/> <b>2 times: RICH → LEAN → RICH → LEAN → RICH</b></li> </ol>                    |                                                    |           |
| <p><b>ⓧ Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Stop engine.</li> <li>2. Replace heated oxygen sensor 1 (front).</li> <li>3. Start engine and warm it up to normal operating temperature.</li> <li>4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load.</li> <li>5. Set voltmeter probe between ECM terminal 62 and ground.</li> <li>6. Make sure that voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm.<br/> <b>1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</b><br/> <b>2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</b></li> </ol> <p style="text-align: center;"><b>OK or NG</b></p> |                                                    |           |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ▶                                                  | GO TO 6.  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ▶                                                  | GO TO 18. |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------|
| <b>18</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>DETECT MALFUNCTIONING PART</b> |          |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Connect heated oxygen sensor 1 (front) harness connector to heated oxygen sensor 1 (front).</li> <li>● Check fuel pressure regulator. Refer to EC-51.</li> <li>● Check mass air flow sensor and its circuit. Refer to EC-154.</li> <li>● Check injector and its circuit. Refer to EC-574.<br/>Clean or replace if necessary.</li> <li>● Check engine coolant temperature sensor and its circuit. Refer to EC-171.</li> <li>● Check ECM function by substituting another known-good ECM.<br/>(ECM may be the cause of a problem, but this is rarely the case.)</li> </ul> |                                   |          |
| ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                   | GO TO 6. |



|                            |
|----------------------------|
| SELECT WORK ITEM           |
| TP SW/TP SEN IDLE POSI ADJ |
| FUEL PRESSURE RELEASE      |
| <b>IDLE AIR VOL LEARN</b>  |
| SELF-LEARNING CONT         |
| EVAP SYSTEM CLOSE          |
| TARGET ING TIM ADJ         |

SEF452Y

|                    |         |
|--------------------|---------|
| WORK SUPPORT       |         |
| IDLE AIR VOL LEARN |         |
| MONITOR            |         |
| ENG SPEED          | XXX rpm |
|                    |         |
|                    |         |
|                    |         |
|                    |         |
|                    |         |
|                    |         |
|                    |         |
| START              |         |

SEF454Y

|                     |         |
|---------------------|---------|
| WORK SUPPORT        |         |
| IDLE AIR VOL LEARN  | CMPLT   |
| MONITOR             |         |
| ENG SPEED           | XXX rpm |
| Result appears.     |         |
| CMPLT: successful   |         |
| INCMP: unsuccessful |         |
|                     |         |
|                     |         |
| START               |         |

SEF455Y

## Idle Air Volume Learning

NCEC0503

### DESCRIPTION

NCEC0503S01

“Idle Air Volume Learning” is an operation to learn the idle air volume that keeps each engine within the specific range. It must be performed under any of the following conditions:

- Each time IACV-AAC valve, throttle body or ECM is replaced.
- Idle speed or ignition timing is out of specification.

### PRE-CONDITIONING

NCEC0503S02

Before performing “Idle Air Volume Learning”, make sure that all of the following conditions are satisfied.

Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 95°C (158 - 203°F)
- PNP switch: ON
- Electric load switch: OFF  
(Air conditioner, headlamp, rear window defogger)

**On vehicles equipped with daytime running light systems, if the parking brake is applied before the engine is started, the headlamp will not be illuminated.**

- Cooling fan motor: Not operating
  - Steering wheel: Neutral (Straight-ahead position)
  - Vehicle speed: Stopped
  - Transmission: Warmed-up
- For A/T models with CONSULT-II, drive vehicle until “FLUID TEMP SE” in “DATA MONITOR” mode of “A/T” system indicates less than 0.9V.
- For A/T models without CONSULT-II and M/T models, drive vehicle for 10 minutes.

### OPERATION PROCEDURE

NCEC0503S03

#### Ⓜ With CONSULT-II

NCEC0503S0301

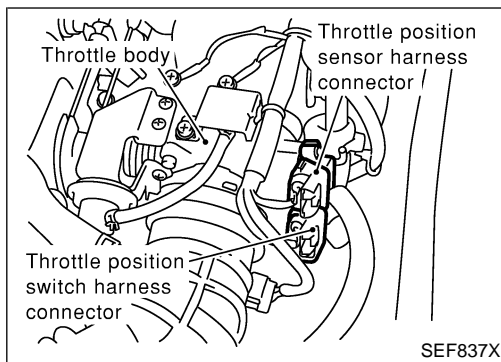
1. Turn ignition switch “ON” and wait at least 1 second.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic “PRE-CONDITIONING” (previously mentioned) are in good order.
5. Turn ignition switch “OFF” and wait at least 10 seconds.
6. Start the engine and let it idle for at least 15 seconds.
7. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.
8. Touch “START” and wait 15 seconds.
9. Make sure that “CMPLT” is displayed on CONSULT-II screen. If “INCMP” is displayed, “Idle Air Volume Learning” will not be carried out successfully. In this case, find the cause of the problem by referring to the NOTE below.
10. Rev up the engine two or three times. Make sure that idle speed and ignition timing are within specifications.

| ITEM            | SPECIFICATION                                                 |
|-----------------|---------------------------------------------------------------|
| Idle speed      | M/T: 800±50 rpm<br>A/T: 800±50 rpm (in “P” or “N” position)   |
| Ignition timing | M/T: 15°±2° BTDC<br>A/T: 15°±2° BTDC (in “P” or “N” position) |

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

# BASIC SERVICE PROCEDURE

## Idle Air Volume Learning (Cont'd)



### ⊗ Without CONSULT-II

=NCEC0503S0302

1. Turn ignition switch "ON" and wait at least 1 second.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic "PRE-CONDITIONING" (previously mentioned) are in good order.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start the engine and let it idle for at least 15 seconds.
7. Disconnect throttle position sensor harness connector (brown), then reconnect it within 5 seconds.
8. Wait 15 seconds.
9. Make sure that idle speed is within specifications. If not, the result will be incomplete. In this case, find the cause of the problem by referring to the NOTE below.
10. Rev up the engine two or three times. Make sure that idle speed and ignition timing are within specifications.

| ITEM            | SPECIFICATION                                                 |
|-----------------|---------------------------------------------------------------|
| Idle speed      | M/T: 800±50 rpm<br>A/T: 800±50 rpm (in "P" or "N" position)   |
| Ignition timing | M/T: 15°±2° BTDC<br>A/T: 15°±2° BTDC (in "P" or "N" position) |

### NOTE:

If idle air volume learning cannot be performed successfully, proceed as follows:

- 1) Check that throttle valve is fully closed.
- 2) Check that downstream of throttle valve is free from air leakage.
- 3) Adjust closed throttle position switch and reset memory. (Refer to Basic Inspection, EC-107.)
- 4) When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the problem.
- 5) If any of the following conditions occur after the engine has started, eliminate the cause of the problem and perform "Idle air volume learning" all over again:
  - Engine stalls.
  - Erroneous idle.
  - Blown fuses related to the IACV-AAC valve system.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Introduction

## Introduction

NCEC0029

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

| Emission-related diagnostic information         | SAE Mode            |
|-------------------------------------------------|---------------------|
| Diagnostic Trouble Code (DTC)                   | Mode 3 of SAE J1979 |
| Freeze Frame data                               | Mode 2 of SAE J1979 |
| System Readiness Test (SRT) code                | Mode 1 of SAE J1979 |
| 1st Trip Diagnostic Trouble Code (1st Trip DTC) | Mode 7 of SAE J1979 |
| 1st Trip Freeze Frame data                      |                     |
| Test values and Test limits                     | Mode 6 of SAE J1979 |

The above information can be checked using procedures listed in the table below.

X: Applicable —: Not applicable

|            | DTC | 1st trip DTC | Freeze Frame data | 1st trip Freeze Frame data | SRT code | Test value |
|------------|-----|--------------|-------------------|----------------------------|----------|------------|
| CONSULT-II | X   | X            | X                 | X                          | X        | —          |
| GST        | X   | X*1          | X                 | —                          | X        | X          |

\*1: 1st trip DTCs for self-diagnoses concerning SRT items cannot be shown on the GST display.

The malfunction indicator lamp (MIL) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to EC-124.)

## Two Trip Detection Logic

NCEC0030

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL lights up. The MIL lights up at the same time when the DTC is stored. <2nd trip> The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

X: Applicable —: Not applicable

| Items                                                                               | MIL      |             |          |             | DTC                 |                     | 1st trip DTC        |                     |
|-------------------------------------------------------------------------------------|----------|-------------|----------|-------------|---------------------|---------------------|---------------------|---------------------|
|                                                                                     | 1st trip |             | 2nd trip |             | 1st trip displaying | 2nd trip displaying | 1st trip displaying | 2nd trip displaying |
|                                                                                     | Blinking | Lighting up | Blinking | Lighting up |                     |                     |                     |                     |
| Coolant overtemperature enrichment protection — DTC: P0217                          | —        | X           | —        | —           | X                   | —                   | X                   | —                   |
| Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected | X        | —           | —        | —           | —                   | —                   | X                   | —                   |
| Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected | —        | —           | X        | —           | —                   | X                   | —                   | —                   |
| Closed loop control — DTC: P1148                                                    | —        | X           | —        | —           | X                   | —                   | X                   | —                   |
| Fail-safe items (Refer to EC-124.)                                                  | —        | X           | —        | —           | X*1                 | —                   | X*1                 | —                   |
| Except above                                                                        | —        | —           | —        | X           | —                   | X                   | X                   | —                   |

\*1: Except “ECM”

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information

## Emission-related Diagnostic Information

NCEC0031

### DTC AND 1ST TRIP DTC

NCEC0031S01

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.

For malfunctions in which 1st trip DTCs are displayed, refer to EC-77. These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-II.

1st trip DTC is specified in Mode 7 of SAE J1979. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a problem. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in "Work Flow" procedure Step II, refer to EC-105. Then perform "DTC Confirmation Procedure" or "Overall Function Check" to try to duplicate the problem. If the malfunction is duplicated, the item requires repair.

### How to Read DTC and 1st Trip DTC

NCEC0031S0101

DTC and 1st trip DTC can be read by the following methods.

 With CONSULT-II

 With GST

CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P1320, P0705, P0750, etc. These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST does not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be "0".

If a 1st trip DTC is stored in the ECM, the time data will be "[1t]".

|             |                         |   |                      |                         |    |
|-------------|-------------------------|---|----------------------|-------------------------|----|
| DTC display | SELF DIAG RESULTS       |   | 1st trip DTC display | SELF DIAG RESULTS       |    |
|             | DTC RESULTS             |   |                      | DTC RESULTS             |    |
|             | TIME                    |   |                      | TIME                    |    |
|             | MAF SEN/CIRCUIT [P0100] | 0 |                      | MAF SEN/CIRCUIT [P0100] | 1t |
|             |                         |   |                      |                         |    |
|             |                         |   |                      |                         |    |

SEF992X

### FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

NCEC0031S02

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed and absolute pressure at the moment a malfunction is detected.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see EC-93.

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

| Priority | Items                      |                                                                                    |
|----------|----------------------------|------------------------------------------------------------------------------------|
| 1        | Freeze frame data          | Misfire — DTC: P0300 - P0304<br>Fuel Injection System Function — DTC: P0171, P0172 |
| 2        |                            | Except the above items (Includes A/T related items)                                |
| 3        | 1st trip freeze frame data |                                                                                    |

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.

## SYSTEM READINESS TEST (SRT) CODE

NCE0031S03

System Readiness Test (SRT) code is specified in Mode 1 of SAE J1979.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.

If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating "INCMP", use the information in this Service Manual to set the SRT to "CMPLT".

In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate "CMPLT" for each application system. Once set as "CMPLT", the SRT status remains "CMPLT" until the self-diagnosis memory is erased.

Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate "INCMP" for these items.

### NOTE:

The SRT will also indicate "INCMP" if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.

If, during the state emissions inspection, the SRT indicates "CMPLT" for all test items, the inspector will continue with the emissions test. However, if the SRT indicates "INCMP" for one or more of the SRT items the vehicle is returned to the customer untested.

### NOTE:

If MIL is "ON" during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates "CMPLT" for all test items. Therefore, it is important to check SRT ("CMPLT") and DTC (No DTCs) before the inspection.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

## SRT Item

=NCEC0031S0307

The table below shows required self-diagnostic items to set the SRT to "CMPLT".

| SRT item<br>(CONSULT-II indication) | Performance Priority*2 | Required self-diagnostic items to set the SRT to "CMPLT" | Corresponding DTC No. |
|-------------------------------------|------------------------|----------------------------------------------------------|-----------------------|
| CATALYST                            | 3                      | Three way catalyst function                              | P0420                 |
| EVAP SYSTEM                         | 2                      | EVAP control system (small leak) (negative pressure)     | P0440                 |
|                                     | —                      | EVAP control system (small leak) (positive pressure)     | P1440*1               |
|                                     | 3                      | EVAP control system purge flow monitoring                | P1447                 |
| O2 SENSOR                           | 3                      | Heated oxygen sensor 1 (front) (circuit)                 | P0130                 |
|                                     |                        | Heated oxygen sensor 1 (front) (lean shift monitoring)   | P0131                 |
|                                     |                        | Heated oxygen sensor 1 (front) (rich shift monitoring)   | P0132                 |
|                                     |                        | Heated oxygen sensor 1 (front) (response monitoring)     | P0133                 |
|                                     |                        | Heated oxygen sensor 1 (front) (high voltage)            | P0134                 |
|                                     |                        | Heated oxygen sensor 2 (rear) (min. voltage monitoring)  | P0137                 |
|                                     |                        | Heated oxygen sensor 2 (rear) (max. voltage monitoring)  | P0138                 |
|                                     |                        | Heated oxygen sensor 2 (rear) (response monitoring)      | P0139                 |
|                                     |                        | Heated oxygen sensor 2 (rear) (high voltage)             | P0140                 |
| O2 SEN HEATER                       | 3                      | Heated oxygen sensor 1 heater (front)                    | P0135                 |
|                                     |                        | Heated oxygen sensor 2 heater (rear)                     | P0141                 |
| EGR SYSTEM                          | 3                      | EGR function (close)                                     | P0400                 |
|                                     | 1                      | EGR function (open)                                      | P1402                 |

\*1: P1440 [EVAP control system (small leak) (positive pressure) diagnosis] is one type of SRT related diagnosis. This diagnosis, however, does not contribute to setting the SRT as "CMPLT", when no malfunction exists in the EVAP system. Therefore, P0440 must be used instead of P1440.

\*2: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT-II.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

## SRT Set Timing

SRT is set as "CMPLT" after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

| Self-diagnosis result |        | Example        |                |         |              |                        |
|-----------------------|--------|----------------|----------------|---------|--------------|------------------------|
|                       |        | Diagnosis      | Ignition cycle |         |              |                        |
|                       | ← ON → |                | OFF            | ← ON →  | OFF          | ← ON →                 |
| All OK                | Case 1 | P0400          | OK (1)         | — (1)   | OK (2)       | — (2)                  |
|                       |        | P0402          | OK (1)         | — (1)   | — (1)        | OK (2)                 |
|                       |        | P1402          | OK (1)         | OK (2)  | — (2)        | — (2)                  |
|                       |        | SRT of EGR     | "CMPLT"        | "CMPLT" | "CMPLT"      | "CMPLT"                |
|                       | Case 2 | P0400          | OK (1)         | — (1)   | — (1)        | — (1)                  |
|                       |        | P0402          | — (0)          | — (0)   | OK (1)       | — (1)                  |
|                       |        | P1402          | OK (1)         | OK (2)  | — (2)        | — (2)                  |
|                       |        | SRT of EGR     | "INCMP"        | "INCMP" | "CMPLT"      | "CMPLT"                |
| NG exists             | Case 3 | P0400          | OK             | OK      | —            | —                      |
|                       |        | P0402          | —              | —       | —            | —                      |
|                       |        | P1402          | NG             | —       | NG           | NG<br>(Consecutive NG) |
|                       |        | (1st trip) DTC | 1st trip DTC   | —       | 1st trip DTC | DTC<br>(= MIL "ON")    |
|                       |        | SRT of EGR     | "INCMP"        | "INCMP" | "INCMP"      | "CMPLT"                |

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

—: Self-diagnosis is not carried out.

When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate "CMPLT". → Case 1 above

When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate "CMPLT" at the time the respective self-diagnoses have at least one OK result. → Case 2 above

If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate "CMPLT". → Case 3 above

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary of each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate "CMPLT" at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires "CMPLT" of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to "CMPLT" of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate "INCMP".

### NOTE:

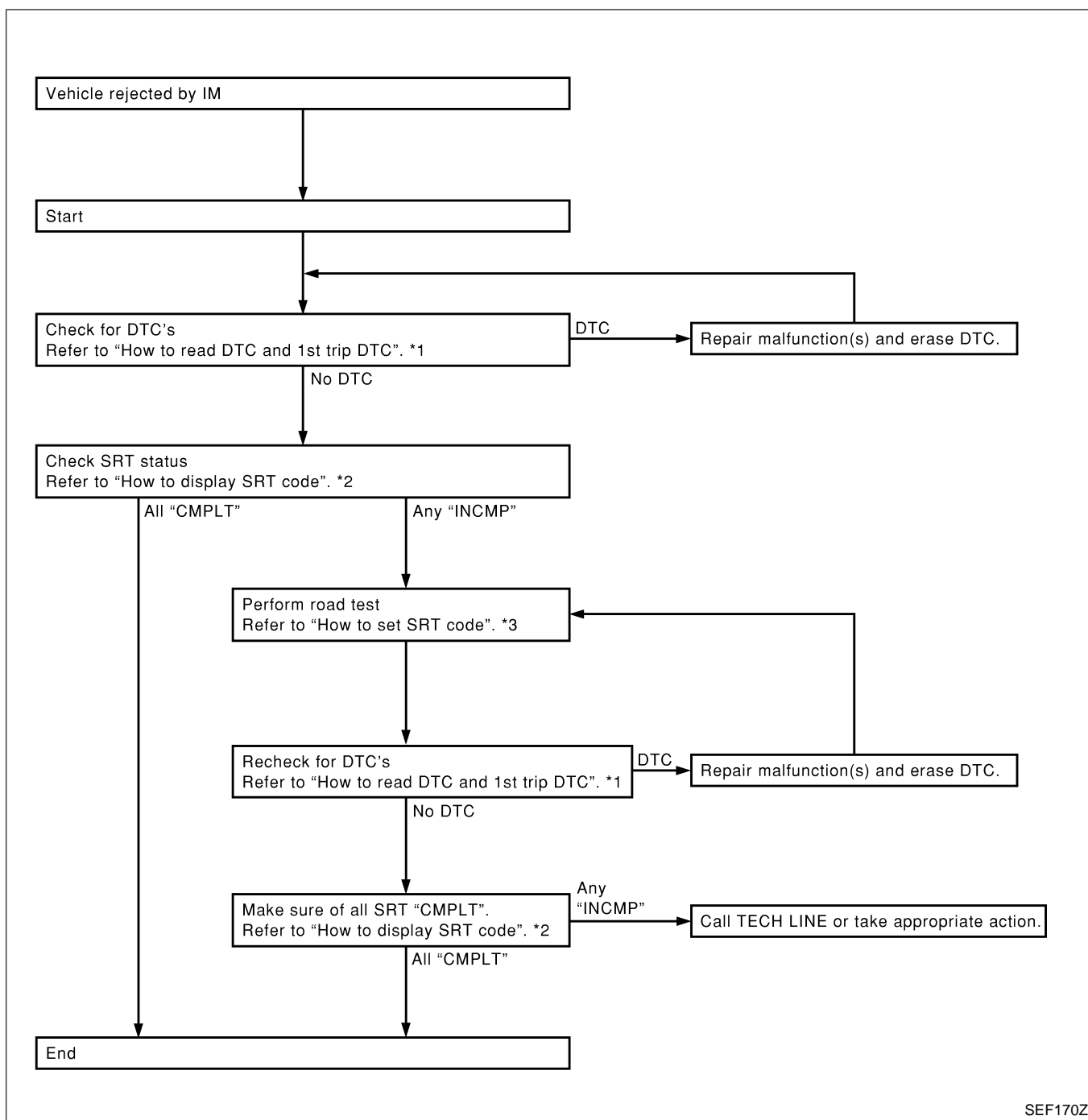
SRT can be set as "CMPLT" together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates "CMPLT".

## SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating "INCMP", review the flowchart diagnostic sequence on the next page.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)



SEF170Z

\*1 EC-68

\*2 EC-72

\*3 EC-73

## How to Display SRT Code

### With CONSULT-II

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-II.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-II screen; for items whose SRT codes are not set, "INCMP" is displayed.

### With GST

Selecting Mode 1 with GST (Generic Scan Tool)

A sample of CONSULT-II display for SRT code is shown below.

"INCMP" means the self-diagnosis is incomplete and SRT is not set. "CMPLT" means the self-diagnosis is complete and SRT is set.

NCEC0031S0301



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

| SRT STATUS  |       |
|-------------|-------|
| CATALYST    | CMPLT |
| EVAP SYSTEM | INCMP |
| HO2S HTR    | CMPLT |
| HO2S        | CMPLT |
| EGR SYSTEM  | INCMP |

SEF713Y

GI

MA

EM

LC

**EC**

## How to Set SRT Code

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions. NCEC0031S0302

### With CONSULT-II

Perform corresponding DTC Confirmation Procedure one by one based on "Performance Priority" in the table on EC-70.

### Without CONSULT-II

The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

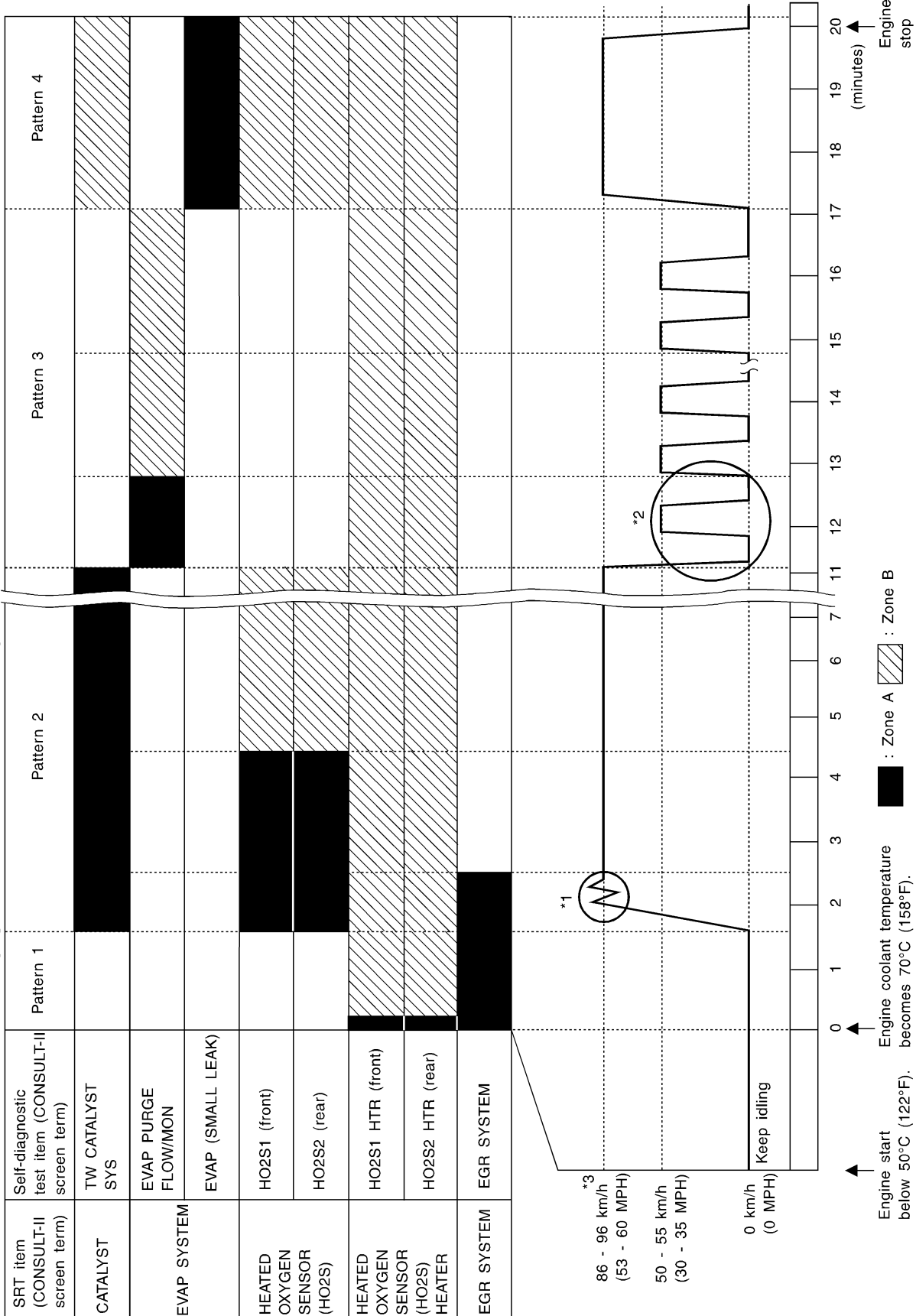
Emission-related Diagnostic Information (Cont'd)

## Driving Pattern

NCEC0031S0303

**Note:** Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.

### Driving pattern



SEF676Y

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.  
Zone A refers to the range where the time required, for the diagnosis under normal conditions\*, is the shortest.  
Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

\*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.  
Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 70 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 70 and ground is lower than 1.4V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 82 and ground is less than 4.1V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

Pattern 3:

- The driving pattern outlined in \*2 must be repeated at least 3 times.

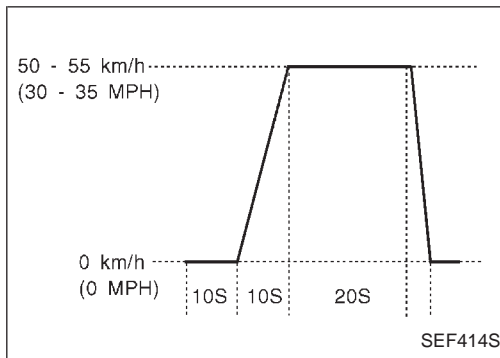
Pattern 4:

- Tests are performed after the engine has been operated for at least 17 minutes.
- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

\*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.

\*2: Operate the vehicle in the following driving pattern.

- 1) Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
- 2) Repeat driving pattern shown below at least 10 times.
  - **During acceleration, hold the accelerator pedal as steady as possible.**
- 3) Repeat steps 1 and 2 until the EGR system SRT is set.



\*3: Checking the vehicle speed with GST is advised.

## Suggested Transmission Gear Position for A/T Models

Set the selector lever in the "D" position with the overdrive switch turned ON.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

*Emission-related Diagnostic Information (Cont'd)*

## Suggested upshift speeds for M/T models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

| Gear change | For normal acceleration in low altitude areas<br>[less than 1,219 m (4,000 ft)]: | For quick acceleration in low altitude areas and high altitude areas<br>[over 1,219 m (4,000 ft)]: |
|-------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|             | ACCEL shift point<br>km/h (MPH)                                                  | km/h (MPH)                                                                                         |
| 1st to 2nd  | 24 (15)                                                                          | 25 (15)                                                                                            |
| 2nd to 3rd  | 40 (25)                                                                          | 40 (25)                                                                                            |
| 3rd to 4th  | 65 (40)                                                                          | 65 (40)                                                                                            |
| 4th to 5th  | 75 (45)                                                                          | 75 (45)                                                                                            |

## Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate. Do not exceed the maximum suggested speed (shown below) in any gear. For level road driving, use the highest gear suggested for that speed. Always observe posted speed limits and drive according to the road conditions to ensure safe operation. Do not over-rev the engine when shifting to a lower gear as it may cause engine damage or loss of vehicle control.

| Gear | km/h (MPH) |
|------|------------|
| 1st  | 55 (35)    |
| 2nd  | 95 (60)    |
| 3rd  | 135 (85)   |
| 4th  | —          |
| 5th  | —          |

## TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-II)

NCEC0031S04

The following is the information specified in Mode 6 of SAE J1979.

The test value is a parameter used to determine whether a system/circuit diagnostic test is “OK” or “NG” while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

Items for which these data (test value and test limit) are displayed are the same as SRT code items (9 test items).

These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

X: Applicable —: Not applicable

| SRT item    | Self-diagnostic test item                    | Test value (GST display) |     | Test limit | Application |
|-------------|----------------------------------------------|--------------------------|-----|------------|-------------|
|             |                                              | TID                      | CID |            |             |
| CATALYST    | Three way catalyst function                  | 01H                      | 01H | Max.       | X           |
|             |                                              | 02H                      | 81H | Min.       | X           |
| EVAP SYSTEM | EVAP control system<br>(Small leak)          | 05H                      | 03H | Max.       | X           |
|             | EVAP control system purge<br>flow monitoring | 06H                      | 83H | Min.       | X           |

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

| SRT item         | Self-diagnostic test item             | Test value (GST display) |      | Test limit | Application |
|------------------|---------------------------------------|--------------------------|------|------------|-------------|
|                  |                                       | TID                      | CID  |            |             |
| O2 SENSOR        | Heated oxygen sensor 1 (front)        | 09H                      | 04H  | Max.       | X           |
|                  |                                       | 0AH                      | 84H  | Min.       | X           |
|                  |                                       | 0BH                      | 04H  | Max.       | X           |
|                  |                                       | 0CH                      | 04H  | Max.       | X           |
|                  |                                       | 0DH                      | 04H  | Max.       | X           |
|                  | Heated oxygen sensor 2 (rear)         | 19H                      | 86H  | Min.       | X           |
|                  |                                       | 1AH                      | 86H  | Min.       | X           |
|                  |                                       | 1BH                      | 06H  | Max.       | X           |
| 1CH              |                                       | 06H                      | Max. | X          |             |
| O2 SENSOR HEATER | Heated oxygen sensor 1 heater (front) | 29H                      | 08H  | Max.       | X           |
|                  |                                       | 2AH                      | 88H  | Min.       | X           |
|                  | Heated oxygen sensor 2 heater (rear)  | 2DH                      | 0AH  | Max.       | X           |
|                  |                                       | 2EH                      | 8AH  | Min.       | X           |
| EGR SYSTEM       | EGR function                          | 31H                      | 8CH  | Min.       | X           |
|                  |                                       | 32H                      | 8CH  | Min.       | X           |
|                  |                                       | 33H                      | 8CH  | Min.       | X           |
|                  |                                       | 34H                      | 8CH  | Min.       | X           |
|                  |                                       | 35H                      | 0CH  | Max.       | X           |

## EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

X: Applicable —: Not applicable NCEC0031S05

| Items (CONSULT-II screen terms)                             | DTC*1        | SRT code | Test value/ Test limit (GST only) | 1st trip DTC*1 | Reference page |
|-------------------------------------------------------------|--------------|----------|-----------------------------------|----------------|----------------|
| <b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b> | <b>P0000</b> | —        | —                                 | —              | —              |
| MAF SEN/CIRCUIT                                             | P0100        | —        | —                                 | X              | EC-154         |
| ABSL PRES SEN/CIRC                                          | P0105        | —        | —                                 | X              | EC-163         |
| AIR TEMP SEN/CIRC                                           | P0110        | —        | —                                 | X              | EC-165         |
| COOLANT T SEN/CIRC                                          | P0115        | —        | —                                 | X              | EC-171         |
| THRTL POS SEN/CIRC                                          | P0120        | —        | —                                 | X              | EC-177         |
| *COOLAN T SEN/CIRC                                          | P0125        | —        | —                                 | X              | EC-190         |
| HO2S1 (B1)                                                  | P0130        | X        | X                                 | X*2            | EC-196         |
| HO2S1 (B1)                                                  | P0131        | X        | X                                 | X*2            | EC-204         |
| HO2S1 (B1)                                                  | P0132        | X        | X                                 | X*2            | EC-210         |
| HO2S1 (B1)                                                  | P0133        | X        | X                                 | X*2            | EC-217         |
| HO2S1 (B1)                                                  | P0134        | X        | X                                 | X*2            | EC-226         |
| HO2S1 HTR (B1)                                              | P0135        | X        | X                                 | X*2            | EC-232         |

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

*Emission-related Diagnostic Information (Cont'd)*

| Items<br>(CONSULT-II screen terms) | DTC*1 | SRT code | Test value/ Test<br>limit<br>(GST only) | 1st trip DTC*1 | Reference page |
|------------------------------------|-------|----------|-----------------------------------------|----------------|----------------|
| HO2S2 (B1)                         | P0137 | X        | X                                       | X*2            | EC-237         |
| HO2S2 (B1)                         | P0138 | X        | X                                       | X*2            | EC-245         |
| HO2S2 (B1)                         | P0139 | X        | X                                       | X*2            | EC-253         |
| HO2S2 (B1)                         | P0140 | X        | X                                       | X*2            | EC-261         |
| HO2S2 HTR (B1)                     | P0141 | X        | X                                       | X*2            | EC-267         |
| FUEL SYS-LEAN/BK1                  | P0171 | —        | —                                       | X              | EC-272         |
| FUEL SYS-RICH/BK1                  | P0172 | —        | —                                       | X              | EC-279         |
| FUEL TEMP SEN/CIRC                 | P0180 | —        | —                                       | X              | EC-286         |
| ENG OVER TEMP                      | P0217 | —        | —                                       | X              | EC-291         |
| MULTI CYL MISFIRE                  | P0300 | —        | —                                       | X              | EC-309         |
| CYL 1 MISFIRE                      | P0301 | —        | —                                       | X              | EC-309         |
| CYL 2 MISFIRE                      | P0302 | —        | —                                       | X              | EC-309         |
| CYL 3 MISFIRE                      | P0303 | —        | —                                       | X              | EC-309         |
| CYL 4 MISFIRE                      | P0304 | —        | —                                       | X              | EC-309         |
| KNOCK SEN/CIRC-B1                  | P0325 | —        | —                                       | —              | EC-316         |
| CKP SEN/CIRCUIT                    | P0335 | —        | —                                       | X              | EC-320         |
| CMP SEN/CIRC                       | P0340 | —        | —                                       | X              | EC-326         |
| EGR SYSTEM                         | P0400 | X        | X                                       | X*2            | EC-334         |
| EGR VOL CONT/V CIR                 | P0403 | —        | —                                       | X              | EC-344         |
| TW CATALYST SYS-B1                 | P0420 | X        | X                                       | X*2            | EC-351         |
| EVAP SMALL LEAK                    | P0440 | X        | X                                       | X*2            | EC-355         |
| PURG VOLUME CONT/V                 | P0443 | —        | —                                       | X              | EC-369         |
| VENT CONTROL VALVE                 | P0446 | —        | —                                       | X              | EC-376         |
| EVAPO SYS PRES SEN                 | P0450 | —        | —                                       | X              | EC-383         |
| EVAP GROSS LEAK                    | P0455 | —        | X                                       | X*2            | EC-396         |
| FUEL LEV SE SLOSH                  | P0460 | —        | —                                       | X              | EC-407         |
| FUEL LEVEL SENSOR                  | P0461 | —        | —                                       | X              | EC-412         |
| FUEL LEVL SEN/CIRC                 | P0464 | —        | —                                       | X              | EC-414         |
| VEH SPEED SEN/CIRC                 | P0500 | —        | —                                       | X              | EC-419         |
| IACV/AAC VLV/CIRC                  | P0505 | —        | —                                       | X              | EC-423         |
| CLOSED TP SW/CIRC                  | P0510 | —        | —                                       | X              | EC-432         |
| A/T COMM LINE                      | P0600 | —        | —                                       | —              | EC-440         |
| ECM                                | P0605 | —        | —                                       | X              | EC-443         |
| PNP SW/CIRC                        | P0705 | —        | —                                       | X              | AT-107         |
| ATF TEMP SEN/CIRC                  | P0710 | —        | —                                       | X              | AT-113         |
| VEH SPD SEN/CIR AT                 | P0720 | —        | —                                       | X              | AT-119         |
| ENGINE SPEED SIG                   | P0725 | —        | —                                       | X              | AT-124         |

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

| Items<br>(CONSULT-II screen terms) | DTC*1 | SRT code | Test value/ Test<br>limit<br>(GST only) | 1st trip DTC*1 | Reference page |    |
|------------------------------------|-------|----------|-----------------------------------------|----------------|----------------|----|
| A/T 1ST GR FNCTN                   | P0731 | —        | —                                       | X              | AT-128         | GI |
| A/T 2ND GR FNCTN                   | P0732 | —        | —                                       | X              | AT-135         | MA |
| A/T 3RD GR FNCTN                   | P0733 | —        | —                                       | X              | AT-141         | EM |
| A/T 4TH GR FNCTN                   | P0734 | —        | —                                       | X              | AT-147         | EM |
| TCC SOLENOID/CIRC                  | P0740 | —        | —                                       | X              | AT-157         | LC |
| A/T TCC S/V FNCTN                  | P0744 | —        | —                                       | X              | AT-163         | LC |
| L/PRESS SOL/CIRC                   | P0745 | —        | —                                       | X              | AT-174         | EC |
| SFT SOL A/CIRC                     | P0750 | —        | —                                       | X              | AT-181         | EC |
| SFT SOL B/CIRC                     | P0755 | —        | —                                       | X              | AT-187         | FE |
| THERMOSTAT FNCTN                   | P1126 | —        | —                                       | X              | EC-445         | FE |
| CLOSED LOOP-B1                     | P1148 | —        | —                                       | X              | EC-447         | CL |
| ENG OVER TEMP                      | P1217 | —        | —                                       | X              | EC-449         | CL |
| CKP SENSOR COG                     | P1336 | —        | —                                       | X              | EC-467         | MT |
| EGR TEMP SEN/CIRC                  | P1401 | —        | —                                       | X              | EC-473         | MT |
| EGR SYSTEM                         | P1402 | X        | X                                       | X*2            | EC-481         | AT |
| EVAP SMALL LEAK                    | P1440 | X        | X                                       | X*2            | EC-491         | AT |
| PURG VOLUME CONT/V                 | P1444 | —        | —                                       | X              | EC-493         | AX |
| VENT CONTROL VALVE                 | P1446 | —        | —                                       | X              | EC-505         | AX |
| EVAP PURG FLOW/MON                 | P1447 | X        | X                                       | X*2            | EC-513         | SU |
| VENT CONTROL VALVE                 | P1448 | —        | —                                       | X              | EC-525         | SU |
| FUEL LEVL SEN/CIRC                 | P1464 | —        | —                                       | X              | EC-534         | BR |
| VC/V BYPASS/V                      | P1490 | —        | —                                       | X              | EC-538         | BR |
| VC CUT/V BYPASS/V                  | P1491 | —        | —                                       | X              | EC-544         | ST |
| A/T DIAG COMM LINE                 | P1605 | —        | —                                       | X              | EC-556         | ST |
| TP SEN/CIRC A/T                    | P1705 | —        | —                                       | X              | AT-193         | RS |
| P-N POS SW/CIRCUIT                 | P1706 | —        | —                                       | X              | EC-559         | RS |
| O/R CLTCH SOL/CIRC                 | P1760 | —        | —                                       | X              | AT-202         | BT |

\*1: 1st trip DTC No. is the same as DTC No.

\*2: These are not displayed with GST.

## HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

### How to Erase DTC (E) With CONSULT-II)

NCEC0031S06

NCEC0031S0601

#### NOTE:

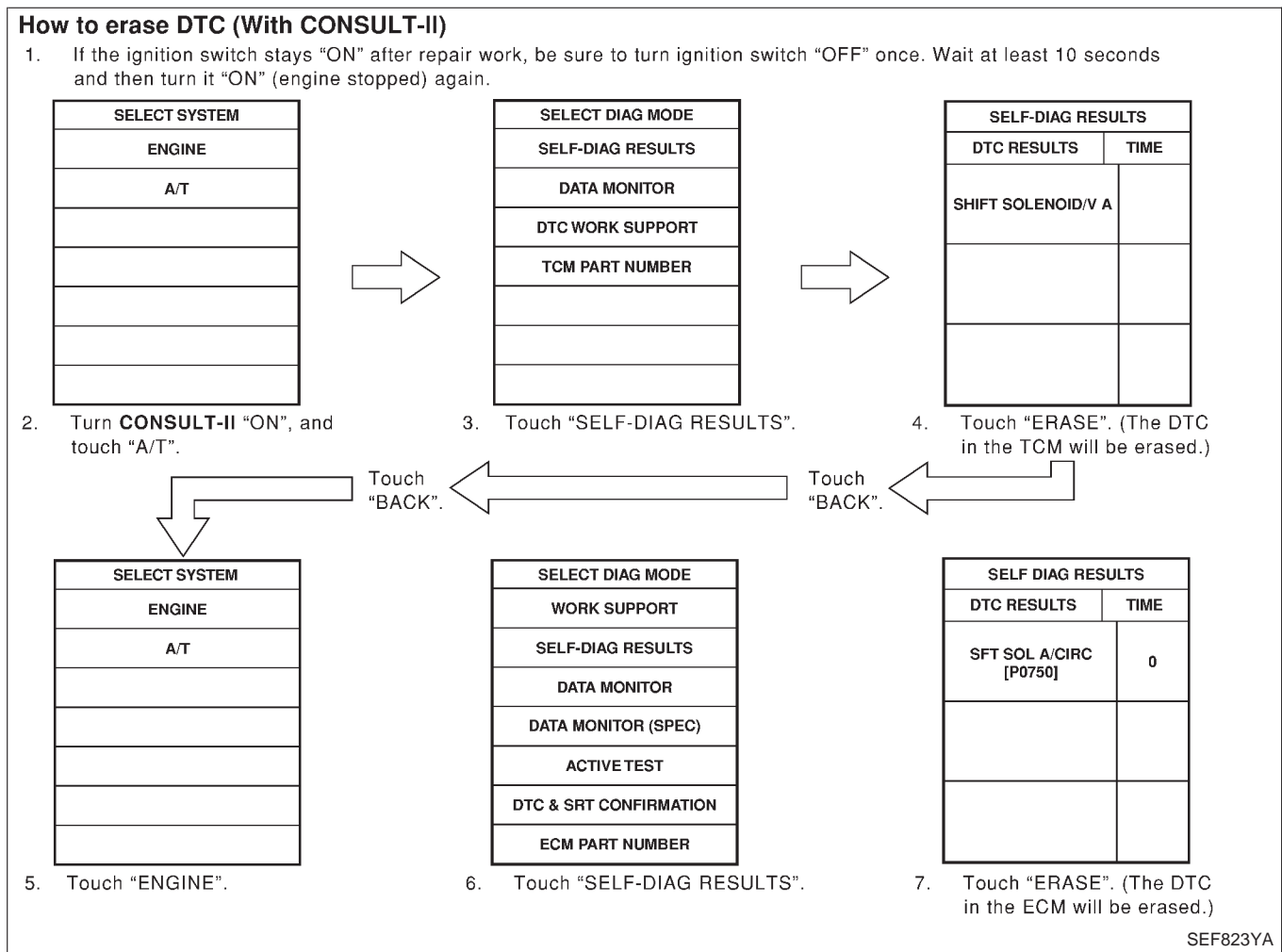
If the DTC is not for A/T related items (see EC-8), skip steps 2 through 4.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
2. Turn CONSULT-II "ON" and touch "A/T".
3. Touch "SELF-DIAG RESULTS".
4. Touch "ERASE". [The DTC in the TCM (Transmission control module) will be erased.] Then touch "BACK" twice.
5. Touch "ENGINE".

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

6. Touch "SELF-DIAG RESULTS".
7. Touch "ERASE". (The DTC in the ECM will be erased.)
- If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).



The emission related diagnostic information in the ECM can be erased by selecting "ERASE" in the "SELF-DIAG RESULTS" mode with CONSULT-II.

## How to Erase DTC (GST) With GST

NCEC0031S0602

### NOTE:

If the DTC is not for A/T related items (see EC-8), skip step 2.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
2. Perform "SELF-DIAGNOSTIC PROCEDURE (Without CONSULT-II)" in AT section titled "TROUBLE DIAGNOSIS", "Self-diagnosis". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with GST (Generic Scan Tool).

The emission related diagnostic information in the ECM can be erased by selecting Mode 4 with GST.

- If the battery is disconnected, the emission-related diagnostic information will be lost after approx. 24 hours.
- The following data are cleared when the ECM memory is erased.
  - 1) Diagnostic trouble codes
  - 2) 1st trip diagnostic trouble codes
  - 3) Freeze frame data
  - 4) 1st trip freeze frame data
  - 5) System readiness test (SRT) codes



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

- 6) Test values
- 7) Others

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

## IVIS (INFINITI VEHICLE IMMOBILIZER SYSTEM — NATS)

NCEC0031S07

| SELF DIAG RESULTS           |      |
|-----------------------------|------|
| DTC RESULTS                 | TIME |
| NATS MALFUNCTION<br>[P1610] | 0    |
|                             |      |
|                             |      |

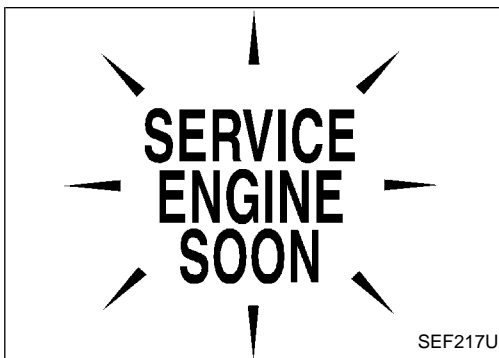
SEF515Y

- If the security indicator lights up with the ignition switch in the “ON” position or “NATS MALFUNCTION” is displayed on “SELF-DIAG RESULTS” screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to EL-249, “IVIS (INFINITI Vehicle Immobilizer System — NATS)”.
- Confirm no self-diagnostic results of IVIS (NATS) is displayed before touching “ERASE” in “SELF-DIAG RESULTS” mode with CONSULT-II.
- When replacing ECM, initialization of IVIS (NATS) system and registration of all IVIS (NATS) ignition key IDs must be carried out with CONSULT-II using NATS program card. Therefore, be sure to receive all keys from vehicle owner. Regarding the procedures of IVIS (NATS) initialization and IVIS (NATS) ignition key ID registration, refer to CONSULT-II operation manual, IVIS/NVIS.

## Malfunction Indicator Lamp (MIL)

### DESCRIPTION

NCEC0032



The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
  - If the MIL does not light up, refer to EL-98, “WARNING LAMPS” or see EC-609.
2. When the engine is started, the MIL should go off.  
If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.




# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Malfunction Indicator Lamp (MIL) (Cont'd)

## On Board Diagnostic System Function

=NCEC0032S01

The on board diagnostic system has the following two functions.

| Diagnostic Test Mode | KEY and ENG. Status                                                                                                                                                                                                          | Function            | Explanation of Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mode I               | Ignition switch in "ON" position<br><br>Engine stopped<br> | BULB CHECK          | This function checks the MIL bulb for damage (blown, open circuit, etc.).<br>If the MIL does not come on, check MIL circuit.                                                                                                                                                                                                                                                                                                                                                                                                |
|                      | Engine running<br>                                                                                                                          | MALFUNCTION WARNING | This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected.<br>The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> <li>● Coolant overtemperature enrichment protection</li> <li>● "Misfire (Possible three way catalyst damage)"</li> <li>● "Closed loop control"</li> <li>● Fail-safe mode</li> </ul> |

### Diagnostic Test Mode I — Bulb Check

NCEC0032S0102

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to EL-98, "WARNING LAMPS" or see EC-609.

### Diagnostic Test Mode I — Malfunction Warning

NCEC0032S0103

| MIL | Condition                                                            |
|-----|----------------------------------------------------------------------|
| ON  | When the malfunction is detected or the ECM's CPU is malfunctioning. |
| OFF | No malfunction.                                                      |

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart

## OBD System Operation Chart

=NCEC0033

### RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

NCEC0033S01

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory. GI
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on. For details, refer to “Two Trip Detection Logic” on EC-67. MA
- The MIL will go off after the vehicle is driven 3 times with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset. EM
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The “TIME” in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-II will count the number of times the vehicle is driven. LC
- The 1st trip DTC is not displayed when the self-diagnosis results in “OK” for the 2nd trip. EC

### SUMMARY CHART

NCEC0033S02

| Items                               | Fuel Injection System | Misfire           | Other          |
|-------------------------------------|-----------------------|-------------------|----------------|
| MIL (goes off)                      | 3 (pattern B)         | 3 (pattern B)     | 3 (pattern B)  |
| DTC, Freeze Frame Data (no display) | 80 (pattern C)        | 80 (pattern C)    | 40 (pattern A) |
| 1st Trip DTC (clear)                | 1 (pattern C), *1     | 1 (pattern C), *1 | 1 (pattern B)  |
| 1st Trip Freeze Frame Data (clear)  | *1, *2                | *1, *2            | 1 (pattern B)  |

For details about patterns “B” and “C” under “Fuel Injection System” and “Misfire”, see EC-85.

For details about patterns “A” and “B” under “Other”, see EC-87.

\*1: Clear timing is at the moment OK is detected.

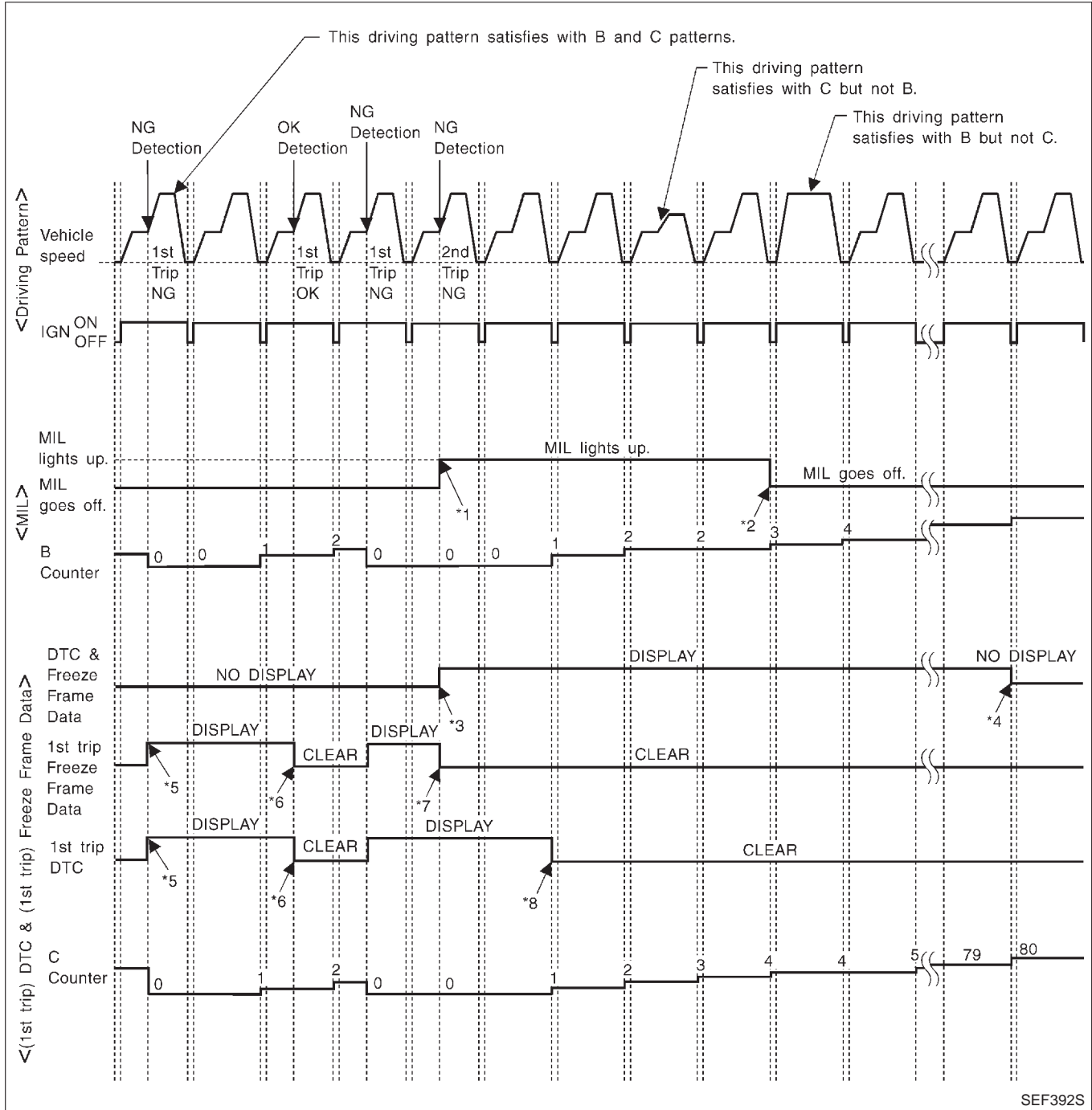
\*2: Clear timing is when the same malfunction is detected in the 2nd trip.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

## RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR "MISFIRE" <EXHAUST QUALITY DETERIORATION>, "FUEL INJECTION SYSTEM"

=NCEC0033S03



SEF392S

- \*1: When the same malfunction is detected in two consecutive trips, MIL will light up.
- \*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.
- \*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.
- \*4: The DTC and the freeze frame

- data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- \*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.
- \*6: The 1st trip DTC and the 1st trip

- freeze frame data will be cleared at the moment OK is detected.
- \*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.
- \*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

## EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”

=NCEC0033S04

NCEC0033S0401

### Driving Pattern B

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MIL will go off when the B counter reaches 3. (\*2 in “OBD SYSTEM OPERATION CHART”)

### Driving Pattern C

NCEC0033S0402

Driving pattern C means the vehicle operation as follows:

1) The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data)  $\pm 375$  rpm

Calculated load value: (Calculated load value in the freeze frame data)  $\times (1 \pm 0.1)$  [%]

Engine coolant temperature (T) condition:

- When the freeze frame data shows lower than 70°C (158°F), “T” should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), “T” should be higher than or equal to 70°C (158°F).

Example:

If the stored freeze frame data is as follows:

Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)

To be satisfied with driving pattern C, the vehicle should run under the following conditions:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of (1).
- The C counter will be counted up when (1) is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

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BR

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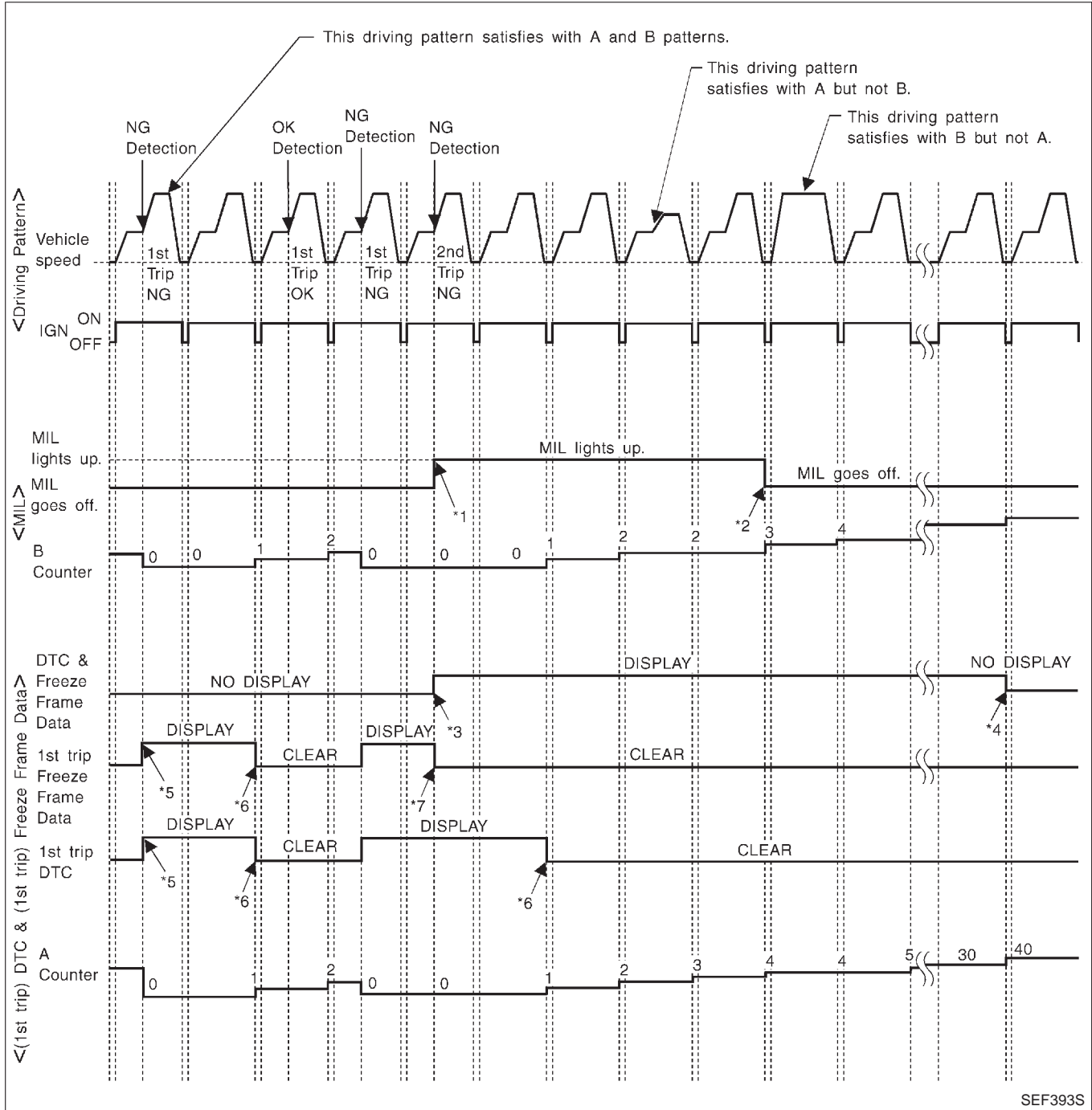
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# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

## RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

NCEC0033S05



SEF393S

- \*1: When the same malfunction is detected in two consecutive trips, MIL will light up.
- \*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.
- \*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

- \*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- \*5: When a malfunction is detected for the first time, the 1st trip DTC

- and the 1st trip freeze frame data will be stored in ECM.
- \*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.
- \*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

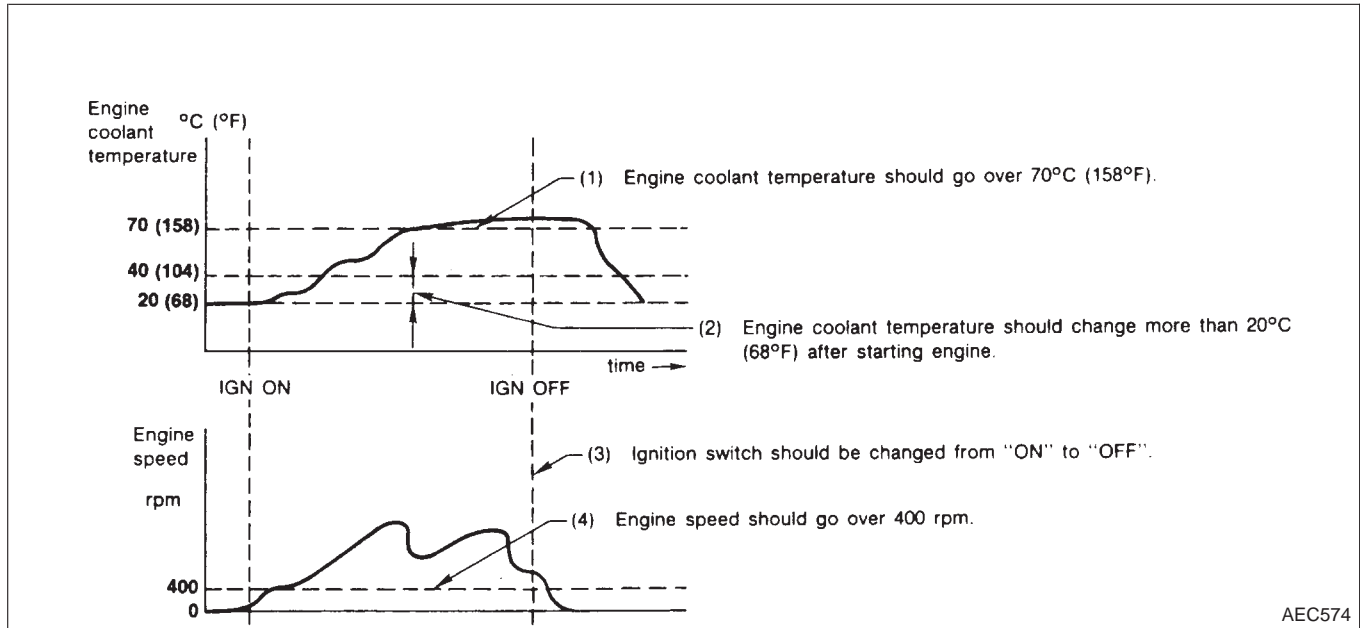
OBD System Operation Chart (Cont'd)

## EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

NCEC0033S06

### Driving Pattern A

NCEC0033S0601



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

### Driving Pattern B

NCEC0033S0602

Driving pattern B means the vehicle operation as follows:

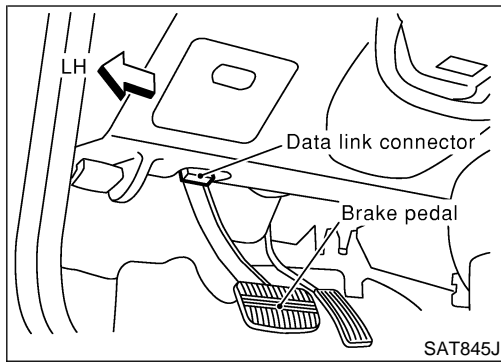
All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will go off when the B counter reaches 3 (\*2 in "OBD SYSTEM OPERATION CHART").

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II



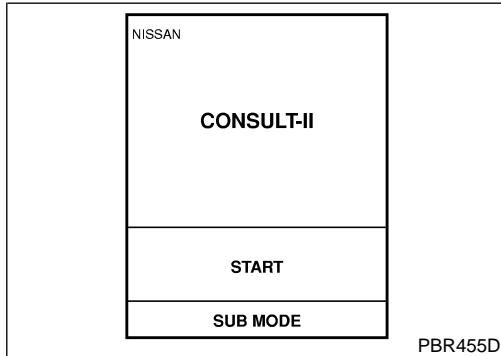
## CONSULT-II

### CONSULT-II INSPECTION PROCEDURE

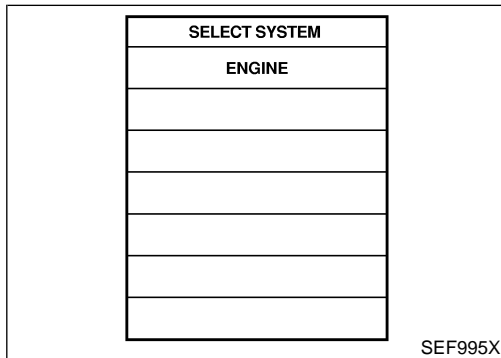
=NCEC0504

NCEC0504S01

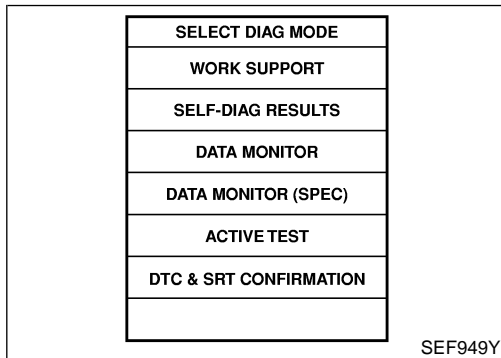
1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector, which is located under LH dash panel near the fuse box cover.



3. Turn ignition switch ON.
4. Touch "START".



5. Touch "ENGINE".



6. Perform each diagnostic test mode according to each service procedure.

**For further information, see the CONSULT-II Operation Manual.**



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

## ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

NCEC0504S02

| Item                                    |                                                                   | DIAGNOSTIC TEST MODE |                         |                     |               |                      |             |                        | GI<br>MA<br>EM<br>LC<br>EC<br>FE<br>CL<br>MT<br>AT<br>AX<br>SU<br>BR<br>ST<br>RS<br>BT<br>HA<br>SC<br>EL<br>IDX |                   |
|-----------------------------------------|-------------------------------------------------------------------|----------------------|-------------------------|---------------------|---------------|----------------------|-------------|------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------|
|                                         |                                                                   | WORK SUP-PORT        | SELF-DIAGNOSTIC RESULTS |                     | DATA MONI-TOR | DATA MONI-TOR (SPEC) | ACTIVE TEST | DTC & SRT CONFIRMATION |                                                                                                                 |                   |
|                                         |                                                                   |                      | DTC*1                   | FREEZE FRAME DATA*2 |               |                      |             | SRT STATUS             |                                                                                                                 | DTC WORK SUP-PORT |
| ENGINE CONTROL COMPONENT PARTS<br>INPUT | Camshaft position sensor                                          |                      | X                       | X                   | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Crankshaft position sensor (OBD)                                  |                      | X                       |                     |               |                      |             |                        |                                                                                                                 |                   |
|                                         | Mass air flow sensor                                              |                      | X                       |                     | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Engine coolant temperature sensor                                 |                      | X                       | X                   | X             | X                    | X           |                        |                                                                                                                 |                   |
|                                         | Heated oxygen sensor 1 (front)                                    |                      | X                       |                     | X             | X                    |             | X                      | X                                                                                                               |                   |
|                                         | Heated oxygen sensor 2 (rear)                                     |                      | X                       |                     | X             | X                    |             | X                      | X                                                                                                               |                   |
|                                         | Vehicle speed sensor                                              |                      | X                       | X                   | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Throttle position sensor                                          |                      | X                       | X                   | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Fuel tank temperature sensor                                      |                      | X                       |                     | X             | X                    | X           |                        |                                                                                                                 |                   |
|                                         | EVAP control system pressure sensor                               |                      | X                       |                     | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Absolute pressure sensor (Built into ECM)                         |                      | X                       |                     | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | EGR temperature sensor                                            |                      | X                       |                     | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Intake air temperature sensor                                     |                      | X                       | X                   | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Knock sensor                                                      |                      | X                       |                     |               |                      |             |                        |                                                                                                                 |                   |
|                                         | Ignition switch (start signal)                                    |                      |                         |                     | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Closed throttle position switch                                   |                      | X                       |                     | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Closed throttle position switch (throttle position sensor signal) |                      |                         |                     | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Air conditioner switch                                            |                      |                         |                     | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Park/neutral position (PNP) switch                                |                      | X                       |                     | X             | X                    |             |                        |                                                                                                                 |                   |
|                                         | Power steering oil pressure switch                                |                      |                         |                     | X             | X                    |             |                        |                                                                                                                 |                   |
| Battery voltage                         |                                                                   |                      |                         | X                   | X             |                      |             |                        |                                                                                                                 |                   |
| Load signal                             |                                                                   |                      |                         | X                   | X             |                      |             |                        |                                                                                                                 |                   |
| Fuel level sensor                       |                                                                   | X                    |                         | X                   | X             |                      |             |                        |                                                                                                                 |                   |

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

| Item                                     |                                                   | DIAGNOSTIC TEST MODE |                         |                     |               |                      |             |                        |                   |
|------------------------------------------|---------------------------------------------------|----------------------|-------------------------|---------------------|---------------|----------------------|-------------|------------------------|-------------------|
|                                          |                                                   | WORK SUP-PORT        | SELF-DIAGNOSTIC RESULTS |                     | DATA MONI-TOR | DATA MONI-TOR (SPEC) | ACTIVE TEST | DTC & SRT CONFIRMATION |                   |
|                                          |                                                   |                      | DTC*1                   | FREEZE FRAME DATA*2 |               |                      |             | SRT STATUS             | DTC WORK SUP-PORT |
| ENGINE CONTROL COMPONENT PARTS<br>OUTPUT | Injectors                                         |                      |                         |                     | X             | X                    | X           |                        |                   |
|                                          | Power transistor (Ignition timing)                | X                    |                         |                     | X             | X                    | X           |                        |                   |
|                                          | IACV-AAC valve                                    |                      | X                       |                     | X             | X                    | X           |                        |                   |
|                                          | EVAP canister purge volume control solenoid valve |                      | X                       |                     | X             | X                    | X           |                        | X                 |
|                                          | Air conditioner relay                             |                      |                         |                     | X             | X                    |             |                        |                   |
|                                          | Fuel pump relay                                   | X                    |                         |                     | X             | X                    | X           |                        |                   |
|                                          | Cooling fan                                       |                      | X                       |                     | X             | X                    | X           |                        |                   |
|                                          | EGR volume control valve                          |                      | X                       |                     | X             | X                    | X           |                        |                   |
|                                          | Heated oxygen sensor 1 heater (front)             |                      | X                       |                     | X             | X                    |             | X                      |                   |
|                                          | Heated oxygen sensor 2 heater (rear)              |                      | X                       |                     | X             | X                    |             | X                      |                   |
|                                          | EVAP canister vent control valve                  |                      | X                       |                     | X             | X                    | X           |                        |                   |
|                                          | Vacuum cut valve bypass valve                     |                      | X                       |                     | X             | X                    | X           |                        | X                 |
|                                          | Calculated load value                             |                      |                         | X                   | X             | X                    |             |                        |                   |

X: Applicable

\*1: This item includes 1st trip DTCs.

\*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-68.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

## FUNCTION

=NCEC0504S03

| Diagnostic test mode    | Function                                                                                                                                 |    |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----|
| Work support            | This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.    | GI |
| Self-diagnostic results | Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*1 | MA |
| Data monitor            | Input/Output data in the ECM can be read.                                                                                                | EM |
| Data monitor (SPEC)     | Input/Output specification of the Basic fuel schedule, AFM, A/F feedback control value and the other data monitor items can be read.     | LC |
| Active test             | Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range. | EC |
| DTC & SRT confirmation  | The status of system monitoring tests and the self-diagnosis status/result can be confirmed.                                             |    |
| ECM part number         | ECM part number can be read.                                                                                                             | FE |

\*1 The following emission-related diagnostic information is cleared when the ECM memory is erased.

- 1) Diagnostic trouble codes
- 2) 1st trip diagnostic trouble codes
- 3) Freeze frame data
- 4) 1st trip freeze frame data
- 5) System readiness test (SRT) codes
- 6) Test values
- 7) Others

## WORK SUPPORT MODE

NCEC0504S04

| WORK ITEM                  | CONDITION                                                                                                                                                                | USAGE                                                        |     |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----|
| TP SW/TP SEN IDLE POSI ADJ | ● FOLLOW THE BASIC INSPECTION IN THE SERVICE MANUAL.                                                                                                                     | When adjusting the idle throttle position.                   | AX  |
| IGNITION TIMING ADJ        | ● IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING "START". AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR. | When adjusting initial ignition timing                       | SU  |
| FUEL PRESSURE RELEASE      | ● FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.                                                                          | When releasing fuel pressure from fuel line                  | BR  |
| IDLE AIR VOL LEARN         | ● THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.                                                                              | When learning the idle air volume                            | ST  |
| SELF-LEARNING CONT         | ● THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.                                                                            | When clearing the coefficient of self-learning control value | RS  |
|                            |                                                                                                                                                                          |                                                              | BT  |
|                            |                                                                                                                                                                          |                                                              | HA  |
|                            |                                                                                                                                                                          |                                                              | SC  |
|                            |                                                                                                                                                                          |                                                              | EL  |
|                            |                                                                                                                                                                          |                                                              | IDX |

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

| WORK ITEM            | CONDITION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | USAGE                                               |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| EVAP SYSTEM CLOSE    | <p>OPEN THE VACUUM CUT VALVE BYPASS VALVE AND CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> <li>● IGN SW "ON"</li> <li>● ENGINE NOT RUNNING</li> <li>● AMBIENT TEMPERATURE IS ABOVE 0°C (32°F).</li> <li>● NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM</li> <li>● TANK FUEL TEMP. IS MORE THAN 0°C (32°F).</li> <li>● WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE"</li> <li>● WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION.</li> </ul> <p><b>NOTE:</b><br/> <b>WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</b></p> | When detecting EVAP vapor leak point of EVAP system |
| TARGET IDLE RPM ADJ* | <ul style="list-style-type: none"> <li>● IDLE CONDITION</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | When setting target idle speed                      |

\*: This function is not necessary in the usual service procedure.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

## SELF-DIAGNOSTIC MODE

=NCEC0504S05

### DTC and 1st Trip DTC

Regarding items of "DTC and 1st trip DTC", refer to "TROUBLE DIAGNOSIS — INDEX" (See EC-8.)

NCEC0504S0501

### Freeze Frame Data and 1st Trip Freeze Frame Data

NCEC0504S0502

| Freeze frame data item*1   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DIAG TROUBLE CODE [PXXXX]  | <ul style="list-style-type: none"> <li>The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to "TROUBLE DIAGNOSIS — INDEX", EC-8.)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                          |
| FUEL SYS-B1                | <ul style="list-style-type: none"> <li>"Fuel injection system status" at the moment a malfunction is detected is displayed.</li> <li>One mode in the following is displayed.                             <ul style="list-style-type: none"> <li>"MODE 2": Open loop due to detected system malfunction</li> <li>"MODE 3": Open loop due to driving conditions (power enrichment, deceleration enrichment)</li> <li>"MODE 4": Closed loop - using oxygen sensor(s) as feedback for fuel control</li> <li>"MODE 5": Open loop - has not yet satisfied condition to go to closed loop</li> </ul> </li> </ul> |
| CAL/LD VALUE [%]           | <ul style="list-style-type: none"> <li>The calculated load value at the moment a malfunction is detected is displayed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| COOLANT TEMP [°C] or [°F]  | <ul style="list-style-type: none"> <li>The engine coolant temperature at the moment a malfunction is detected is displayed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| S-FUEL TRIM-B1 [%]         | <ul style="list-style-type: none"> <li>"Short-term fuel trim" at the moment a malfunction is detected is displayed.</li> <li>The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.</li> </ul>                                                                                                                                                                                                                                                                                                                                                      |
| L-FUEL TRIM-B1 [%]         | <ul style="list-style-type: none"> <li>"Long-term fuel trim" at the moment a malfunction is detected is displayed.</li> <li>The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.</li> </ul>                                                                                                                                                                                                                                                                                                                                     |
| ENGINE SPEED [rpm]         | <ul style="list-style-type: none"> <li>The engine speed at the moment a malfunction is detected is displayed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| VHCL SPEED [km/h] or [mph] | <ul style="list-style-type: none"> <li>The vehicle speed at the moment a malfunction is detected is displayed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| ABSOL TH-P/S [%]           | <ul style="list-style-type: none"> <li>The throttle valve opening angle at the moment a malfunction is detected is displayed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| B/FUEL SCHDL [msec]        | <ul style="list-style-type: none"> <li>The base fuel schedule at the moment a malfunction is detected is displayed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| INT/A TEMP SE [°C] or [°F] | <ul style="list-style-type: none"> <li>The intake air temperature at the moment a malfunction is detected is displayed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

\*1: The items are the same as those of 1st trip freeze frame data.

GI  
MA  
EM  
LC  
EC  
FE  
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AT  
AX  
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BR  
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RS  
BT  
HA  
SC  
EL  
IDX

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

## DATA MONITOR MODE

=NCEC0504S06

| Monitored item [Unit]         | ECM input signals | Main signals | Description                                                                                                                                                                                                                                                                                                                                        | Remarks                                                                                                                                                                                                                                                                               |
|-------------------------------|-------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ENG SPEED [rpm]               | ○                 | ○            | <ul style="list-style-type: none"> <li>Indicates the engine speed computed from the REF signal (180° signal) of the camshaft position sensor.</li> </ul>                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                       |
| MAS A/F SE-B1 [V]             | ○                 | ○            | <ul style="list-style-type: none"> <li>The signal voltage of the mass air flow sensor is displayed.</li> </ul>                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>                                                                                                                                                                           |
| B/FUEL SCHDL [msec]           |                   |              | <ul style="list-style-type: none"> <li>"Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.</li> </ul>                                                                                                                                                                     |                                                                                                                                                                                                                                                                                       |
| A/F ALPHA-B1 [%]              |                   | ○            | <ul style="list-style-type: none"> <li>The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.</li> </ul>                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> </ul>                                                                                        |
| COOLAN TEMP/S [°C] or [°F]    | ○                 | ○            | <ul style="list-style-type: none"> <li>The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.</li> </ul>                                                                                                                                                                         | <ul style="list-style-type: none"> <li>When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.</li> </ul>                                                                |
| HO2S1 (B1) [V]                | ○                 | ○            | <ul style="list-style-type: none"> <li>The signal voltage of the heated oxygen sensor 1 (front) is displayed.</li> </ul>                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                       |
| HO2S2 (B1) [V]                | ○                 | ○            | <ul style="list-style-type: none"> <li>The signal voltage of the heated oxygen sensor 2 (rear) is displayed.</li> </ul>                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                       |
| HO2S1 MNTR (B1) [RICH/LEAN]   | ○                 |              | <ul style="list-style-type: none"> <li>Display of heated oxygen sensor 1 (front) signal during air-fuel ratio feedback control:<br/>RICH ... means the mixture became "rich", and control is being affected toward a leaner mixture.<br/>LEAN ... means the mixture became "lean", and control is being affected toward a rich mixture.</li> </ul> | <ul style="list-style-type: none"> <li>After turning ON the ignition switch, "RICH" is displayed until air-fuel mixture ratio feedback control begins.</li> <li>When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.</li> </ul> |
| HO2S2 MNTR (B1) [RICH/LEAN]   | ○                 |              | <ul style="list-style-type: none"> <li>Display of heated oxygen sensor 2 (rear) signal:<br/>RICH ... means the amount of oxygen after three way catalyst is relatively small.<br/>LEAN ... means the amount of oxygen after three way catalyst is relatively large.</li> </ul>                                                                     | <ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>                                                                                                                                                                           |
| VHCL SPEED SE [km/h] or [mph] | ○                 | ○            | <ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed sensor signal is displayed.</li> </ul>                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                       |
| BATTERY VOLT [V]              | ○                 | ○            | <ul style="list-style-type: none"> <li>The power supply voltage of ECM is displayed.</li> </ul>                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                       |
| THRTL POS SEN [V]             | ○                 | ○            | <ul style="list-style-type: none"> <li>The throttle position sensor signal voltage is displayed.</li> </ul>                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                       |
| FUEL T/TMP SE [°C] or [°F]    | ○                 |              | <ul style="list-style-type: none"> <li>The fuel temperature judged from the tank fuel temperature sensor signal voltage is displayed.</li> </ul>                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                       |

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

| Monitored item [Unit]      | ECM input signals | Main signals | Description                                                                                                                                                                                                                                                                                    | Remarks                                                                                                                           |           |
|----------------------------|-------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------|
| INT/A TEMP SE [°C] or [°F] | ○                 | ○            | <ul style="list-style-type: none"> <li>The intake air temperature determined by the signal voltage of the intake air temperature sensor is indicated.</li> </ul>                                                                                                                               |                                                                                                                                   | GI        |
| EGR TEMP SEN [V]           | ○                 | ○            | <ul style="list-style-type: none"> <li>The signal voltage of the EGR temperature sensor is displayed.</li> </ul>                                                                                                                                                                               |                                                                                                                                   | MA        |
| EVAP SYS PRES [V]          | ○                 |              | <ul style="list-style-type: none"> <li>The signal voltage of EVAP control system pressure sensor is displayed.</li> </ul>                                                                                                                                                                      |                                                                                                                                   | EM        |
| ABSOL PRES/SE [V]          | ○                 |              | <ul style="list-style-type: none"> <li>The signal voltage of the absolute pressure sensor is displayed.</li> </ul>                                                                                                                                                                             |                                                                                                                                   | LC        |
| FUEL LEVEL SE [V]          | ○                 |              | <ul style="list-style-type: none"> <li>The signal voltage of the fuel level sensor is displayed.</li> </ul>                                                                                                                                                                                    |                                                                                                                                   | <b>EC</b> |
| START SIGNAL [ON/OFF]      | ○                 | ○            | <ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the starter signal.</li> </ul>                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>After starting the engine, [OFF] is displayed regardless of the starter signal.</li> </ul> | FE        |
| CLSD THL POS [ON/OFF]      | ○                 | ○            | <ul style="list-style-type: none"> <li>Indicates idle position [ON/OFF] computed by ECM according to the throttle position sensor signal.</li> </ul>                                                                                                                                           |                                                                                                                                   | CL        |
| CLSD THL/P SW [ON/OFF]     | ○                 |              | <ul style="list-style-type: none"> <li>Indicates mechanical contact [ON/OFF] condition of the closed throttle position switch.</li> </ul>                                                                                                                                                      |                                                                                                                                   | MT        |
| AIR COND SIG [ON/OFF]      | ○                 | ○            | <ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.</li> </ul>                                                                                                                                      |                                                                                                                                   | AT        |
| P/N POSI SW [ON/OFF]       | ○                 | ○            | <ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.</li> </ul>                                                                                                                                                             |                                                                                                                                   | AX        |
| PW/ST SIGNAL [ON/OFF]      | ○                 | ○            | <ul style="list-style-type: none"> <li>[ON/OFF] condition of the power steering oil pressure switch determined by the power steering oil pressure signal is indicated.</li> </ul>                                                                                                              |                                                                                                                                   | SU        |
| LOAD SIGNAL [ON/OFF]       | ○                 | ○            | <ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the electrical load signal and/or lighting switch.</li> <li>ON ... rear defogger is operating and/or lighting switch is on.</li> <li>OFF ... rear defogger is not operating and lighting switch is not on.</li> </ul> |                                                                                                                                   | BR        |
| IGNITION SW [ON/OFF]       | ○                 |              | <ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ignition switch.</li> </ul>                                                                                                                                                                                           |                                                                                                                                   | ST        |
| INJ PULSE-B1 [msec]        |                   | ○            | <ul style="list-style-type: none"> <li>Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.</li> </ul>                                                                                                                                           | <ul style="list-style-type: none"> <li>When the engine is stopped, a certain computed value is indicated.</li> </ul>              | RS        |
| IGN TIMING [BTDC]          |                   | ○            | <ul style="list-style-type: none"> <li>Indicates the ignition timing computed by ECM according to the input signals.</li> </ul>                                                                                                                                                                | <ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>                       | BT        |
| CAL/LD VALUE [%]           |                   |              | <ul style="list-style-type: none"> <li>"Calculated load value" indicates the value of the current airflow divided by peak airflow.</li> </ul>                                                                                                                                                  |                                                                                                                                   | HA        |
| ABSOL TH-P/S [%]           |                   |              | <ul style="list-style-type: none"> <li>"Absolute throttle position sensor" indicates the throttle valve opening angle computed by ECM according to the signal voltage of the throttle position sensor.</li> </ul>                                                                              |                                                                                                                                   | SC        |
|                            |                   |              |                                                                                                                                                                                                                                                                                                |                                                                                                                                   | EL        |
|                            |                   |              |                                                                                                                                                                                                                                                                                                |                                                                                                                                   | IDX       |

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

| Monitored item [Unit]      | ECM input signals | Main signals | Description                                                                                                                                                                                                                                               | Remarks |
|----------------------------|-------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| MASS AIRFLOW [g·m/s]       |                   |              | <ul style="list-style-type: none"> <li>Indicates the mass airflow computed by ECM according to the signal voltage of the mass airflow sensor.</li> </ul>                                                                                                  |         |
| IACV-AAC/V [step]          |                   | ○            | <ul style="list-style-type: none"> <li>Indicates the IACV-AAC valve control value computed by ECM according to the input signals.</li> </ul>                                                                                                              |         |
| PURG VOL C/V [%]           |                   |              | <ul style="list-style-type: none"> <li>Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals.</li> <li>The opening becomes larger as the value increases.</li> </ul>           |         |
| EGR VOL CON/V [step]       |                   | ○            | <ul style="list-style-type: none"> <li>Indicates the EGR volume control value computed by the ECM according to the input signals.</li> <li>The opening becomes larger as the value increases.</li> </ul>                                                  |         |
| AIR COND RLY [ON/OFF]      |                   | ○            | <ul style="list-style-type: none"> <li>The air conditioner relay control condition (determined by ECM according to the input signal) is indicated.</li> </ul>                                                                                             |         |
| FUEL PUMP RLY [ON/OFF]     |                   | ○            | <ul style="list-style-type: none"> <li>Indicates the fuel pump relay control condition determined by ECM according to the input signals.</li> </ul>                                                                                                       |         |
| VC/V BYPASS/V [ON/OFF]     |                   |              | <ul style="list-style-type: none"> <li>The control condition of the vacuum cut valve bypass valve (determined by ECM according to the input signal) is indicated.</li> <li>ON ... Open</li> <li>OFF ... Closed</li> </ul>                                 |         |
| VENT CONT/V [ON/OFF]       |                   |              | <ul style="list-style-type: none"> <li>The control condition of the EVAP canister vent control valve (determined by ECM according to the input signal) is indicated.</li> <li>ON ... Closed</li> <li>OFF ... Open</li> </ul>                              |         |
| COOLING FAN [HIGH/LOW/OFF] |                   |              | <ul style="list-style-type: none"> <li>Indicates the control condition of the cooling fan (determined by ECM according to the input signal).</li> <li>HIGH ... High speed operation</li> <li>LOW ... Low speed operation</li> <li>OFF ... Stop</li> </ul> |         |
| HO2S1 HTR (B1) [ON/OFF]    |                   |              | <ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of heated oxygen sensor 1 heater (front) determined by ECM according to the input signals.</li> </ul>                                                                                 |         |
| HO2S2 HTR (B1) [ON/OFF]    |                   |              | <ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of heated oxygen sensor 2 heater (rear) determined by ECM according to the input signals.</li> </ul>                                                                                  |         |



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

| Monitored item [Unit]            | ECM input signals | Main signals | Description                                                                                                                                                                                                                                                                                                                                     | Remarks                                                                                                                                                                                                                                           |
|----------------------------------|-------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IDL A/V LEAN                     |                   |              | <ul style="list-style-type: none"> <li>Display the condition of idle air volume learning</li> <li>YET ... Idle air volume learning has not been performed yet.</li> <li>CMPLT ... Idle air volume learning has already been performed successfully.</li> <li>INCMP ... Idle air volume learning has not been performed successfully.</li> </ul> |                                                                                                                                                                                                                                                   |
| TRVL AFTER MIL [km] or [Mile]    |                   |              | <ul style="list-style-type: none"> <li>Distance traveled while MIL is activated</li> </ul>                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                   |
| Voltage [V]                      |                   |              | <ul style="list-style-type: none"> <li>Voltage measured by the voltage probe.</li> </ul>                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                   |
| Frequently [msec] or [Hz] or [%] |                   |              | <ul style="list-style-type: none"> <li>Pulse width, frequency or duty cycle measured by the pulse probe.</li> </ul>                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Only “#” is displayed if item is unable to be measured.</li> <li>Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.</li> </ul> |

**NOTE:**

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

## DATA MONITOR (SPEC) MODE

NCEC0504S11

| Monitored item [Unit] | ECM input signals | Main signals | Description                                                                                                                                                                    | Remarks                                                                                                                                                                                       |
|-----------------------|-------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAS A/F SE-B1 [V]     | ○                 | ○            | <ul style="list-style-type: none"> <li>The signal voltage of the mass air flow sensor specification is displayed.</li> </ul>                                                   | <ul style="list-style-type: none"> <li>When engine is running specification range is indicated.</li> </ul>                                                                                    |
| B/FUEL SCHDL [msec]   |                   |              | <ul style="list-style-type: none"> <li>“Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.</li> </ul> | <ul style="list-style-type: none"> <li>When engine is running specification range is indicated.</li> </ul>                                                                                    |
| A/F ALPHA-B1 [%]      |                   | ○            | <ul style="list-style-type: none"> <li>The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.</li> </ul>                                      | <ul style="list-style-type: none"> <li>When engine is running specification range is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> </ul> |

**NOTE:**

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

## ACTIVE TEST MODE

NCEC0504S07

| TEST ITEM       | CONDITION                                                                                                                                                                           | JUDGEMENT                                      | CHECK ITEM (REMEDY)                                                                                                                     |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| FUEL INJECTION  | <ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change the amount of fuel injection using CONSULT-II.</li> </ul>                   | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> <li>Harness and connector</li> <li>Fuel injectors</li> <li>Heated oxygen sensor 1 (front)</li> </ul> |
| IGNITION TIMING | <ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Timing light: Set</li> <li>Retard the ignition timing using CONSULT-II.</li> </ul> | If trouble symptom disappears, see CHECK ITEM. | <ul style="list-style-type: none"> <li>Adjust initial ignition timing</li> </ul>                                                        |

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

| TEST ITEM             | CONDITION                                                                                                                                                                                                                     | JUDGEMENT                                              | CHECK ITEM (REMEDY)                                                                                                                                                                                                         |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IACV-AAC/V<br>OPENING | <ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine.</li> <li>● Change the IACV-AAC valve opening percent using CONSULT-II.</li> </ul>                                                         | Engine speed changes according to the opening percent. | <ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● IACV-AAC valve</li> </ul>                                                                                                                         |
| POWER BAL-<br>ANCE    | <ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine.</li> <li>● A/C switch "OFF"</li> <li>● Shift lever "N"</li> <li>● Cut off each injector signal one at a time using CONSULT-II.</li> </ul> | Engine runs rough or dies.                             | <ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Compression</li> <li>● Injectors</li> <li>● Power transistor</li> <li>● Spark plugs</li> <li>● Ignition coil</li> <li>● Ignition wires</li> </ul> |
| COOLING FAN           | <ul style="list-style-type: none"> <li>● Ignition switch: ON</li> <li>● Turn the cooling fan "HIGH", "LOW" and "OFF" using CONSULT-II.</li> </ul>                                                                             | Cooling fan moves high speed, low speed and stops.     | <ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Cooling fan motors</li> <li>● Cooling fan relays</li> </ul>                                                                                       |
| ENG COOLANT<br>TEMP   | <ul style="list-style-type: none"> <li>● Engine: Return to the original trouble condition</li> <li>● Change the engine coolant temperature using CONSULT-II.</li> </ul>                                                       | If trouble symptom disappears, see CHECK ITEM.         | <ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Engine coolant temperature sensor</li> <li>● Fuel injectors</li> </ul>                                                                            |
| FUEL PUMP<br>RELAY    | <ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Turn the fuel pump relay "ON" and "OFF" using CONSULT-II and listen to operating sound.</li> </ul>                                   | Fuel pump relay makes the operating sound.             | <ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Fuel pump relay</li> </ul>                                                                                                                        |
| EGR VOL<br>CONT/V     | <ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Change EGR volume control valve opening step using CONSULT-II.</li> </ul>                                                            | EGR volume control valve makes an operating sound.     | <ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● EGR volume control valve</li> </ul>                                                                                                               |
| PURG VOL<br>CONT/V    | <ul style="list-style-type: none"> <li>● Engine: After warming up, run engine at 1,500 rpm.</li> <li>● Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II.</li> </ul>              | Engine speed changes according to the opening percent. | <ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Solenoid valve</li> </ul>                                                                                                                         |
| FUEL/T TEMP<br>SEN    | <ul style="list-style-type: none"> <li>● Change the fuel tank temperature using CONSULT-II.</li> </ul>                                                                                                                        |                                                        |                                                                                                                                                                                                                             |
| VENT<br>CONTROL/V     | <ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound.</li> </ul>                                     | Solenoid valve makes an operating sound.               | <ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Solenoid valve</li> </ul>                                                                                                                         |
| VC/V BYPASS/V         | <ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound.</li> </ul>                                     | Solenoid valve makes an operating sound.               | <ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Solenoid valve</li> </ul>                                                                                                                         |

## DTC & SRT CONFIRMATION MODE

### SRT STATUS Mode

NCEC0504S08

For details, refer to "SYSTEM READINESS TEST (SRT) CODE", EC-69.

### SRT Work Support Mode

NCEC0504S0802

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

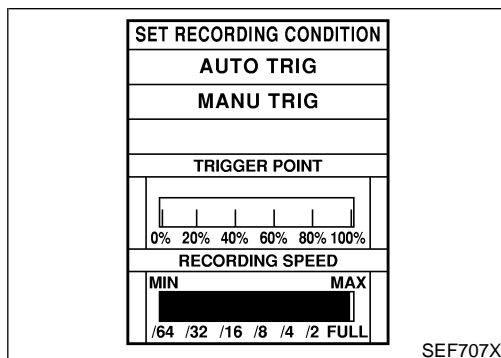
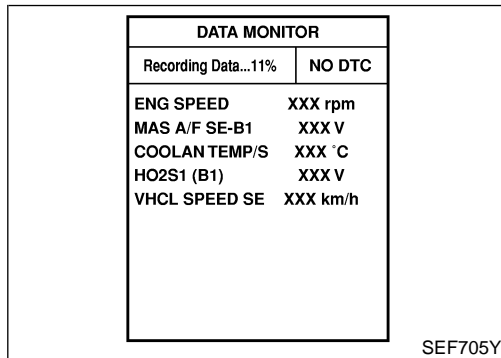
CONSULT-II (Cont'd)

## DTC Work Support Mode

NCEC0504S0803

| Test mode                      | Test item           | Condition                                         | Reference page                                    |                                                   |        |    |
|--------------------------------|---------------------|---------------------------------------------------|---------------------------------------------------|---------------------------------------------------|--------|----|
| EVAPORATIVE SYSTEM             | EVAP SML LEAK P0440 | Refer to corresponding trouble diagnosis for DTC. | EC-355                                            | GI                                                |        |    |
|                                | EVAP SML LEAK P1440 |                                                   | EC-491                                            | MA                                                |        |    |
|                                | PURG VOL CN/V P1444 |                                                   | EC-493                                            | EM                                                |        |    |
|                                | PURGE FLOW P1447    |                                                   | EC-513                                            | EM                                                |        |    |
|                                | VC CUT/V BP/V P1491 |                                                   | EC-544                                            | LC                                                |        |    |
| HEATED OXYGEN SENSOR 1 (FRONT) | HO2S1 (B1) P0130    |                                                   | Refer to corresponding trouble diagnosis for DTC. | EC-196                                            | LC     |    |
|                                | HO2S1 (B1) P0131    |                                                   |                                                   | EC-204                                            | EC     |    |
|                                | HO2S1 (B1) P0132    |                                                   |                                                   | EC-210                                            | EC     |    |
|                                | HO2S1 (B1) P0133    |                                                   |                                                   | EC-217                                            | FE     |    |
| HEATED OXYGEN SENSOR 2 (REAR)  | HO2S2 (B1) P0137    |                                                   |                                                   | Refer to corresponding trouble diagnosis for DTC. | EC-237 | FE |
|                                | HO2S2 (B1) P0138    | EC-245                                            |                                                   |                                                   | CL     |    |
|                                | HO2S2 (B1) P0139    | EC-253                                            |                                                   |                                                   | CL     |    |
| EGR SYSTEM                     | EGR SYSTEM P0400    | Refer to corresponding trouble diagnosis for DTC. |                                                   |                                                   | EC-334 | MT |
|                                | EGR SYSTEM P1402    |                                                   |                                                   |                                                   | EC-481 | MT |

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### REAL TIME DIAGNOSIS IN DATA MONITOR MODE (RECORDING VEHICLE DATA)

NCEC0504S09

CONSULT-II has two kinds of triggers and they can be selected by touching "SETTING" in "DATA MONITOR" mode.

- "AUTO TRIG" (Automatic trigger):
  - The malfunction will be identified on the CONSULT-II screen in real time. In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM. At the moment a malfunction is detected by ECM, "MONITOR" in "DATA MONITOR" screen is changed to "Recording Data ... xx%" as shown at left, and the data after the malfunction detection is recorded. Then when the percentage reached 100%, "REAL-TIME DIAG" screen is displayed. If "STOP" is touched on the screen during "Recording Data ... xx%", "REAL-TIME DIAG" screen is also displayed. The recording time after the malfunction detection and the recording speed can be changed by "TRIGGER POINT" and "Recording Speed". Refer to CONSULT-II OPERATION MANUAL.
- "MANU TRIG" (Manual trigger):
  - DTC/1st trip DTC and malfunction item will not be displayed

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

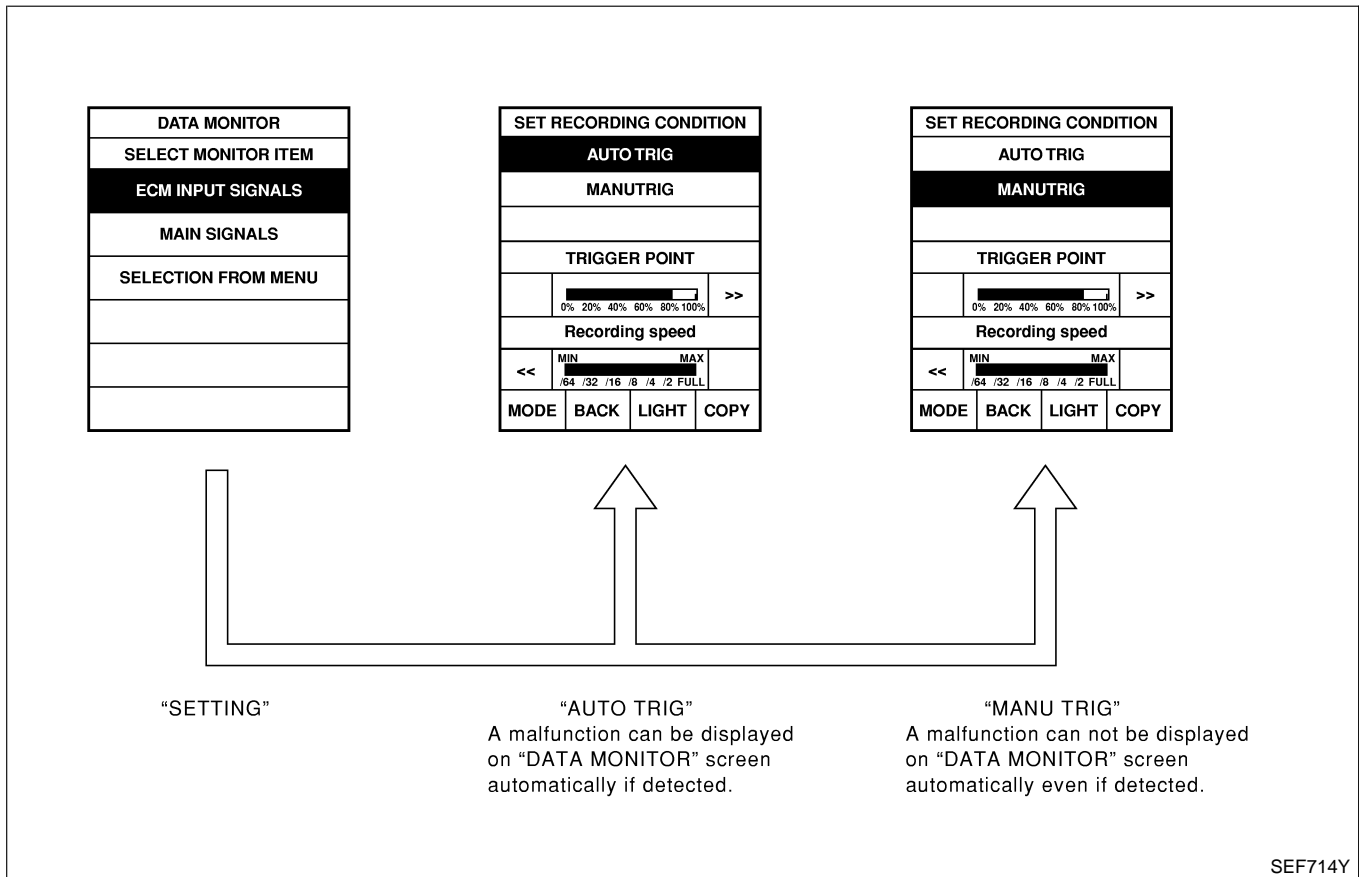
CONSULT-II (Cont'd)

automatically on CONSULT-II screen even though a malfunction is detected by ECM.

DATA MONITOR can be performed continuously even though a malfunction is detected.

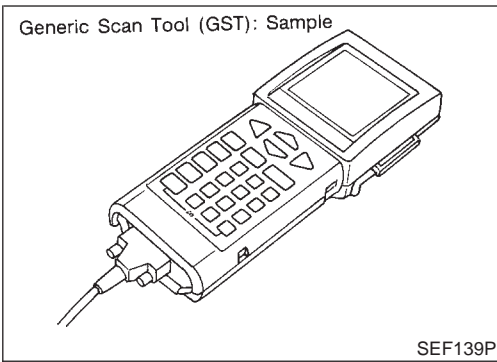
Use these triggers as follows:

- 1) "AUTO TRIG"
  - While trying to detect the DTC/1st trip DTC by performing the "DTC Confirmation Procedure", be sure to select to "DATA MONITOR (AUTO TRIG)" mode. You can confirm the malfunction at the moment it is detected.
  - While narrowing down the possible causes, CONSULT-II should be set in "DATA MONITOR (AUTO TRIG)" mode, especially in case the incident is intermittent. When you are inspecting the circuit by gently shaking (or twisting) the suspicious connectors, components and harness in the "DTC Confirmation Procedure", the moment a malfunction is found the DTC/1st trip DTC will be displayed. (Refer to GI-25, "Incident Simulation Tests".)
- 2) "MANU TRIG"
  - If the malfunction is displayed as soon as "DATA MONITOR" is selected, reset CONSULT-II to "MANU TRIG". By selecting "MANU TRIG" you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Generic Scan Tool (GST)



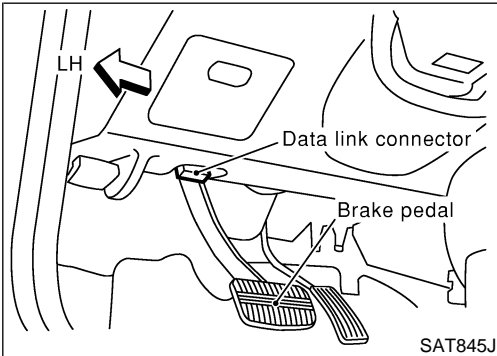
## Generic Scan Tool (GST)

=NCEC0035

### DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 7 different functions explained on the next page. ISO9141 is used as the protocol. The name "GST" or "Generic Scan Tool" is used in this service manual.

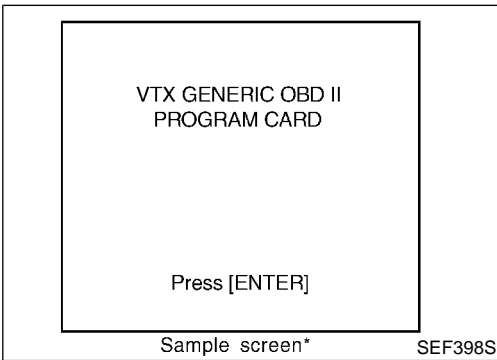
NCEC0035S01



### GST INSPECTION PROCEDURE

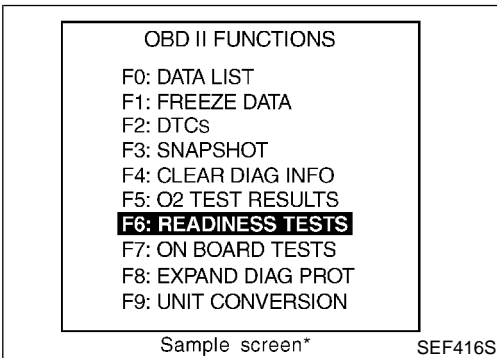
NCEC0035S02

1. Turn ignition switch OFF.
2. Connect "GST" to data link connector for GST. (Data link connector for GST is located under LH dash panel near the fuse box cover.)



3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.

(\*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic mode according to each service procedure.

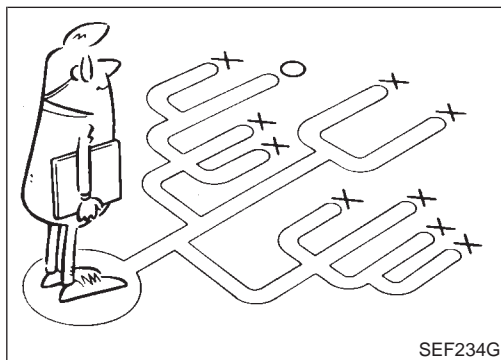
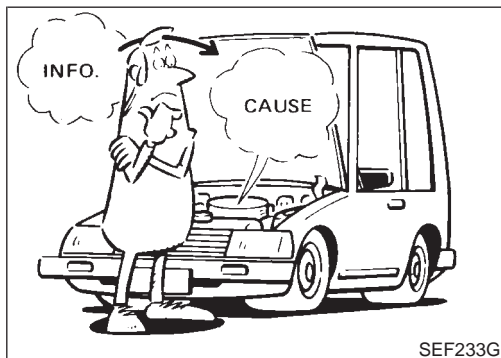
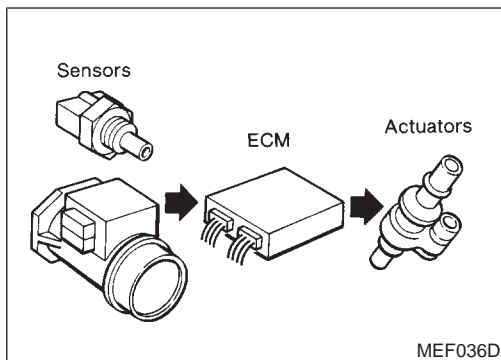
**For further information, see the GST Operation Manual of the tool maker.**

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# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Generic Scan Tool (GST) (Cont'd)

| FUNCTION             |                  | <small>NCEC0035S03</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Diagnostic test mode |                  | Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| MODE 1               | READINESS TESTS  | This mode gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| MODE 2               | (FREEZE DATA)    | This mode gains access to emission-related data value which were stored by ECM during the freeze frame. [For details, refer to "Freeze Frame Data" (EC-93).]                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| MODE 3               | DTCs             | This mode gains access to emission-related power train trouble codes which were stored by ECM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| MODE 4               | CLEAR DIAG INFO  | This mode can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> <li>● Clear number of diagnostic trouble codes (MODE 1)</li> <li>● Clear diagnostic trouble codes (MODE 3)</li> <li>● Clear trouble code for freeze frame data (MODE 1)</li> <li>● Clear freeze frame data (MODE 2)</li> <li>● Reset status of system monitoring test (MODE 1)</li> <li>● Clear on board monitoring test results (MODE 6 and 7)</li> </ul>                                                                                                                                           |
| MODE 6               | (ON BOARD TESTS) | This mode accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| MODE 7               | (ON BOARD TESTS) | This mode enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| MODE 8               | —                | This mode can close EVAP system in ignition switch "ON" position (Engine stopped). When this mode is performed, following parts can be opened or closed. <ul style="list-style-type: none"> <li>● EVAP canister vent control valve open</li> <li>● Vacuum cut valve bypass valve closed</li> </ul> In the following conditions, this mode cannot function. <ul style="list-style-type: none"> <li>● Low ambient temperature</li> <li>● Low battery voltage</li> <li>● Engine running</li> <li>● Ignition switch "OFF"</li> <li>● Low fuel temperature</li> <li>● Too much pressure is applied to EVAP system</li> </ul> |
| MODE 9               | (CALIBRATION ID) | This mode enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



**KEY POINTS**

|                    |                                                          |
|--------------------|----------------------------------------------------------|
| <b>WHAT</b> .....  | Vehicle & engine model                                   |
| <b>WHEN</b> .....  | Date, Frequencies                                        |
| <b>WHERE</b> ..... | Road conditions                                          |
| <b>HOW</b> .....   | Operating conditions,<br>Weather conditions,<br>Symptoms |

SEF907L

## Introduction

NCEC0036

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no problems such as vacuum leaks, fouled spark plugs, or other problems with the engine.

It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow" on EC-105.

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example on next page should be used.

Start your diagnosis by looking for "conventional" problems first. This will help troubleshoot driveability problems on an electronically controlled engine vehicle.

## DIAGNOSTIC WORKSHEET

NCEC0036S01

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make trouble-shooting faster and more accurate.

In general, each customer feels differently about a problem. It is important to fully understand the symptoms or conditions for a customer complaint.

Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

Some conditions may cause the malfunction indicator lamp to come on steady or blink and DTC to be detected. Examples:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere [for the models with EVAP (SMALL LEAK) diagnosis].

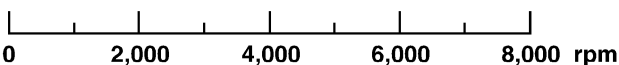
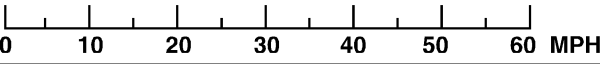
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# TROUBLE DIAGNOSIS — INTRODUCTION

Introduction (Cont'd)

## Worksheet Sample

NCEC0036S0101

|                            |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |
|----------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Customer name MR/MS        |                                       | Model & Year                                                                                                                                                                                                                                                                                                                                                                                                                                          | VIN             |
| Engine #                   |                                       | Trans.                                                                                                                                                                                                                                                                                                                                                                                                                                                | Mileage         |
| Incident Date              |                                       | Manuf. Date                                                                                                                                                                                                                                                                                                                                                                                                                                           | In Service Date |
| Fuel and fuel filler cap   |                                       | <input type="checkbox"/> Vehicle ran out of fuel causing misfire<br><input type="checkbox"/> Fuel filler cap was left off or incorrectly screwed on.                                                                                                                                                                                                                                                                                                  |                 |
| Symptoms                   | <input type="checkbox"/> Startability | <input type="checkbox"/> Impossible to start <input type="checkbox"/> No combustion <input type="checkbox"/> Partial combustion<br><input type="checkbox"/> Partial combustion affected by throttle position<br><input type="checkbox"/> Partial combustion NOT affected by throttle position<br><input type="checkbox"/> Possible but hard to start <input type="checkbox"/> Others [                                                  ]             |                 |
|                            | <input type="checkbox"/> Idling       | <input type="checkbox"/> No fast idle <input type="checkbox"/> Unstable <input type="checkbox"/> High idle <input type="checkbox"/> Low idle<br><input type="checkbox"/> Others [                                                  ]                                                                                                                                                                                                                  |                 |
|                            | <input type="checkbox"/> Driveability | <input type="checkbox"/> Stumble <input type="checkbox"/> Surge <input type="checkbox"/> Knock <input type="checkbox"/> Lack of power<br><input type="checkbox"/> Intake backfire <input type="checkbox"/> Exhaust backfire<br><input type="checkbox"/> Others [                                                  ]                                                                                                                                   |                 |
|                            | <input type="checkbox"/> Engine stall | <input type="checkbox"/> At the time of start <input type="checkbox"/> While idling<br><input type="checkbox"/> While accelerating <input type="checkbox"/> While decelerating<br><input type="checkbox"/> Just after stopping <input type="checkbox"/> While loading                                                                                                                                                                                 |                 |
| Incident occurrence        |                                       | <input type="checkbox"/> Just after delivery <input type="checkbox"/> Recently<br><input type="checkbox"/> In the morning <input type="checkbox"/> At night <input type="checkbox"/> In the daytime                                                                                                                                                                                                                                                   |                 |
| Frequency                  |                                       | <input type="checkbox"/> All the time <input type="checkbox"/> Under certain conditions <input type="checkbox"/> Sometimes                                                                                                                                                                                                                                                                                                                            |                 |
| Weather conditions         |                                       | <input type="checkbox"/> Not affected                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |
| Weather                    |                                       | <input type="checkbox"/> Fine <input type="checkbox"/> Raining <input type="checkbox"/> Snowing <input type="checkbox"/> Others [                                                  ]                                                                                                                                                                                                                                                                  |                 |
| Temperature                |                                       | <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold <input type="checkbox"/> Humid    °F                                                                                                                                                                                                                                                                                           |                 |
| Engine conditions          |                                       | <input type="checkbox"/> Cold <input type="checkbox"/> During warm-up <input type="checkbox"/> After warm-up<br><br>Engine speed                                                                                                                                                                                                                                  |                 |
| Road conditions            |                                       | <input type="checkbox"/> In town <input type="checkbox"/> In suburbs <input type="checkbox"/> Highway <input type="checkbox"/> Off road (up/down)                                                                                                                                                                                                                                                                                                     |                 |
| Driving conditions         |                                       | <input type="checkbox"/> Not affected<br><input type="checkbox"/> At starting <input type="checkbox"/> While idling <input type="checkbox"/> At racing<br><input type="checkbox"/> While accelerating <input type="checkbox"/> While cruising<br><input type="checkbox"/> While decelerating <input type="checkbox"/> While turning (RH/LH)<br><br>Vehicle speed  |                 |
| Malfunction indicator lamp |                                       | <input type="checkbox"/> Turned on <input type="checkbox"/> Not turned on                                                                                                                                                                                                                                                                                                                                                                             |                 |

MTBL0017

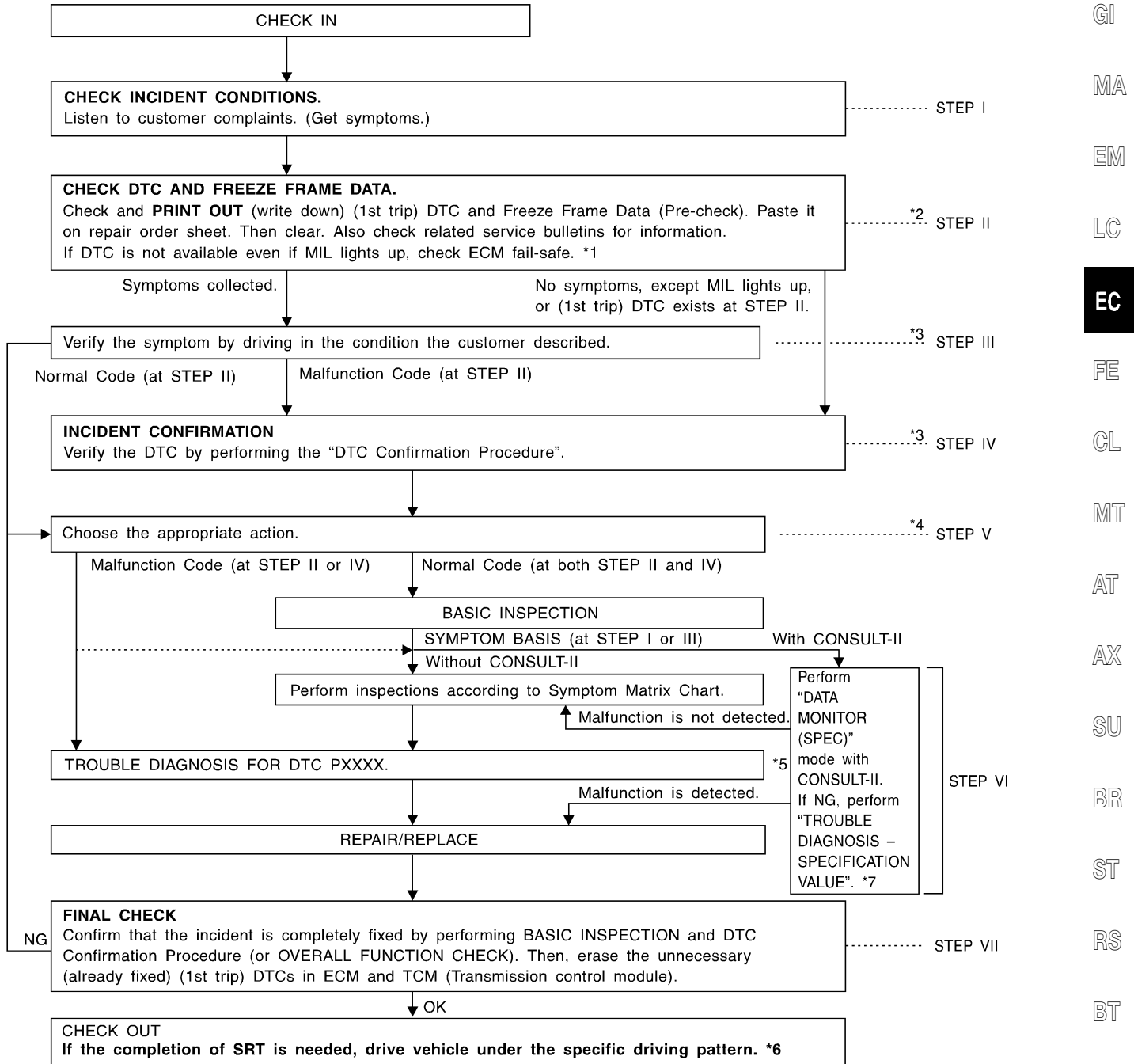


# TROUBLE DIAGNOSIS — INTRODUCTION

Work Flow

NCEC0037

## Work Flow



\*1: EC-124

\*2: If time data of "SELF-DIAG RESULTS" is other than "0" or "1t", refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT", EC-146.

\*3: If the incident cannot be duplicated, refer to "TROUBLE

DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.

\*4: If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to "TROUBLE DIAGNOSIS FOR POWER SUPPLY", EC-147.

\*5: If the malfunctioning part cannot be found, refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.

\*6: EC-74

\*7: EC-142

SEF510ZE

# TROUBLE DIAGNOSIS — INTRODUCTION

Work Flow (Cont'd)

## DESCRIPTION FOR WORK FLOW

NCEC0037S01

| STEP     | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STEP I   | Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DIAGNOSTIC WORK SHEET", EC-104.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| STEP II  | <p>Before confirming the concern, check and write down (print out using CONSULT-II or Generic Scan Tool) the (1st trip) Diagnostic Trouble Code (DTC) and the (1st trip) freeze frame data, then erase the code and the data. (Refer to EC-79.) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III &amp; IV.</p> <p>Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The "Symptom Matrix Chart" will be useful. See EC-125.)</p> <p>Also check related service bulletins for information.</p>                                                                                                                                                                                                                                                                                                                                                                                    |
| STEP III | <p>Try to confirm the symptom and under what conditions the incident occurs.</p> <p>The "DIAGNOSTIC WORK SHEET" and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results.</p> <p>If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to GI-25.)</p> <p>If the malfunction code is detected, skip STEP IV and perform STEP V.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| STEP IV  | <p>Try to detect the (1st trip) Diagnostic Trouble Code by driving in (or performing) the "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE". Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II or Generic Scan Tool.</p> <p>During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results.</p> <p>If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to GI-25.)</p> <p>In case the "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" is not available, perform the "OVERALL FUNCTION CHECK" instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified "check" is an effective alternative.</p> <p>The "NG" result of the "OVERALL FUNCTION CHECK" is the same as the (1st trip) DTC detection.</p>                                                                                                                  |
| STEP V   | <p>Take the appropriate action based on the results of STEP I through IV.</p> <p>If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX.</p> <p>If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to EC-107.) If CONSULT-II is available, perform "DATA MONITOR (SPEC)" mode with CONSULT-II and proceed to the "TROUBLE DIAGNOSIS — SPECIFICATION VALUE". (Refer to EC-142.) (If malfunction is detected, proceed to "REPAIR/REPLACE".) Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-125.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| STEP VI  | <p>Identify where to begin diagnosis based on the relationship study between symptom and possible causes.</p> <p>Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) "Harness Layouts". Gently shake the related connectors, components or wiring harness with CONSULT-II set in "DATA MONITOR (AUTO TRIG)" mode.</p> <p>Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to EC-134.</p> <p>The "DIAGNOSTIC PROCEDURE" in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the DIAGNOSTIC PROCEDURE. For details, refer to GI section ("HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT", "Circuit Inspection").</p> <p>Repair or replace the malfunction parts.</p> <p>If malfunctioning part cannot be detected, perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p> |
| STEP VII | <p>Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint.</p> <p>Perform the "DTC CONFIRMATION PROCEDURE" and confirm the normal code [DTC No. P0000 or 0505] is detected. If the incident is still detected in the final check, perform STEP VI by using a different method from the previous one.</p> <p>Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to EC-79.)</p>                                                                                                                                                                                                                                                                                                                                                                                     |

## Basic Inspection

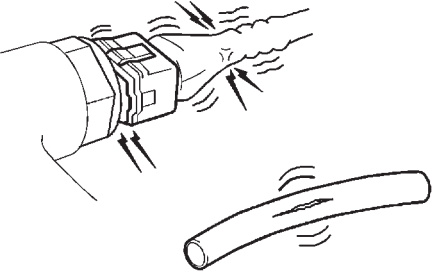
NCEC0038

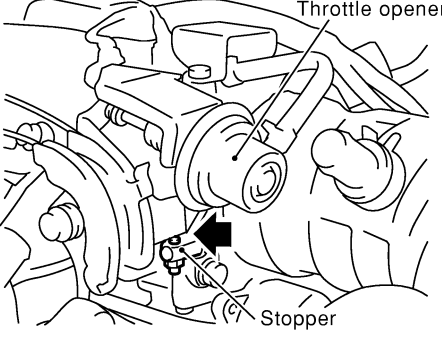
**Precaution:**

**Perform Basic Inspection without electrical or mechanical loads applied;**

- Headlamp switch is OFF,
- Air conditioner switch is OFF,
- Rear window defogger switch is OFF,
- Steering wheel is in the straight-ahead position, etc.

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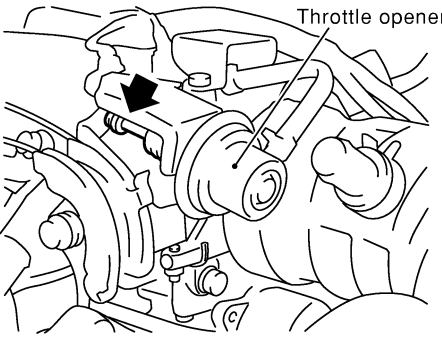
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>INSPECTION START</b> |
| <p>1. Check service records for any recent repairs that may indicate a related problem, or a current need for scheduled maintenance.</p> <p>2. Open engine hood and check the following:</p> <ul style="list-style-type: none"> <li>● Harness connectors for improper connections</li> <li>● Vacuum hoses for splits, kinks and improper connections</li> <li>● Wiring for improper connections, pinches and cuts</li> <li>● Air cleaner clogging</li> <li>● Hoses and ducts for leaks</li> </ul> |                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |
| SEF983U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                         |
| ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | GO TO 2.                |

|                                                                                      |                                          |
|--------------------------------------------------------------------------------------|------------------------------------------|
| <b>2</b>                                                                             | <b>CHECK THROTTLE OPENER OPERATION-I</b> |
| Confirm that there is a clearance between throttle drum and stopper.                 |                                          |
|  |                                          |
| SEF864X                                                                              |                                          |
| <b>OK or NG</b>                                                                      |                                          |
| OK                                                                                   | ▶ GO TO 4.                               |
| NG                                                                                   | ▶ GO TO 3.                               |

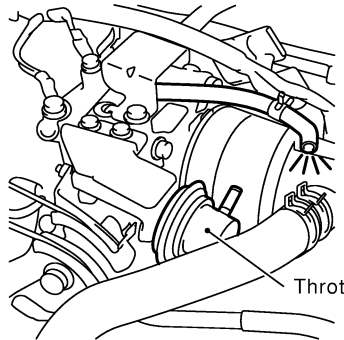
|                                                   |                                             |
|---------------------------------------------------|---------------------------------------------|
| <b>3</b>                                          | <b>CHECK THROTTLE OPENER FIXING BOLTS</b>   |
| Check throttle opener fixing bolts for loosening. |                                             |
| <b>OK or NG</b>                                   |                                             |
| OK                                                | ▶ Repair or replace throttle body assembly. |
| NG                                                | ▶ Retighten the fixing bolts.               |

# TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

| 4                                                                                                                                                                                                                   |   | CHECK THROTTLE OPENER OPERATION-II |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------|
| <ol style="list-style-type: none"><li>1. Start engine and let it idle.</li><li>2. Confirm that throttle opener rod moves backward and there is a clearance between throttle drum and throttle opener rod.</li></ol> |   |                                    |
|  <p>Throttle opener</p>                                                                                                           |   |                                    |
| <b>OK or NG</b>                                                                                                                                                                                                     |   |                                    |
| OK                                                                                                                                                                                                                  | ▶ | GO TO 7.                           |
| NG                                                                                                                                                                                                                  | ▶ | GO TO 5.                           |

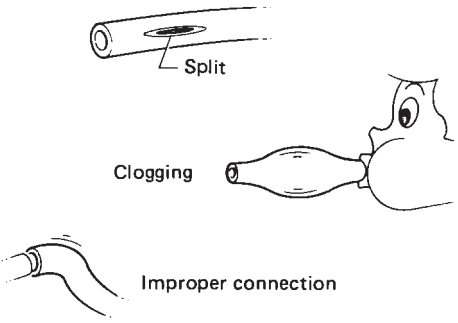
SEF865X

| 5                                                                                                                                                              |   | CHECK VACUUM SOURCE FOR THROTTLE OPENER   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------|
| <ol style="list-style-type: none"><li>1. Disconnect vacuum hose connected to throttle opener.</li><li>2. Check vacuum existence with engine running.</li></ol> |   |                                           |
|  <p>Vacuum should exist.</p> <p>Throttle opener</p>                          |   |                                           |
| <b>OK or NG</b>                                                                                                                                                |   |                                           |
| OK                                                                                                                                                             | ▶ | Repair or replace throttle body assembly. |
| NG                                                                                                                                                             | ▶ | GO TO 6.                                  |

SEF866X

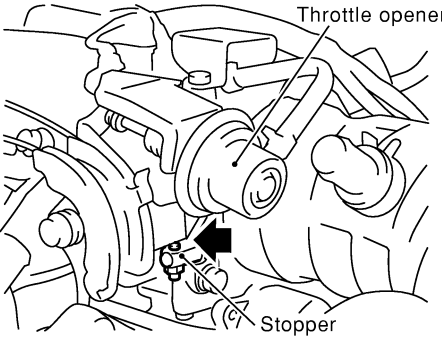
# TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

|                                                                                                                                                                         |                          |                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------|
| <b>6</b>                                                                                                                                                                | <b>CHECK VACUUM HOSE</b> |                                   |
| <ol style="list-style-type: none"> <li>1. Stop engine.</li> <li>2. Remove the vacuum hose.</li> <li>3. Check the vacuum hose for splits, kinks and clogging.</li> </ol> |                          |                                   |
|                                                                                       |                          |                                   |
| SEF109L                                                                                                                                                                 |                          |                                   |
| <b>OK or NG</b>                                                                                                                                                         |                          |                                   |
| OK                                                                                                                                                                      | ▶                        | Clean vacuum port by blowing air. |
| NG                                                                                                                                                                      | ▶                        | Replace vacuum hose.              |

GI  
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CL

|                                                                                     |                                      |           |
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| <b>7</b>                                                                            | <b>CHECK THROTTLE DRUM OPERATION</b> |           |
| Confirm that throttle drum moves to contact the stopper.                            |                                      |           |
|  |                                      |           |
| SEF864X                                                                             |                                      |           |
| <b>OK or NG</b>                                                                     |                                      |           |
| OK                                                                                  | ▶                                    | GO TO 10. |
| NG                                                                                  | ▶                                    | GO TO 8.  |

MT  
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RS

|                                                                                                                 |                                            |                                                                       |
|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------|
| <b>8</b>                                                                                                        | <b>CHECK ACCELERATOR WIRE INSTALLATION</b> |                                                                       |
| <ol style="list-style-type: none"> <li>1. Stop engine.</li> <li>2. Check accelerator wire for slack.</li> </ol> |                                            |                                                                       |
| <b>OK or NG</b>                                                                                                 |                                            |                                                                       |
| OK                                                                                                              | ▶                                          | GO TO 9.                                                              |
| NG                                                                                                              | ▶                                          | Adjust accelerator wire. Refer to FE-3, "Adjusting Accelerator Wire". |

BT  
HA  
SC

|                                                                                                                                                             |                                       |                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------|
| <b>9</b>                                                                                                                                                    | <b>CHECK THROTTLE VALVE OPERATION</b> |                                             |
| <ol style="list-style-type: none"> <li>1. Remove intake air ducts.</li> <li>2. Check throttle valve operation when moving throttle drum by hand.</li> </ol> |                                       |                                             |
| <b>OK or NG</b>                                                                                                                                             |                                       |                                             |
| OK                                                                                                                                                          | ▶                                     | Retighten the throttle drum fixing nuts.    |
| NG                                                                                                                                                          | ▶                                     | Clean the throttle body and throttle valve. |

EL  
IDX

# TROUBLE DIAGNOSIS — BASIC INSPECTION

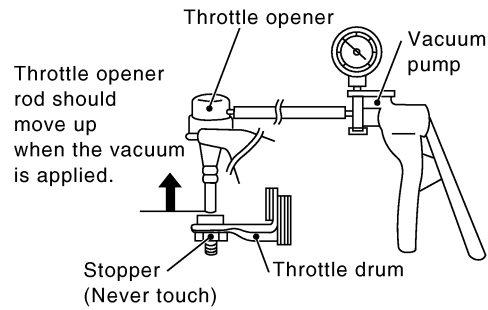
Basic Inspection (Cont'd)

## 10 CHECK THROTTLE POSITION SWITCH CLOSED POSITION-I

### NOTE:

Always check ignition timing before performing the following.

1. Warm up engine to normal operating temperature.
2. Stop engine.
3. Remove the vacuum hose connected to the throttle opener.
4. Connect suitable vacuum hose to vacuum pump as shown below.



SEF793WA

5. Apply vacuum [more than  $-40.0$  kPa ( $-300$  mmHg,  $-11.81$  inHg)] until the throttle drum is free from the throttle opener rod.

With CONSULT-II ► GO TO 11.

Without CONSULT-II ► GO TO 17.

# TROUBLE DIAGNOSIS — BASIC INSPECTION

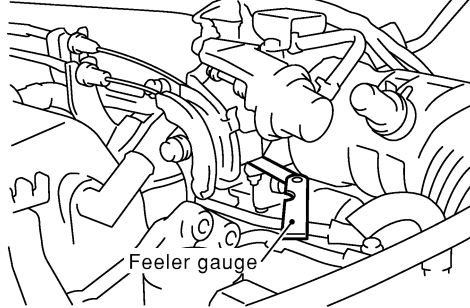
Basic Inspection (Cont'd)

## 11 CHECK THROTTLE POSITION SWITCH CLOSED POSITION-II

**Ⓟ With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "TP SW/TP SEN IDLE POSI ADJ" in "WORK SUPPORT" mode with CONSULT-II.
3. Read "CLSD THL/P SW" signal under the following conditions.
  - Insert a 0.05 mm (0.0020 in) and 0.15 mm (0.0059 in) feeler gauge alternately between stopper and throttle drum as shown in the figure and check the signal.

**View with blow-by hose removed**



SEF862X

| TP SW/TP SEN IDLE POSI ADJ |       |
|----------------------------|-------|
| MONITOR                    |       |
| COOLAN TEMP/S              | 91 °C |
| CLSD THL POS               | ON    |
| CLSD THL/P SW              | ON    |
|                            |       |
|                            |       |
|                            |       |
|                            |       |
|                            |       |
|                            |       |

SEF715Y

"CLSD THL/P SW" signal should remain "ON" while inserting 0.05 mm (0.0020 in) feeler gauge.  
 "CLSD THL/P SW" signal should remain "OFF" while inserting 0.15 mm (0.0059 in) feeler gauge.

OK or NG

|    |   |           |
|----|---|-----------|
| OK | ▶ | GO TO 14. |
| NG | ▶ | GO TO 12. |

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# TROUBLE DIAGNOSIS — BASIC INSPECTION

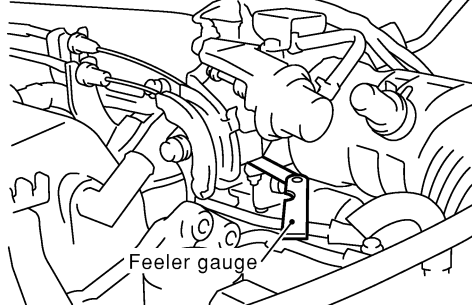
Basic Inspection (Cont'd)

## 12 | ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-I

 With CONSULT-II

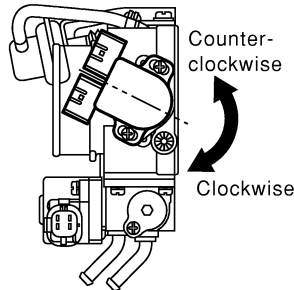
1. Loosen throttle position sensor fixing bolts.
2. Confirm that proper vacuum is applied. Refer to test No. 10. During adjustment, vacuum should be applied.
3. Insert 0.05 mm (0.0020 in) feeler gauge between stopper and throttle drum as shown in the figure.

**View with blow-by hose removed**



SEF862X

4. Turn throttle position sensor body counterclockwise until "CLSD THL/P SW" signal switches to "OFF".



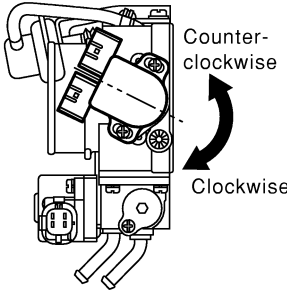
SEF867X

| TP SW/TP SEN IDLE POSI ADJ |       |
|----------------------------|-------|
| MONITOR                    |       |
| COOLAN TEMP/S              | 91 °C |
| CLSD THL POS               | ON    |
| CLSD THL/P SW              | ON    |
|                            |       |
|                            |       |
|                            |       |
|                            |       |
|                            |       |

SEF715Y

▶ GO TO 13.



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>13</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-II</b> |
| <p>Ⓟ <b>With CONSULT-II</b></p> <p>1. Temporarily tighten sensor body fixing bolts as follows.</p> <ul style="list-style-type: none"> <li>● Gradually move the sensor body clockwise and stop it when “CLSD THL/P SW” signal switches from “OFF” to “ON”, then temporarily tighten sensor body fixing bolts.</li> </ul> <div style="text-align: center; margin: 10px 0;">  </div> <p style="text-align: right; margin-right: 20px;">SEF867X</p> <p>2. Make sure two or three times that the signal is “ON” when the throttle valve is closed and “OFF” when it is opened.</p> <p>3. Remove 0.05 mm (0.0020 in) feeler gauge then insert 0.15 mm (0.0059 in) feeler gauge.</p> <p>4. Make sure two or three times that the signal remains “OFF” when the throttle valve is closed.</p> <p>5. Tighten throttle position sensor.</p> <p>6. Check the “CLSD THL/P SW” signal again.</p> <p style="margin-left: 20px;"><b>The signal remains “OFF” while closing throttle valve.</b></p> <p style="text-align: center; margin: 10px 0;"><b>OK or NG</b></p> |                                                               |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶ GO TO 14.                                                   |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶ GO TO 12.                                                   |

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# TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

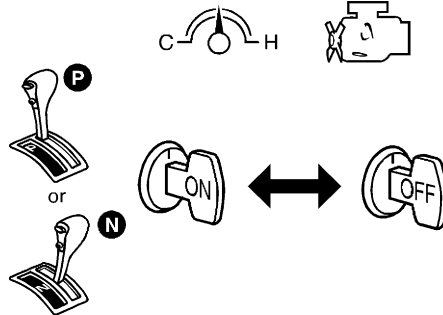
## 14 RESET THROTTLE POSITION SENSOR IDLE POSITION MEMORY

Ⓟ With CONSULT-II

**NOTE:**

**Always warm up engine to normal operating temperature. If engine is cool, the throttle position sensor idle position memory will not be reset correctly.**

1. Confirm that proper vacuum is applied. Refer to Test No. 10.
2. Attach blind cap to vacuum port from which vacuum hose to throttle opener was disconnected.
3. Start engine.
4. Warm up engine to normal operating temperature.
5. Select "TP SW/TP SEN IDLE POSI ADJ" in "WORK SUPPORT" mode.
6. Stop engine. (Turn ignition switch "OFF".)
7. Turn ignition switch "ON" and wait at least 5 seconds.



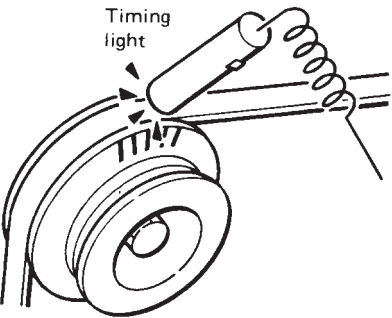
SEF864V

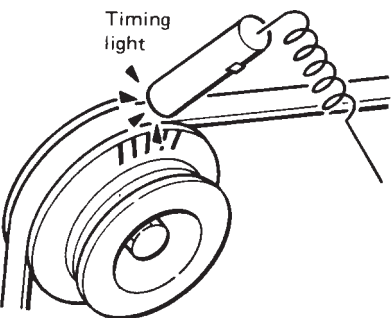
8. Turn ignition switch "OFF" and wait at least 10 seconds.
9. Repeat steps 7 and 8 until "CLSD THL POS" signal changes to "ON".

| TP SW/TP SEN IDLE POSI ADJ |      |
|----------------------------|------|
| MONITOR                    |      |
| COOLAN TEMP/S              | 91°C |
| CLSD THL POS               | ON   |
| CLSD THL/P SW              | ON   |
|                            |      |
|                            |      |
|                            |      |
|                            |      |
|                            |      |
|                            |      |

SEF715Y

▶ GO TO 15.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                |                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>15</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>CHECK IGNITION TIMING-I</b> |                                                                                                                                                                                                       |
| <p><b>Ⓟ With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Release vacuum from throttle opener.</li> <li>3. Remove vacuum pump and vacuum hose from throttle opener.</li> <li>4. Reinstall original vacuum hose to throttle opener securely.</li> <li>5. Start engine and warm it up to normal operating temperature.</li> <li>6. Select "IGNITION TIMING ADJ" in "WORK SUPPORT" mode with CONSULT-II.</li> <li>7. Touch "START".</li> <li>8. Check ignition timing at idle using a timing light.</li> </ol> |                                |                                                                                                                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |                                                                                                                                                                                                       |
| <p><b>Ignition timing:</b><br/> <b>M/T 15°±2° BTDC</b><br/> <b>A/T 15°±2° BTDC (in "P" or "N" position)</b></p> <p style="text-align: right;">SEF284G</p>                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                                                                                                                                                                                                       |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                |                                                                                                                                                                                                       |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶                              | GO TO 16.                                                                                                                                                                                             |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶                              | <ol style="list-style-type: none"> <li>1. Adjust ignition timing by turning distributor. Refer to "Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment", EC-53.</li> <li>2. GO TO 16.</li> </ol> |

|                                                                                                                                                                                  |                                 |           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------|
| <b>16</b>                                                                                                                                                                        | <b>CHECK IGNITION TIMING-II</b> |           |
| <p><b>Ⓟ With CONSULT-II</b></p> <p>Touch "MODE" or "BACK". (Cancel "IGNITION TIMING ADJ" in "WORK SUPPORT" mode.)</p> <p>Check ignition timing at idle using a timing light.</p> |                                 |           |
|                                                                                               |                                 |           |
| <p><b>Ignition timing:</b><br/> <b>M/T 15°±2° BTDC</b><br/> <b>A/T 15°±2° BTDC (in "P" or "N" position)</b></p> <p style="text-align: right;">SEF284G</p>                        |                                 |           |
| <b>OK or NG</b>                                                                                                                                                                  |                                 |           |
| OK                                                                                                                                                                               | ▶                               | GO TO 30. |
| NG                                                                                                                                                                               | ▶                               | GO TO 23. |

GI  
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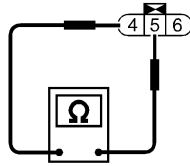
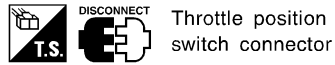
# TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

## 17 CHECK THROTTLE POSITION SWITCH CLOSED POSITION-II

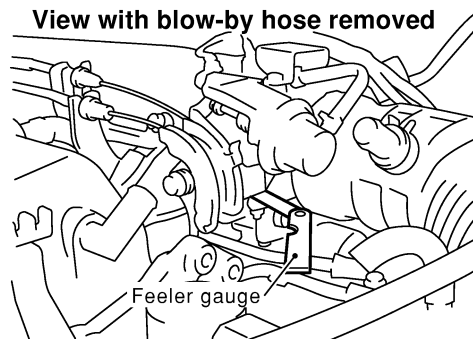
⊗ Without CONSULT-II

1. Disconnect closed throttle position switch harness connector.
2. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions.



SEF711X

- Insert the 0.05 mm (0.0020 in) and 0.15 mm (0.0059 in) feeler gauge alternately between the stopper and throttle drum as shown in the figure.



SEF862X

- “Continuity should exist” while inserting 0.05 mm (0.0020 in) feeler gauge.
- “Continuity should not exist” while inserting 0.15 mm (0.0059 in) feeler gauge.

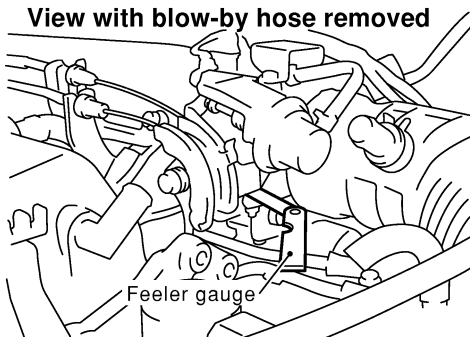
OK or NG

|    |   |           |
|----|---|-----------|
| OK | ▶ | GO TO 20. |
| NG | ▶ | GO TO 18. |

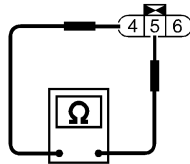
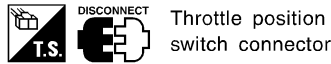
**18**    **ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-I**

⊗ **Without CONSULT-II**

1. Loosen throttle position sensor fixing bolts.
2. Confirm that proper vacuum is applied. Refer to Test No. 10. During adjustment, vacuum should be applied.
3. Insert 0.05 mm (0.0020 in) feeler gauge between stopper and throttle drum as shown in the figure.

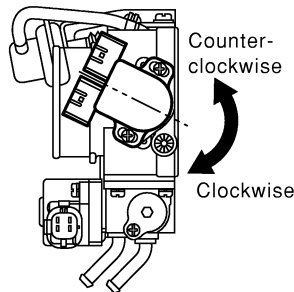


SEF862X



4. Turn throttle position sensor body counterclockwise until continuity does not exist.

SEF711X



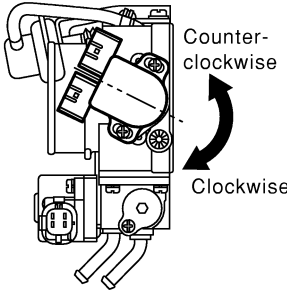
SEF867X

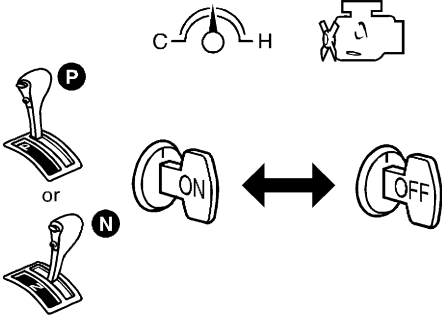
▶ GO TO 19.

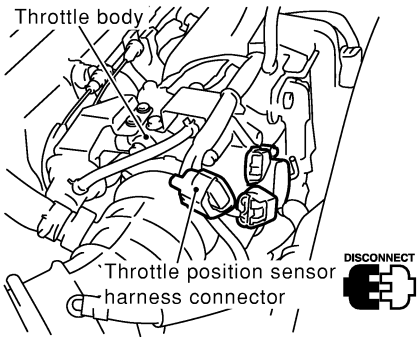
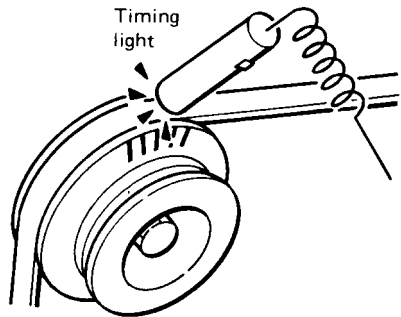
GI  
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 IDX

# TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

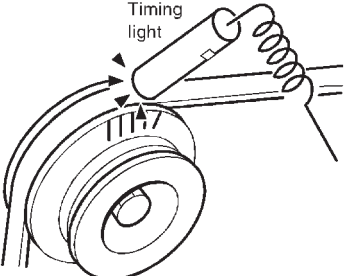
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>19</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-II</b> |
| <p>⊗ Without CONSULT-II</p> <p>1. Temporarily tighten sensor body fixing bolts as follows.</p> <ul style="list-style-type: none"> <li>● Gradually move the sensor body clockwise and stop it when the continuity comes to exist, then temporarily tighten sensor body fixing bolts.</li> </ul>                                                                                                                                                                                                                                                                                                        |                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                               |
| SEF867X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                               |
| <p>2. Make sure two or three times that the continuity exists when the throttle valve is closed and continuity does not exist when it is opened.</p> <p>3. Remove 0.05 mm (0.0020 in) feeler gauge then insert 0.15 mm (0.0059 in) feeler gauge.</p> <p>4. Make sure two or three times that the continuity does not exist when the throttle valve is closed.</p> <p>5. Tighten throttle position sensor.</p> <p>6. Check the continuity again.</p> <p style="color: blue;"><b>Continuity does not exist while closing the throttle valve.</b></p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                               |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 20.                                                   |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 18.                                                   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>20</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>RESET THROTTLE POSITION SENSOR IDLE POSITION MEMORY</b> |
| <p>⊗ Without CONSULT-II</p> <p><b>NOTE:</b></p> <p><b>Always warm up engine to normal operating temperature. If engine is cool, the throttle position sensor idle position memory will not be reset correctly.</b></p> <p>1. Confirm that proper vacuum is applied. Refer to Test No. 10.</p> <p>2. Attach blind cap to vacuum port from which vacuum hose to throttle opener was disconnected.</p> <p>3. Start engine.</p> <p>4. Warm up engine to normal operating temperature.</p> <p>5. Stop engine. (Turn ignition switch "OFF".)</p> <p>6. Turn ignition switch "ON" and wait at least 5 seconds.</p> |                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                            |
| SEF864V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                            |
| <p>7. Turn ignition switch "OFF" and wait at least 10 seconds.</p> <p>8. Repeat steps 6 and 7, 20 times.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                            |
| ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | GO TO 21.                                                  |

|           |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                    |
|-----------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>21</b> | <b>CHECK IGNITION TIMING-I</b> | <p>⊗ <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Release vacuum from throttle opener.</li> <li>3. Remove vacuum pump and vacuum hose from throttle opener.</li> <li>4. Reinstall original vacuum hose to throttle opener securely.</li> <li>5. Start engine and warm it up to normal operating temperature.</li> <li>6. Stop engine and disconnect throttle position sensor harness connector.</li> </ol> <div style="text-align: center; margin: 10px 0;">  </div> <ol style="list-style-type: none"> <li>7. Start engine.</li> <li>8. Check ignition timing at idle using a timing light.</li> </ol> <div style="text-align: center; margin: 10px 0;">  </div> <p style="margin-top: 10px;"><b>Ignition timing:</b><br/> <span style="color: blue;">M/T 15°±2° BTDC</span><br/> <span style="color: blue;">A/T 15°±2° BTDC (in "P" or "N" position)</span></p> <p style="text-align: center; margin-top: 10px;"><b>OK or NG</b></p> | <p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;"><b>EC</b></p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p> |
| OK        | ▶                              | GO TO 22.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                    |
| NG        | ▶                              | <ol style="list-style-type: none"> <li>1. Adjust ignition timing by turning distributor. Refer to "Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment", EC-53.</li> <li>2. GO TO 22.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                    |

# TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |                                                        |                      |   |           |                         |   |                                                        |    |   |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------|----------------------|---|-----------|-------------------------|---|--------------------------------------------------------|----|---|-----------|
| <b>22</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>CHECK IGNITION TIMING-II</b>         |                                                        |                      |   |           |                         |   |                                                        |    |   |           |
| <p>1. Stop engine.<br/>                 2. Reconnect throttle position sensor harness connector.<br/>                 3. Start engine and let it idle.<br/>                 4. Check ignition timing at idle using a timing light.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF984U</p> <p><b>Ignition timing:</b><br/> <b>M/T 15°±2° BTDC</b><br/> <b>A/T 15°±2° BTDC (in "P" or "N" position)</b></p> <p style="text-align: center;"><b>OK or NG</b></p> |                                         |                                                        |                      |   |           |                         |   |                                                        |    |   |           |
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 33.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 23.</td> </tr> </table>                                                                                                                                                                                                                                                                                                             |                                         |                                                        | OK                   | ▶ | GO TO 33. | NG                      | ▶ | GO TO 23.                                              |    |   |           |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ▶                                       | GO TO 33.                                              |                      |   |           |                         |   |                                                        |    |   |           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ▶                                       | GO TO 23.                                              |                      |   |           |                         |   |                                                        |    |   |           |
| <b>23</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>PERFORM IDLE AIR VOLUME LEARNING</b> |                                                        |                      |   |           |                         |   |                                                        |    |   |           |
| <p>Refer to "Idle Air Volume Learning", EC-65.<br/> <b>Is the result CMPLT or INCMP?</b></p> <p style="text-align: center;"><b>CMPLT or INCMP</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                          |                                         |                                                        |                      |   |           |                         |   |                                                        |    |   |           |
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">CMPLT</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 24.</td> </tr> <tr> <td>INCMP</td> <td style="text-align: center;">▶</td> <td>Follow the construction of "Idle Air Volume Learning".</td> </tr> </table>                                                                                                                                                                                                                                                          |                                         |                                                        | CMPLT                | ▶ | GO TO 24. | INCMP                   | ▶ | Follow the construction of "Idle Air Volume Learning". |    |   |           |
| CMPLT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                       | GO TO 24.                                              |                      |   |           |                         |   |                                                        |    |   |           |
| INCMP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                       | Follow the construction of "Idle Air Volume Learning". |                      |   |           |                         |   |                                                        |    |   |           |
| <b>24</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>CHECK IGNITION TIMING AGAIN</b>      |                                                        |                      |   |           |                         |   |                                                        |    |   |           |
| <p>Check ignition timing again. Refer to Test No. 16 (With CONSULT-II) or 22 (Without CONSULT-II).</p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |                                                        |                      |   |           |                         |   |                                                        |    |   |           |
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK (With CONSULT-II)</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 30.</td> </tr> <tr> <td>OK (Without CONSULT-II)</td> <td style="text-align: center;">▶</td> <td>GO TO 33.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 25.</td> </tr> </table>                                                                                                                                                                                     |                                         |                                                        | OK (With CONSULT-II) | ▶ | GO TO 30. | OK (Without CONSULT-II) | ▶ | GO TO 33.                                              | NG | ▶ | GO TO 25. |
| OK (With CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ▶                                       | GO TO 30.                                              |                      |   |           |                         |   |                                                        |    |   |           |
| OK (Without CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶                                       | GO TO 33.                                              |                      |   |           |                         |   |                                                        |    |   |           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ▶                                       | GO TO 25.                                              |                      |   |           |                         |   |                                                        |    |   |           |
| <b>25</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>CHECK FOR INTAKE AIR LEAK</b>        |                                                        |                      |   |           |                         |   |                                                        |    |   |           |
| <p>1. Start engine and let it idle.<br/>                 2. Listen for an air leak from PCV hose and after IACV-AAC valve.</p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                                                                                                                                                                                                                              |                                         |                                                        |                      |   |           |                         |   |                                                        |    |   |           |
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 27.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 26.</td> </tr> </table>                                                                                                                                                                                                                                                                                                             |                                         |                                                        | OK                   | ▶ | GO TO 27. | NG                      | ▶ | GO TO 26.                                              |    |   |           |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ▶                                       | GO TO 27.                                              |                      |   |           |                         |   |                                                        |    |   |           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ▶                                       | GO TO 26.                                              |                      |   |           |                         |   |                                                        |    |   |           |
| <b>26</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>REPAIR MALFUNCTION</b>               |                                                        |                      |   |           |                         |   |                                                        |    |   |           |
| <p>1. Stop engine.<br/>                 2. Repair or replace malfunctioning part.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                         |                                                        |                      |   |           |                         |   |                                                        |    |   |           |
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 23.</td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                |                                         |                                                        |                      | ▶ | GO TO 23. |                         |   |                                                        |    |   |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶                                       | GO TO 23.                                              |                      |   |           |                         |   |                                                        |    |   |           |



# TROUBLE DIAGNOSIS — BASIC INSPECTION

*Basic Inspection (Cont'd)*

|                                                                 |                                   |           |
|-----------------------------------------------------------------|-----------------------------------|-----------|
| <b>27</b>                                                       | <b>DETECT MALFUNCTIONING PART</b> |           |
| Check the IACV-AAC valve circuit and function. Refer to EC-423. |                                   |           |
| <b>OK or NG</b>                                                 |                                   |           |
| OK                                                              | ▶                                 | GO TO 29. |
| NG                                                              | ▶                                 | GO TO 28. |

GI

MA

EM

|                                                                                                                 |                           |  |
|-----------------------------------------------------------------------------------------------------------------|---------------------------|--|
| <b>28</b>                                                                                                       | <b>REPAIR MALFUNCTION</b> |  |
| Repair or replace malfunction part following the “Diagnostic Procedure” corresponding the detected malfunction. |                           |  |
| <b>OK or NG</b>                                                                                                 |                           |  |
| ▶ GO TO 23.                                                                                                     |                           |  |

LC

|                                                                                                                                                                                                                                                                                                            |                           |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--|
| <b>29</b>                                                                                                                                                                                                                                                                                                  | <b>CHECK ECM FUNCTION</b> |  |
| 1. Substitute another known-good ECM to check ECM function.<br>(ECM may be the cause of a problem, but this is rarely the case.)<br>2. Perform initialization of IVIS (NATS) system and registration of IVIS (NATS) ignition key IDs. Refer to “IVIS (INFINITI Vehicle Immobilizer System — NATS)”, EC-81. |                           |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                            |                           |  |
| ▶ GO TO 23.                                                                                                                                                                                                                                                                                                |                           |  |

EC

FE

CL

|                                                                                                                                                                                                                                            |                                |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------|
| <b>30</b>                                                                                                                                                                                                                                  | <b>CHECK TARGET IDLE SPEED</b> |           |
| ⓘ With CONSULT-II<br>1. Start engine and warm it up to normal operating temperature.<br>2. Select “ENG SPEED” in “DATA MONITOR” mode.<br>3. Check idle speed.<br><b>M/T: 800±50 rpm</b><br><b>A/T: 800±50 rpm (in “P” or “N” position)</b> |                                |           |
| <b>OK or NG</b>                                                                                                                                                                                                                            |                                |           |
| OK                                                                                                                                                                                                                                         | ▶                              | GO TO 36. |
| NG                                                                                                                                                                                                                                         | ▶                              | GO TO 31. |

MT

AT

AX

SU

BR

|                                                                                     |                                         |                                                        |
|-------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------|
| <b>31</b>                                                                           | <b>PERFORM IDLE AIR VOLUME LEARNING</b> |                                                        |
| Refer to “Idle Air Volume Learning”, EC-65.<br><b>Is the result CMPLT or INCMP?</b> |                                         |                                                        |
| <b>CMPLT or INCMP</b>                                                               |                                         |                                                        |
| CMPLT                                                                               | ▶                                       | GO TO 32.                                              |
| INCMP                                                                               | ▶                                       | Follow the construction of “Idle Air Volume Learning”. |

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|                                                                                                                                                                                                                                       |                                      |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------|
| <b>32</b>                                                                                                                                                                                                                             | <b>CHECK TARGET IDLE SPEED AGAIN</b> |           |
| 1. Start engine and warm it up to normal operating temperature.<br>2. Select “ENG SPEED” in “DATA MONITOR” mode with CONSULT-II.<br>3. Check idle speed.<br><b>M/T: 800±50 rpm</b><br><b>A/T: 800±50 rpm (in “P” or “N” position)</b> |                                      |           |
| <b>OK or NG</b>                                                                                                                                                                                                                       |                                      |           |
| OK                                                                                                                                                                                                                                    | ▶                                    | GO TO 36. |
| NG                                                                                                                                                                                                                                    | ▶                                    | GO TO 25. |

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# TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

|                                                                                                                                                                                                                                                                                                                                    |                                |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------|
| <b>33</b>                                                                                                                                                                                                                                                                                                                          | <b>CHECK TARGET IDLE SPEED</b> |           |
| <p>⊗ <b>Without CONSULT-II</b></p> <p>1. Start engine and warm it up to normal operating temperature.</p> <p>2. Check idle speed.</p> <p style="margin-left: 20px;"><b>M/T: 800±50 rpm</b></p> <p style="margin-left: 20px;"><b>A/T: 800±50 rpm (in “P” or “N” position)</b></p> <p style="text-align: right;"><b>OK or NG</b></p> |                                |           |
| OK                                                                                                                                                                                                                                                                                                                                 | ▶                              | GO TO 36. |
| NG                                                                                                                                                                                                                                                                                                                                 | ▶                              | GO TO 34. |

|                                                                                                                                                        |                                         |                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------|
| <b>34</b>                                                                                                                                              | <b>PERFORM IDLE AIR VOLUME LEARNING</b> |                                                        |
| <p>Refer to “Idle Air Volume Learning”, EC-65.</p> <p><b>Is the result CMPLT or INCMP?</b></p> <p style="text-align: right;"><b>CMPLT or INCMP</b></p> |                                         |                                                        |
| CMPLT                                                                                                                                                  | ▶                                       | GO TO 35.                                              |
| INCMP                                                                                                                                                  | ▶                                       | Follow the construction of “Idle Air Volume Learning”. |

|                                                                                                                                                                                                                                                                                                 |                                      |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------|
| <b>35</b>                                                                                                                                                                                                                                                                                       | <b>CHECK TARGET IDLE SPEED AGAIN</b> |           |
| <p>1. Start engine and warm it up to normal operating temperature.</p> <p>2. Check idle speed.</p> <p style="margin-left: 20px;"><b>M/T: 800±50 rpm</b></p> <p style="margin-left: 20px;"><b>A/T: 800±50 rpm (in “P” or “N” position)</b></p> <p style="text-align: right;"><b>OK or NG</b></p> |                                      |           |
| OK                                                                                                                                                                                                                                                                                              | ▶                                    | GO TO 36. |
| NG                                                                                                                                                                                                                                                                                              | ▶                                    | GO TO 25. |

|                                                                                                                                                                                                                                                                 |                              |                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------|
| <b>36</b>                                                                                                                                                                                                                                                       | <b>ERASE UNNECESSARY DTC</b> |                       |
| <p>After this inspection, unnecessary DTC No. might be displayed.</p> <p>Erase the stored memory in ECM and TCM (Transmission control module).</p> <p>Refer to “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”, EC-79 and “HOW TO ERASE DTC”, AT-38.</p> |                              |                       |
|                                                                                                                                                                                                                                                                 | ▶                            | <b>INSPECTION END</b> |

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

*DTC Inspection Priority Chart*

## DTC Inspection Priority Chart

NCEC0039

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

| Priority | Detected items (DTC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                    |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | <ul style="list-style-type: none"> <li>● P0100 Mass air flow sensor</li> <li>● P0110 Intake air temperature sensor</li> <li>● P0115, P0125 Engine coolant temperature sensor</li> <li>● P0120 Throttle position sensor</li> <li>● P0180 Fuel tank temperature sensor</li> <li>● P0325 Knock sensor</li> <li>● P0340 Camshaft position sensor</li> <li>● P0403 EGR volume control valve</li> <li>● P0460, P0461, P0464, P1464 Fuel level sensor</li> <li>● P0500 Vehicle speed sensor</li> <li>● P0605 ECM</li> <li>● P1126 Thermostat function</li> <li>● P1605 A/T diagnosis communication line</li> <li>● P1706 Park/Neutral position (PNP) switch</li> </ul>                                                                                                                                                                                                                                                                   | <p style="text-align: right;">GI</p> <p style="text-align: right;">MA</p> <p style="text-align: right;">EM</p> <p style="text-align: right;">LC</p> <p style="text-align: right; background-color: black; color: white; padding: 2px;">EC</p> <p style="text-align: right;">FE</p> |
| 2        | <ul style="list-style-type: none"> <li>● P0105 Absolute pressure sensor</li> <li>● P0130-P0134 Heated oxygen sensor 1 (front)</li> <li>● P0135 Heated oxygen sensor 1 heater (front)</li> <li>● P0137-P0140 Heated oxygen sensor 2 (rear)</li> <li>● P0141 Heated oxygen sensor 2 heater (rear)</li> <li>● P0217 Coolant overtemperature enrichment protection</li> <li>● P0335, P1336 Crankshaft position sensor (OBD)</li> <li>● P0443, P1444 EVAP canister purge volume control solenoid valve</li> <li>● P0446, P1446, P1448 EVAP canister vent control valve</li> <li>● P0450 EVAP control system pressure sensor</li> <li>● P0510 Closed throttle position switch</li> <li>● P0705-P0725, P0740-P1760 A/T related sensors, solenoid valves and switches</li> <li>● P1401 EGR temperature sensor</li> <li>● P1447 EVAP control system purge flow monitoring</li> <li>● P1490, P1491 Vacuum cut valve bypass valve</li> </ul> | <p style="text-align: right;">CL</p> <p style="text-align: right;">MT</p> <p style="text-align: right;">AT</p> <p style="text-align: right;">AX</p> <p style="text-align: right;">SU</p>                                                                                           |
| 3        | <ul style="list-style-type: none"> <li>● P0171, P0172 Fuel injection system function</li> <li>● P0300-P0304 Misfire</li> <li>● P0400, P1402 EGR function</li> <li>● P0420 Three way catalyst function</li> <li>● P0440, P1440 EVAP control system (SMALL LEAK)</li> <li>● P0455 EVAP control system (GROSS LEAK)</li> <li>● P0505 IACV-AAC valve</li> <li>● P0600 A/T communication line</li> <li>● P0731-P0734, P0744 A/T function</li> <li>● P1148 Closed loop control</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p style="text-align: right;">BR</p> <p style="text-align: right;">ST</p> <p style="text-align: right;">RS</p>                                                                                                                                                                     |

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# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

*Fail-safe Chart*

## Fail-safe Chart

=NCEC0040

The ECM enters fail-safe mode if any of the following malfunctions is detected due to the open or short circuit. When the ECM enters the fail-safe mode, the MIL illuminates.

| DTC No.              | Detected items                            | Engine operating condition in fail-safe mode                                                                                                                                                                                                                                                                                                                     |                                                                             |
|----------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| P0100                | Mass air flow sensor circuit              | Engine speed will not rise more than 2,400 rpm due to the fuel cut.                                                                                                                                                                                                                                                                                              |                                                                             |
| P0115                | Engine coolant temperature sensor circuit | Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START".<br>CONSULT-II displays the engine coolant temperature decided by ECM.                                                                                                                                                                      |                                                                             |
|                      |                                           | Condition                                                                                                                                                                                                                                                                                                                                                        | Engine coolant temperature decided (CONSULT-II display)                     |
|                      |                                           | Just as ignition switch is turned ON or Start                                                                                                                                                                                                                                                                                                                    | 40°C (104°F)                                                                |
|                      |                                           | More than approx. 4 minutes after ignition ON or Start                                                                                                                                                                                                                                                                                                           | 80°C (176°F)                                                                |
|                      |                                           | Except as shown above                                                                                                                                                                                                                                                                                                                                            | 40 - 80°C (104 - 176°F)<br>(Depends on the time)                            |
| P0120                | Throttle position sensor circuit          | Throttle position will be determined based on the injected fuel amount and the engine speed. Therefore, acceleration will be poor.                                                                                                                                                                                                                               |                                                                             |
|                      |                                           | Condition                                                                                                                                                                                                                                                                                                                                                        | Driving condition                                                           |
|                      |                                           | When engine is idling                                                                                                                                                                                                                                                                                                                                            | Normal                                                                      |
|                      |                                           | When accelerating                                                                                                                                                                                                                                                                                                                                                | Poor acceleration                                                           |
| P0403                | EGR volume control valve circuit          | Engine speed will not rise more than 2,800 rpm due to the fuel cut.                                                                                                                                                                                                                                                                                              |                                                                             |
| Unable to access ECM | ECM                                       | <b>ECM fail-safe activating condition</b><br>The computing function of the ECM was judged to be malfunctioning.<br>When the fail-safe system activates (i.e., if the ECM detects a malfunction condition in the CPU of ECM), the MIL on the instrument panel lights to warn the driver.<br>However it is not possible to access ECM and DTC cannot be confirmed. |                                                                             |
|                      |                                           | <b>Engine control with fail-safe</b><br>When ECM fail-safe is operating, fuel injection, ignition timing, fuel pump operation and IACV-AAC valve operation are controlled under certain limitations.                                                                                                                                                             |                                                                             |
|                      |                                           | ECM fail-safe operation                                                                                                                                                                                                                                                                                                                                          |                                                                             |
|                      |                                           | <b>Engine speed</b>                                                                                                                                                                                                                                                                                                                                              | <b>Engine speed will not rise more than 3,000 rpm</b>                       |
|                      |                                           | Fuel injection                                                                                                                                                                                                                                                                                                                                                   | Simultaneous multipoint fuel injection system                               |
|                      |                                           | Ignition timing                                                                                                                                                                                                                                                                                                                                                  | Ignition timing is fixed at the preset valve                                |
|                      |                                           | Fuel pump                                                                                                                                                                                                                                                                                                                                                        | Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls |
|                      |                                           | IACV-AAC valve                                                                                                                                                                                                                                                                                                                                                   | Full open                                                                   |
|                      |                                           | Replace ECM, if ECM fail-safe condition is confirmed.                                                                                                                                                                                                                                                                                                            |                                                                             |

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart

## Symptom Matrix Chart SYSTEM — ENGINE CONTROL SYSTEM

NCEC0041  
NCEC0041S01

|                                      |                                       | SYMPTOM                          |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           | Reference<br>page |                             |
|--------------------------------------|---------------------------------------|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-------------------|-----------------------------|
|                                      |                                       | HARD/NO START/RESTART (EXCP. HA) | ENGINE STALL | HESITATION/SURGING/FLAT SPOT | SPARK KNOCK/DETONATION | LACK OF POWER/POOR ACCELERATION | HIGH IDLE/LOW IDLE | ROUGH IDLE/HUNTING | IDLING VIBRATION | SLOW/NO RETURN TO IDLE | OVERHEATS/WATER TEMPERATURE HIGH | EXCESSIVE FUEL CONSUMPTION | EXCESSIVE OIL CONSUMPTION |                   | BATTERY DEAD (UNDER CHARGE) |
| Warranty symptom code                |                                       | AA                               | AB           | AC                           | AD                     | AE                              | AF                 | AG                 | AH               | AJ                     | AK                               | AL                         | AM                        | HA                |                             |
| Fuel                                 | Fuel pump circuit                     | 1                                | 1            | 2                            | 3                      | 2                               |                    | 2                  | 2                |                        |                                  | 3                          |                           | 2                 | EC-583                      |
|                                      | Fuel pressure regulator system        | 3                                | 3            | 4                            | 4                      | 4                               | 4                  | 4                  | 4                | 4                      |                                  | 4                          |                           |                   | EC-51                       |
|                                      | Injector circuit                      | 1                                | 1            | 2                            | 3                      | 2                               |                    | 2                  | 2                |                        |                                  | 2                          |                           |                   | EC-574                      |
|                                      | Evaporative emission system           | 3                                | 3            | 4                            | 4                      | 4                               | 4                  | 4                  | 4                | 4                      |                                  | 4                          |                           |                   | EC-33                       |
| Air                                  | Positive crankcase ventilation system | 3                                | 3            | 4                            | 4                      | 4                               | 4                  | 4                  | 4                | 4                      |                                  | 4                          | 1                         |                   | EC-48                       |
|                                      | Incorrect idle speed adjustment       | 3                                | 3            |                              |                        |                                 | 1                  | 1                  | 1                | 1                      |                                  | 1                          |                           |                   | EC-107                      |
|                                      | IACV-AAC valve circuit                | 1                                | 1            | 2                            | 3                      | 3                               | 2                  | 2                  | 2                | 2                      |                                  | 2                          |                           | 2                 | EC-423                      |
| Ignition                             | Incorrect ignition timing adjustment  | 3                                | 3            | 1                            | 1                      | 1                               |                    | 1                  | 1                |                        |                                  | 1                          |                           |                   | EC-107                      |
|                                      | Ignition circuit                      | 1                                | 1            | 2                            | 2                      | 2                               |                    | 2                  | 2                |                        |                                  | 2                          |                           |                   | EC-566                      |
| EGR                                  | EGR volume control valve circuit      |                                  | 2            | 2                            | 3                      | 3                               |                    |                    |                  |                        |                                  | 3                          |                           |                   | EC-344                      |
|                                      | EGR system                            | 2                                | 1            | 2                            | 3                      | 3                               | 3                  | 2                  | 2                | 3                      |                                  | 3                          |                           |                   | EC-334,<br>EC-481           |
| Main power supply and ground circuit |                                       | 2                                | 2            | 3                            | 3                      | 3                               |                    | 3                  | 3                |                        | 2                                | 3                          |                           | 2                 | EC-147                      |
| Air conditioner circuit              |                                       | 2                                | 2            | 3                            | 3                      | 3                               | 3                  | 3                  | 3                | 3                      |                                  | 3                          |                           | 2                 | HA section                  |

1 - 6: The numbers refer to the order of inspection.  
(continued on next page)

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# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart (Cont'd)

|                                               | SYMPTOM                          |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | Reference page |
|-----------------------------------------------|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-----------------------------|----------------|
|                                               | HARD/NO START/RESTART (EXCP. HA) | ENGINE STALL | HESITATION/SURGING/FLAT SPOT | SPARK KNOCK/DETONATION | LACK OF POWER/POOR ACCELERATION | HIGH IDLE/LOW IDLE | ROUGH IDLE/HUNTING | IDLING VIBRATION | SLOW/NO RETURN TO IDLE | OVERHEATS/WATER TEMPERATURE HIGH | EXCESSIVE FUEL CONSUMPTION | EXCESSIVE OIL CONSUMPTION | BATTERY DEAD (UNDER CHARGE) |                |
| Warranty symptom code                         | AA                               | AB           | AC                           | AD                     | AE                              | AF                 | AG                 | AH               | AJ                     | AK                               | AL                         | AM                        | HA                          |                |
| Camshaft position sensor circuit              | 2                                | 2            | 3                            | 3                      | 3                               |                    | 3                  | 3                |                        |                                  | 3                          |                           |                             | EC-326         |
| Mass air flow sensor circuit                  | 1                                | 1            | 2                            | 2                      | 2                               |                    | 2                  | 2                |                        |                                  | 2                          |                           |                             | EC-154         |
| Heated oxygen sensor 1 (front) circuit        |                                  | 1            | 2                            | 3                      | 2                               |                    | 2                  | 2                |                        |                                  | 2                          |                           |                             | EC-196         |
| Engine coolant temperature sensor circuit     | 1                                | 1            | 2                            | 3                      | 2                               | 3                  | 2                  | 2                | 3                      |                                  | 2                          |                           |                             | EC-171, 190    |
| Throttle position sensor circuit              |                                  | 1            | 2                            |                        | 2                               | 2                  | 2                  | 2                | 2                      |                                  | 2                          |                           |                             | EC-177         |
| Incorrect throttle position sensor adjustment |                                  | 3            | 1                            |                        | 1                               | 1                  | 1                  | 1                | 1                      |                                  | 1                          |                           |                             | EC-107         |
| Vehicle speed sensor circuit                  |                                  | 2            | 3                            |                        | 3                               |                    |                    |                  |                        |                                  | 3                          |                           |                             | EC-419         |
| Knock sensor circuit                          |                                  |              | 2                            |                        |                                 |                    |                    |                  |                        |                                  | 3                          |                           |                             | EC-316         |
| ECM                                           | 2                                | 2            | 3                            | 3                      | 3                               | 3                  | 3                  | 3                | 3                      | 3                                | 3                          |                           |                             | EC-443, 124    |
| Start signal circuit                          | 2                                |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | EC-579         |
| PNP switch circuit                            |                                  |              | 3                            |                        | 3                               |                    | 3                  | 3                |                        |                                  | 3                          |                           |                             | EC-559         |
| Power steering oil pressure switch circuit    |                                  | 2            |                              |                        |                                 |                    | 3                  | 3                |                        |                                  |                            |                           |                             | EC-592         |
| Electrical load signal circuit                |                                  |              |                              |                        |                                 |                    | 3                  | 3                |                        |                                  |                            |                           |                             | EC-602         |

1 - 6: The numbers refer to the order of inspection.  
(continued on next page)

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart (Cont'd)

## SYSTEM — ENGINE MECHANICAL & OTHER

NCEC0041S03

|                       |                                                                  | SYMPTOM                          |              |                              |                        |                                 |                    |                    |                  |                        |                                 |                            | Reference page |    |                           |                             |  |
|-----------------------|------------------------------------------------------------------|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|---------------------------------|----------------------------|----------------|----|---------------------------|-----------------------------|--|
|                       |                                                                  | HARD/NO START/RESTART (EXCP. HA) | ENGINE STALL | HESITATION/SURGING/FLAT SPOT | SPARK KNOCK/DETONATION | LACK OF POWER/POOR ACCELERATION | HIGH IDLE/LOW IDLE | ROUGH IDLE/HUNTING | IDLING VIBRATION | SLOW/NO RETURN TO IDLE | OVERHEATSWATER TEMPERATURE HIGH | EXCESSIVE FUEL CONSUMPTION |                |    | EXCESSIVE OIL CONSUMPTION | BATTERY DEAD (UNDER CHARGE) |  |
| Warranty symptom code |                                                                  | AA                               | AB           | AC                           | AD                     | AE                              | AF                 | AG                 | AH               | AJ                     | AK                              | AL                         | AM             | HA |                           |                             |  |
| Fuel                  | Fuel tank                                                        | 5                                | 5            |                              |                        |                                 |                    |                    |                  |                        |                                 |                            |                |    | FE section                | —                           |  |
|                       | Fuel piping                                                      |                                  |              | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        |                                 | 5                          |                |    |                           |                             |  |
|                       | Vapor lock                                                       |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                 |                            |                |    |                           |                             |  |
|                       | Valve deposit                                                    |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                 |                            |                |    |                           |                             |  |
|                       | Poor fuel (Heavy weight gasoline, Low octane)                    | 5                                |              | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        |                                 | 5                          |                |    |                           |                             |  |
| Air                   | Air duct                                                         |                                  | 5            | 5                            |                        |                                 |                    |                    |                  |                        |                                 |                            |                |    | FE section                | —                           |  |
|                       | Air cleaner                                                      |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                 |                            |                |    |                           |                             |  |
|                       | Air leakage from air duct (Mass air flow sensor — throttle body) |                                  |              |                              | 5                      | 5                               |                    | 5                  | 5                | 5                      |                                 |                            | 5              |    |                           |                             |  |
|                       | Throttle body, Throttle wire                                     | 5                                |              |                              |                        | 5                               |                    | 5                  |                  |                        | 5                               |                            |                |    |                           |                             |  |
|                       | Air leakage from intake manifold/Collector/Gasket                |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                 |                            |                |    |                           |                             |  |
| Cranking              | Battery                                                          | 1                                | 1            | 1                            |                        | 1                               |                    | 1                  | 1                |                        |                                 |                            |                | 1  | EL section                | —                           |  |
|                       | Alternator circuit                                               |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                 |                            |                |    |                           |                             |  |
|                       | Starter circuit                                                  | 3                                |              |                              |                        |                                 |                    |                    |                  |                        | 1                               |                            |                |    |                           |                             |  |
|                       | Flywheel/Drive plate                                             | 6                                |              |                              |                        |                                 |                    |                    |                  |                        |                                 |                            |                |    |                           |                             |  |
|                       | PNP switch                                                       | 4                                |              |                              |                        |                                 |                    |                    |                  |                        |                                 |                            |                |    |                           |                             |  |

1 - 6: The numbers refer to the order of inspection.  
(continued on next page)

GI  
 MA  
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**EC**  
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# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart (Cont'd)

|                       |                                                      | SYMPTOM                          |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | Reference<br>page      |
|-----------------------|------------------------------------------------------|----------------------------------|--------------|------------------------------|------------------------|---------------------------------|--------------------|--------------------|------------------|------------------------|----------------------------------|----------------------------|---------------------------|-----------------------------|------------------------|
|                       |                                                      | HARD/NO START/RESTART (EXCP. HA) | ENGINE STALL | HESITATION/SURGING/FLAT SPOT | SPARK KNOCK/DETONATION | LACK OF POWER/POOR ACCELERATION | HIGH IDLE/LOW IDLE | ROUGH IDLE/HUNTING | IDLING VIBRATION | SLOW/NO RETURN TO IDLE | OVERHEATS/WATER TEMPERATURE HIGH | EXCESSIVE FUEL CONSUMPTION | EXCESSIVE OIL CONSUMPTION | BATTERY DEAD (UNDER CHARGE) |                        |
| Warranty symptom code |                                                      | AA                               | AB           | AC                           | AD                     | AE                              | AF                 | AG                 | AH               | AJ                     | AK                               | AL                         | AM                        | HA                          |                        |
| Engine                | Cylinder head                                        | 5                                | 5            | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        |                                  | 5                          |                           |                             | EM section             |
|                       | Cylinder head gasket                                 |                                  |              |                              |                        |                                 |                    |                    |                  |                        | 4                                | 3                          |                           |                             |                        |
|                       | Cylinder block                                       |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            | 4                         |                             |                        |
|                       | Piston                                               |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             |                        |
|                       | Piston ring                                          |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             |                        |
|                       | Connecting rod                                       | 6                                | 6            | 6                            | 6                      | 6                               |                    | 6                  | 6                |                        |                                  | 6                          |                           |                             |                        |
|                       | Bearing                                              |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             |                        |
|                       | Crankshaft                                           |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             |                        |
| Valve mechanism       | Timing chain                                         |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | EM section             |
|                       | Camshaft                                             | 5                                | 5            | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        | 5                                |                            |                           |                             |                        |
|                       | Intake valve                                         |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            | 3                         |                             |                        |
|                       | Exhaust valve                                        |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             |                        |
| Exhaust               | Exhaust manifold/Tube/Muffler/Gasket                 | 5                                | 5            | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        |                                  | 5                          |                           |                             | FE section             |
|                       | Three way catalyst                                   |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             |                        |
| Lubrication           | Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery | 5                                | 5            | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        |                                  | 5                          |                           |                             | MA, EM and LC sections |
|                       | Oil level (Low)/Filthy oil                           |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             |                        |
| Cooling               | Radiator/Hose/Radiator filler cap                    |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | LC section             |
|                       | Thermostat                                           |                                  |              |                              |                        |                                 |                    |                    |                  | 5                      |                                  |                            |                           |                             |                        |
|                       | Water pump                                           |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             |                        |
|                       | Water gallery                                        | 5                                | 5            | 5                            | 5                      | 5                               |                    | 5                  | 5                |                        | 4                                | 5                          |                           |                             |                        |
|                       | Cooling fan                                          |                                  |              |                              |                        |                                 |                    |                    |                  |                        | 5                                |                            |                           |                             |                        |
|                       | Coolant level (low)/Contaminated coolant             |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             |                        |
|                       |                                                      |                                  |              |                              |                        |                                 |                    |                    |                  |                        |                                  |                            |                           |                             | MA section             |

1 - 6: The numbers refer to the order of inspection.



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

CONSULT-II Reference Value in Data Monitor Mode

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0042

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

\* Specification data may not be directly related to their components signals/values/operations.

(i.e., Adjust ignition timing with a timing light before monitoring IGN TIMING. Specification data might be displayed even when ignition timing is not adjusted to specification. This IGN TIMING monitors the data calculated by the ECM according to the input signals from the camshaft position sensor and other ignition timing related sensors.)

- If the real-time diagnosis results are NG, and the on board diagnostic system results are OK, when diagnosing the mass air flow sensor, first check to see if the fuel pump control circuit is normal.

| MONITOR ITEM                  | CONDITION                                                                                                                                                          |                                               | SPECIFICATION                                               |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|
| ENG SPEED                     | <ul style="list-style-type: none"> <li>● Tachometer: Connect</li> <li>● Run engine and compare tachometer indication with the CONSULT-II value.</li> </ul>         |                                               | Almost the same speed as the CONSULT-II value.              |
| MAS A/F SE-B1                 | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: "N"</li> <li>● No-load</li> </ul> | Idle                                          | 1.3 - 1.7V                                                  |
|                               |                                                                                                                                                                    | 2,500 rpm                                     | 1.8 - 2.4V                                                  |
| B/FUEL SCHDL                  | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: "N"</li> <li>● No-load</li> </ul> | Idle                                          | 1.0 - 1.6 msec                                              |
|                               |                                                                                                                                                                    | 2,000 rpm                                     | 0.7 - 1.3 msec                                              |
| A/F ALPHA-B1                  | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>                                                                                       | Maintaining engine speed at 2,000 rpm         | 53 - 155%                                                   |
| COOLAN TEMP/S                 | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>                                                                                       |                                               | More than 70°C (158°F)                                      |
| HO2S1 (B1)                    | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>                                                                                       | Maintaining engine speed at 2,000 rpm         | 0 - 0.3V ↔ 0.6 - 1.0V                                       |
| HO2S1 MNTR (B1)               |                                                                                                                                                                    |                                               | LEAN ↔ RICH<br>Changes more than 5 times during 10 seconds. |
| HO2S2 (B1)                    | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>                                                                                       | Revving engine from idle to 3,000 rpm quickly | 0 - 0.3V ↔ 0.6 - 1.0V                                       |
| HO2S2 MNTR (B1)               |                                                                                                                                                                    |                                               | LEAN ↔ RICH                                                 |
| VHCL SPEED SE                 | <ul style="list-style-type: none"> <li>● Turn drive wheels and compare speedometer indication with the CONSULT-II value</li> </ul>                                 |                                               | Almost the same speed as the CONSULT-II value               |
| BATTERY VOLT                  | <ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> </ul>                                                                           |                                               | 11 - 14V                                                    |
| THRTL POS SEN                 | <ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine</li> </ul>                                                                      | Throttle valve: fully closed                  | 0.15 - 0.85V                                                |
|                               | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Ignition switch: ON (Engine stopped)</li> </ul>                                       | Throttle valve: fully opened                  | 3.5 - 4.7V                                                  |
| EGR TEMP SEN                  | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>                                                                                       |                                               | Less than 4.5V                                              |
| EVAP SYS PRES                 | <ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>                                                                                            |                                               | Approx. 3.4V                                                |
| ABSOL PRES/SE                 | <ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>                                                                                            |                                               | Approx. 4.4V                                                |
| START SIGNAL                  | <ul style="list-style-type: none"> <li>● Ignition switch: ON → START → ON</li> </ul>                                                                               |                                               | OFF → ON → OFF                                              |
| CLSD THL/P SW<br>CLSD THL POS | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Ignition switch: ON (Engine stopped)</li> </ul>                                       | Throttle valve: Idle position                 | ON                                                          |
|                               |                                                                                                                                                                    | Throttle valve: Slightly open                 | OFF                                                         |
| AIR COND SIG                  | <ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine</li> </ul>                                                                      | A/C switch "OFF"                              | OFF                                                         |
|                               |                                                                                                                                                                    | A/C switch "ON"<br>(Compressor operates)      | ON                                                          |

## TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

| MONITOR ITEM  | CONDITION                                                                                                                                      | SPECIFICATION                                                 |                    |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------|
| P/N POSI SW   | ● Ignition switch: ON                                                                                                                          | Shift lever "P" or "N"                                        | ON                 |
|               |                                                                                                                                                | Except above                                                  | OFF                |
| PW/ST SIGNAL  | ● Engine: After warming up, idle the engine                                                                                                    | Steering wheel in neutral position (forward direction)        | OFF                |
|               |                                                                                                                                                | The steering wheel is turned                                  | ON                 |
| LOAD SIGNAL   | ● Ignition switch: ON                                                                                                                          | Rear window defogger switch "ON" and/or lighting switch "2ND" | ON                 |
|               |                                                                                                                                                | Rear window defogger switch and lighting switch "OFF"         | OFF                |
| IGNITION SW   | ● Ignition switch: ON → OFF                                                                                                                    | ON → OFF                                                      |                    |
| INJ PULSE-B1  | ● Engine: After warming up<br>● Air conditioner switch: OFF<br>● Shift lever: "N"<br>● No-load                                                 | Idle                                                          | 2.4 - 3.2 msec     |
|               |                                                                                                                                                | 2,000 rpm                                                     | 1.9 - 2.8 msec     |
| IGN TIMING    | ● Engine: After warming up<br>● Air conditioner switch: OFF<br>● Shift lever: "N"<br>● No-load                                                 | Idle                                                          | 15°±2° BTDC        |
|               |                                                                                                                                                | 2,000 rpm                                                     | More than 25° BTDC |
| CAL/LD VALUE  | ● Engine: After warming up<br>● Air conditioner switch: OFF<br>● Shift lever: "N"<br>● No-load                                                 | Idle                                                          | 20.0 - 35.5%       |
|               |                                                                                                                                                | 2,500 rpm                                                     | 17.0 - 30.0%       |
| ABSOL TH-P/S  | ● Engine: After warming up, idle the engine                                                                                                    | Throttle valve: fully closed                                  | 0.0%               |
|               | ● Engine: After warming up<br>● Ignition switch: ON (Engine stopped)                                                                           | Throttle valve: fully opened                                  | Approx. 88.0%      |
| MASS AIRFLOW  | ● Engine: After warming up<br>● Air conditioner switch: OFF<br>● Shift lever: N<br>● No-load                                                   | Idle                                                          | 2.5 - 5.0 g·m/s    |
|               |                                                                                                                                                | 2,500 rpm                                                     | 7.1 - 12.5 g·m/s   |
| IACV-AAC/V    | ● Engine: After warming up<br>● Air conditioner switch: OFF<br>● Shift lever: "N"<br>● No-load                                                 | Idle                                                          | 5 - 20 steps       |
|               |                                                                                                                                                | 2,000 rpm                                                     | —                  |
| PURG VOL C/V  | ● Engine: After warming up<br>● Air conditioner switch: "OFF"<br>● Shift lever: "N"<br>● No-load                                               | Idle                                                          | 0 %                |
|               |                                                                                                                                                | 2,000 rpm                                                     | —                  |
| EGR VOL CONV  | ● Engine: After warming up<br>● Air conditioner switch: "OFF"<br>● Shift lever: "N"<br>● No-load                                               | Idle                                                          | 0 step             |
|               |                                                                                                                                                | Engine speed: Revving from idle up to 3,000 rpm quickly       | 10 - 55 step       |
| AIR COND RLY  | ● Air conditioner switch: OFF → ON                                                                                                             | OFF → ON                                                      |                    |
| FUEL PUMP RLY | ● Ignition switch is turned to ON (Operates for 5 seconds)<br>● Engine running and cranking<br>● When engine is stopped (stops in 1.0 seconds) | ON                                                            |                    |
|               | ● Except as shown above                                                                                                                        | OFF                                                           |                    |

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

*CONSULT-II Reference Value in Data Monitor Mode (Cont'd)*

| MONITOR ITEM   | CONDITION                                                                                                                            | SPECIFICATION                                                        |      |    |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------|----|
| VC/V BYPASS/V  | ● Ignition switch: ON                                                                                                                | OFF                                                                  | GI   |    |
| VENT CONT/V    | ● Ignition switch: ON                                                                                                                | OFF                                                                  |      |    |
| COOLING FAN    | <ul style="list-style-type: none"> <li>● After warming up engine, idle the engine.</li> <li>● Air conditioner switch: OFF</li> </ul> | Engine coolant temperature is 94°C (201°F) or less                   | OFF  | MA |
|                |                                                                                                                                      | Engine coolant temperature is between 95°C (203°F) and 104°C (219°F) | LOW  | EM |
|                |                                                                                                                                      | Engine coolant temperature is 105°C (221°F) or more                  | HIGH | LC |
| HO2S1 HTR (B1) | ● Engine speed: Below 3,200 rpm                                                                                                      | ON                                                                   | EC   |    |
|                | ● Engine speed: Above 3,200 rpm                                                                                                      | OFF                                                                  |      |    |
| HO2S2 HTR (B1) | <ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Engine speed: Above 3,600 rpm</li> </ul>    | OFF                                                                  | FE   |    |
|                | ● Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more]                                 | ON                                                                   | CL   |    |

## Major Sensor Reference Graph in Data Monitor Mode

NCEC0043

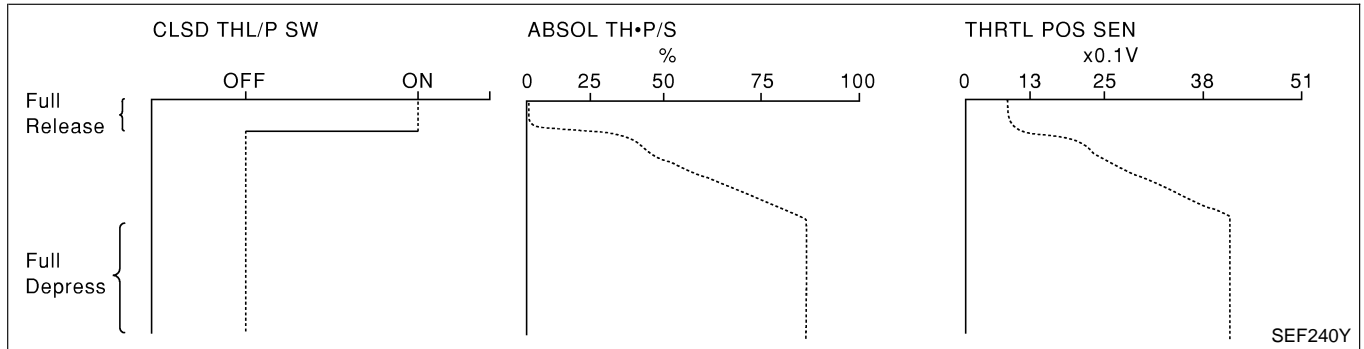
The following are the major sensor reference graphs in "DATA MONITOR" mode.

### THRTL POS SEN, ABSOL TH•P/S, CLSD THL/P SW

NCEC0043S01

Below is the data for "THRTL POS SEN", "ABSOL TH•P/S" and "CLSD THL/P SW" when depressing the accelerator pedal with the ignition switch "ON".

The signal of "THRTL POS SEN" and "ABSOL TH•P/S" should rise gradually without any intermittent drop or rise after "CLSD THL/P SW" is changed from "ON" to "OFF".



### ENG SPEED, MAS A/F SE-B1, THRTL POS SEN, HO2S2 (B1), HO2S1 (B1), INJ PULSE-B1

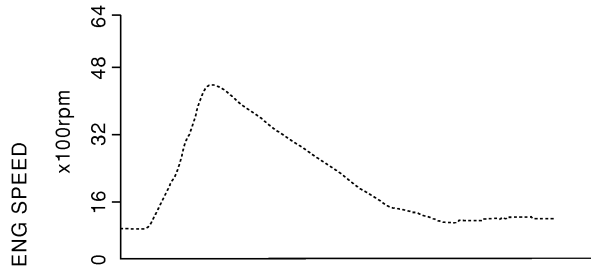
NCEC0043S02

Below is the data for "ENG SPEED", "MAS A/F SE-B1", "THRTL POS SEN", "HO2S2 (B1)", "HO2S1 (B1)" and "INJ PULSE-B1" when revving engine quickly up to 4,800 rpm under no load after warming up engine to normal operating temperature.

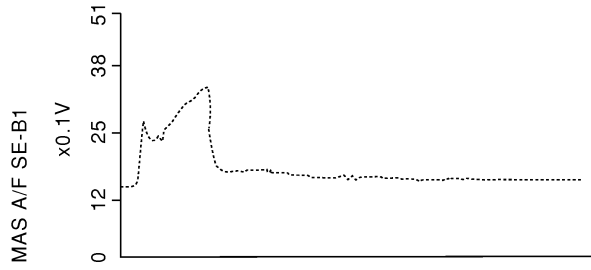
Each value is for reference, the exact value may vary.

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Major Sensor Reference Graph in Data Monitor Mode (Cont'd)



- “ENG SPEED” should increase gradually while depressing the accelerator pedal and should decrease gradually after releasing the pedal without any intermittent drop or rise.

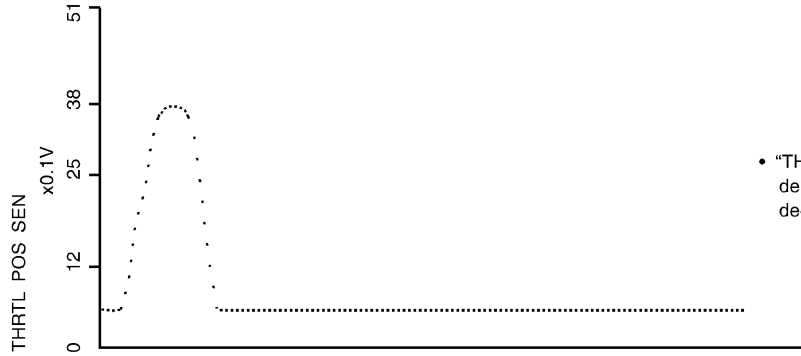


- “MAS A/F SE-B1” should increase when depressing the accelerator pedal and should decrease at the moment “THRTL POS SEN” is closed (accelerator pedal is released).

SEF241Y

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

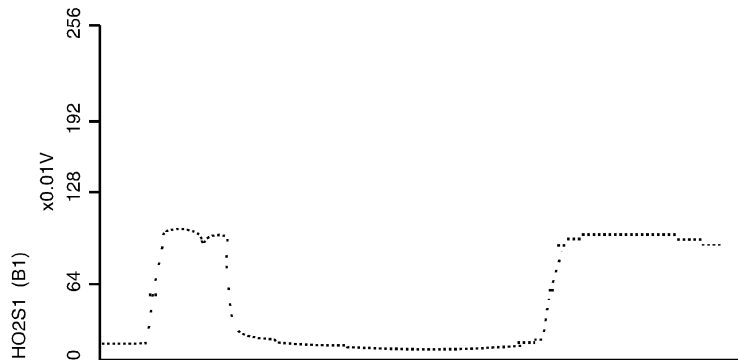
Major Sensor Reference Graph in Data Monitor Mode (Cont'd)



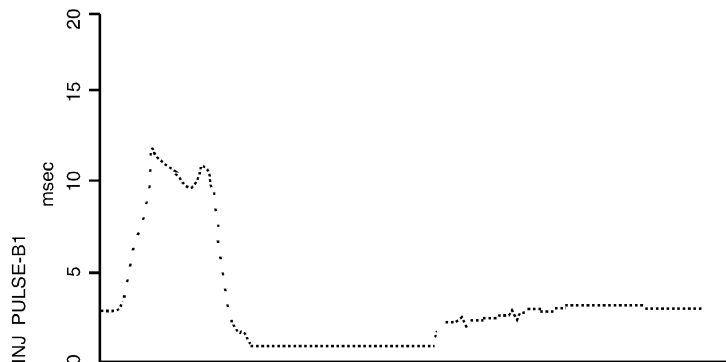
- "THRTL POS SEN" should increase while depressing the accelerator pedal and should decrease while releasing it.



- "HO2S2 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "HO2S1 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "INJ PULSE-B1" should increase when depressing the accelerator pedal and should decrease when the pedal is released.

GI

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

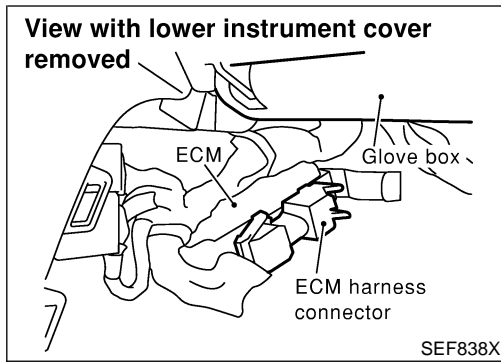
SEF242YA

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

## ECM Terminals and Reference Value

NCEC0044

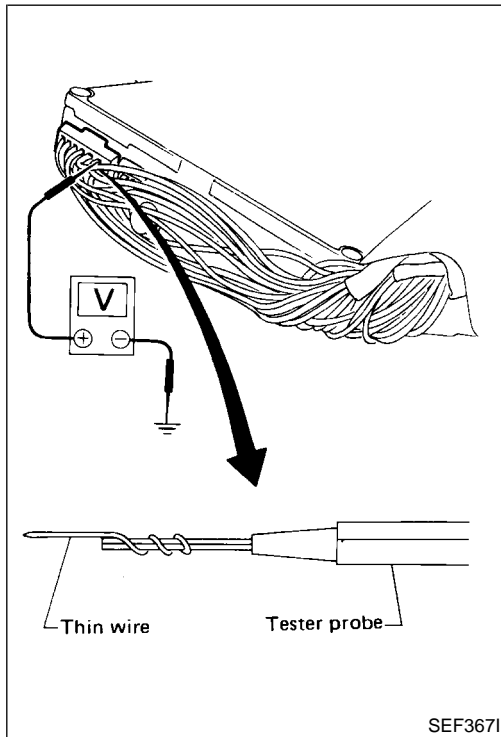
NCEC0044S01



## ECM Terminals and Reference Value

### PREPARATION

- ECM is located behind the center console. For this inspection:
  - Remove the front passenger center console panel.
  - Remove ECM harness protector.



- Perform all voltage measurements with the connector connected. Extend tester probe as shown to perform tests easily.
  - Open harness securing clip to make testing easier.
  - Use extreme care not to touch 2 pins at one time.
  - Data is for comparison and may not be exact.


### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

## ECM HARNESS CONNECTOR TERMINAL LAYOUT

NCEC0044S02

|     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |     |    |    |    |    |     |     |     |
|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|----|----|----|----|-----|-----|-----|
| 101 | 102 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |    |    | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 109 | 110 |    |    |    |    |     |     |     |
| 103 | 104 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 68 | 69 | 70 | 71  | 72  | 73 | 74 | 75 | 76 | 111 | 112 |     |
| 105 | 106 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 77 | 78 | 79 | 80  | 81  | 82 | 83 | 84 | 85 | 86  | 113 | 114 |
| 107 | 108 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |    |    |    |    |    |    |    |    |    |    | 87 | 88 | 89 | 90  | 91  | 92 | 93 | 94 | 95 | 115 | 116 |     |



SEF970W

## ECM INSPECTION TABLE

NCEC0044S03

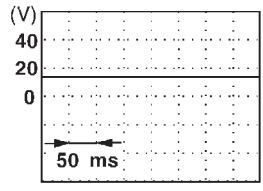
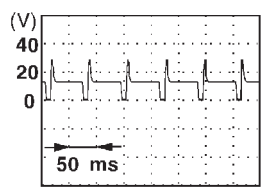
Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

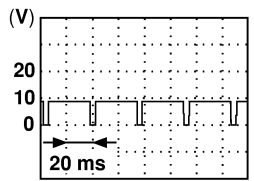
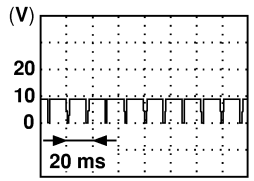
# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

*ECM Terminals and Reference Value (Cont'd)*

| TER-MINAL NO.      | WIRE COLOR              | ITEM                                              | CONDITION                                                                                                                          | DATA (DC Voltage)                                                                                                                     |                |
|--------------------|-------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------|
| 2                  | PU/R                    | Vacuum cut valve bypass valve                     | [Ignition switch "ON"]                                                                                                             | BATTERY VOLTAGE<br>(11 - 14V)                                                                                                         | GI<br>MA       |
| 3                  | R/Y                     | Heated oxygen sensor 2 heater (rear)              | [Engine is running]<br>● Engine speed is below 3,600 rpm.<br>● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more. | 0 - 1.0V                                                                                                                              | EM             |
|                    |                         |                                                   | [Ignition switch "ON"]<br>● Engine stopped<br>[Engine is running]<br>● Engine speed is above 3,600 rpm.                            | BATTERY VOLTAGE<br>(11 - 14V)                                                                                                         | LC<br>EC       |
| 4                  | OR                      | Heated oxygen sensor 1 heater (front)             | [Engine is running]<br>● Engine speed is below 3,200 rpm.                                                                          | 0 - 1.0V                                                                                                                              |                |
|                    |                         |                                                   | [Engine is running]<br>● Engine speed is above 3,200 rpm.                                                                          | BATTERY VOLTAGE<br>(11 - 14V)                                                                                                         | FE             |
| 6<br>7<br>15<br>16 | BR<br>L<br>R<br>G       | IACV-AAC valve                                    | [Engine is running]<br>● Idle speed                                                                                                | 0.1 - 14V                                                                                                                             | CL<br>MT       |
| 8<br>9<br>17<br>18 | SB<br>W/B<br>R/W<br>G/R | EGR volume control valve                          | [Engine is running]<br>● Idle speed                                                                                                | 0.1 - 14V                                                                                                                             | AT             |
| 10                 | Y/B                     | A/T signal No. 3                                  | [Engine is running]<br>● Idle speed                                                                                                | 0 - 1.0V                                                                                                                              | AX             |
| 12                 | LG                      | Cooling fan relay (High)                          | [Engine is running]<br>● Cooling fan is not operating                                                                              | BATTERY VOLTAGE<br>(11 - 14V)                                                                                                         | SU             |
|                    |                         |                                                   | [Engine is running]<br>● Cooling fan (High) is operating                                                                           | 0 - 0.6V                                                                                                                              | BR             |
| 13                 | L/Y                     | Cooling fan relay (Low)                           | [Engine is running]<br>● Cooling fan is not operating                                                                              | BATTERY VOLTAGE<br>(11 - 14V)                                                                                                         | ST             |
|                    |                         |                                                   | [Engine is running]<br>● Cooling fan is operating                                                                                  | 0 - 0.6V                                                                                                                              | RS             |
| 14                 | P                       | EVAP canister purge volume control solenoid valve | [Engine is running]<br>● Idle speed                                                                                                | BATTERY VOLTAGE<br>(11 - 14V)<br><br><br>SEF994U | BT<br>HA<br>SC |
|                    |                         |                                                   | [Engine is running]<br>● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine).                            | BATTERY VOLTAGE<br>(11 - 14V)<br><br><br>SEF995U | EL<br>IDX      |

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

| TER-MINAL NO. | WIRE COLOR | ITEM                       | CONDITION                                                                                                           | DATA (DC Voltage)                                                                                                      |
|---------------|------------|----------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 19            | BR/W       | A/T signal No. 5           | <b>[Engine is running]</b><br>● Idle speed                                                                          | Approximately 8V                                                                                                       |
| 21            | B/P        | Fuel pump relay            | <b>[Ignition switch "ON"]</b><br>● For 5 seconds after turning ignition switch "ON"                                 | 0 - 1V                                                                                                                 |
|               |            |                            | <b>[Engine is running]</b><br>● More than 5 seconds after turning ignition switch "ON"                              | BATTERY VOLTAGE (11 - 14V)                                                                                             |
| 22            | OR/L       | Malfunction indicator lamp | <b>[Ignition switch "ON"]</b>                                                                                       | 0 - 1.0V                                                                                                               |
|               |            |                            | <b>[Engine is running]</b><br>● Idle speed                                                                          | BATTERY VOLTAGE (11 - 14V)                                                                                             |
| 23            | L/W        | Air conditioner relay      | <b>[Engine is running]</b><br>● Both A/C switch and blower switch are "ON" (Compressor operates)                    | 0 - 0.6V                                                                                                               |
|               |            |                            | <b>[Engine is running]</b><br>● A/C switch is "OFF"                                                                 | BATTERY VOLTAGE (11 - 14V)                                                                                             |
| 31            | W/G        | ECM relay (Self shut-off)  | <b>[Engine is running]</b><br><b>[Ignition switch "OFF"]</b><br>● For 5 seconds after turning ignition switch "OFF" | 0 - 1.0V                                                                                                               |
|               |            |                            | <b>[Ignition switch "OFF"]</b><br>● 5 seconds passed after turning ignition switch "OFF"                            | BATTERY VOLTAGE (11 - 14V)                                                                                             |
| 32            | L          | Tachometer                 | <b>[Engine is running]</b><br>● Warm-up condition<br>● Idle speed                                                   | Approximately 8.2V<br><br>SEF928X |
|               |            |                            | <b>[Engine is running]</b><br>● Engine speed is 2,000 rpm                                                           | Approximately 8.2V<br><br>SEF929X |



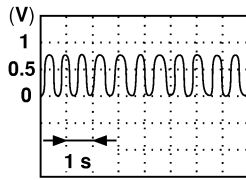
# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

*ECM Terminals and Reference Value (Cont'd)*

| TER-MINAL NO. | WIRE COLOR | ITEM                                       | CONDITION                                                                                                                                                                              | DATA (DC Voltage)          |                       |
|---------------|------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------|
| 35            | W/B        | Ignition signal                            | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>                                                                 | Approximately 0.3V<br>     | GI<br>MA<br>EM<br>LC  |
|               |            |                                            | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm</li> </ul>                                                                               | Approximately 0.5V<br>     | <b>EC</b><br>FE<br>CL |
| 36            | G          | Ignition check                             | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>                                                                 | Approximately 13V<br>      | MT<br>AT<br>AX        |
|               |            |                                            | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm</li> </ul>                                                                               | Approximately 13V<br>      | SU<br>BR<br>ST        |
| 40            | Y          | Throttle position switch (Closed position) | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Accelerator pedal fully released</li> </ul>                                           | BATTERY VOLTAGE (11 - 14V) | RS                    |
|               |            |                                            | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Accelerator pedal depressed</li> </ul>                                                                             | Approximately 0V           | BT                    |
| 41            | B/Y        | Start signal                               | <b>[Ignition switch "ON"]</b>                                                                                                                                                          | Approximately 0V           | HA                    |
|               |            |                                            | <b>[Ignition switch "START"]</b>                                                                                                                                                       | 9 - 14V                    |                       |
| 42            | G/OR       | PNP switch                                 | <b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Gear position is "Neutral position" (M/T models)</li> <li>● Gear position is "P" or "N" (A/T models)</li> </ul> | Approximately 0V           | SC                    |
|               |            |                                            | <b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Except the above gear position</li> </ul>                                                                       | BATTERY VOLTAGE (11 - 14V) | EL                    |
| 43            | B/R        | Ignition switch                            | <b>[Ignition switch "OFF"]</b>                                                                                                                                                         | 0V                         | IDX                   |
|               |            |                                            | <b>[Ignition switch "ON"]</b>                                                                                                                                                          | BATTERY VOLTAGE (11 - 14V) |                       |

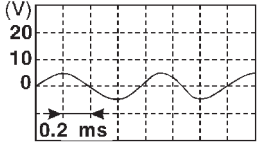
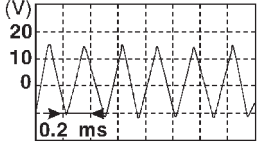
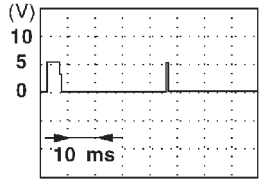
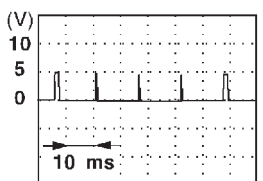
# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

| TER-MINAL NO. | WIRE COLOR | ITEM                               | CONDITION                                                                                 | DATA (DC Voltage)                                                                                                                                   |
|---------------|------------|------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 44            | L/B        | Air conditioner switch             | [Engine is running]<br>● Both A/C switch and blower switch are "ON"                       | Approximately 0V                                                                                                                                    |
|               |            |                                    | [Engine is running]<br>● A/C switch is "OFF"                                              | BATTERY VOLTAGE<br>(11 - 14V)                                                                                                                       |
| 46            | SB         | Power steering oil pressure switch | [Engine is running]<br>● Steering wheel is being turned.                                  | Approximately 0V                                                                                                                                    |
|               |            |                                    | [Engine is running]<br>● Steering wheel is not being turned.                              | Approximately 5V                                                                                                                                    |
| 48            | B          | ECM ground                         | [Engine is running]<br>● Idle speed                                                       | Engine ground                                                                                                                                       |
| 50            | R          | Electrical load signal             | [Ignition switch "ON"]<br>● Lighting switch "2ND" and/or rear window defogger switch "ON" | BATTERY VOLTAGE<br>(11 - 14V)                                                                                                                       |
|               |            |                                    | [Ignition switch "ON"]<br>● Lighting switch and rear window defogger switch "OFF"         | 0V                                                                                                                                                  |
| 54            | Y/R        | A/T signal No. 1                   | [Engine is running]<br>● Idle speed                                                       | Approximately 0 - 1.0V                                                                                                                              |
| 55            | Y/G        | A/T signal No. 2                   | [Engine is running]<br>● Idle speed                                                       | Approximately 0 - 1.0V                                                                                                                              |
| 56            | G/Y        | A/T signal No. 4                   | [Engine is running]<br>● Idle speed                                                       | Approximately 0 - 1.0V                                                                                                                              |
| 57            | B          | ECM ground                         | [Engine is running]<br>● Idle speed                                                       | Engine ground                                                                                                                                       |
| 58            | B          | Sensor's ground                    | [Engine is running]<br>● Warm-up condition<br>● Idle speed                                | Approximately 0V                                                                                                                                    |
| 61            | L          | Mass air flow sensor               | [Engine is running]<br>● Warm-up condition<br>● Idle speed                                | 1.3 - 1.7V                                                                                                                                          |
|               |            |                                    | [Engine is running]<br>● Warm-up condition<br>● Engine speed is 2,500 rpm                 | 1.8 - 2.4V                                                                                                                                          |
| 62            | W          | Heated oxygen sensor 1 (front)     | [Engine is running]<br>● Warm-up condition<br>● Engine speed is 2,000 rpm                 | 0 - Approximately 1.0V<br>(Periodically change)<br><br>SEF059V |
| 63            | W          | Heated oxygen sensor 2 (rear)      | [Engine is running]<br>● Warm-up condition<br>● Engine speed is 2,000 rpm                 | 0 - Approximately 1.0V                                                                                                                              |
| 64            | R/Y        | Intake air temperature sensor      | [Engine is running]                                                                       | Approximately 0 - 4.8V<br>Output voltage varies with intake air temperature.                                                                        |

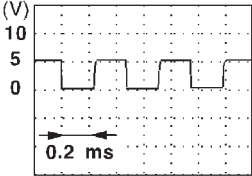
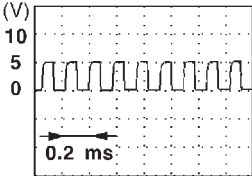
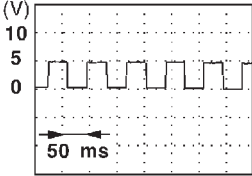
# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

*ECM Terminals and Reference Value (Cont'd)*

| TER-MINAL NO. | WIRE COLOR | ITEM                                        | CONDITION                                                                                                                                           | DATA (DC Voltage)                                                                                                                                                        |                       |
|---------------|------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 65            | W          | Crankshaft position sensor (OBD)            | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>                       | <p>3 - 5V (AC range)</p>  <p style="text-align: right; font-size: small;">SEF721W</p> | GI<br>MA<br>EM        |
|               |            |                                             | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm</li> </ul>                                     | <p>6 - 9V (AC range)</p>  <p style="text-align: right; font-size: small;">SEF722W</p> | LC<br><b>EC</b><br>FE |
| 66<br>75      | L<br>L     | Camshaft position sensor (Reference signal) | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>                       | <p>0.1 - 0.4V</p>  <p style="text-align: right; font-size: small;">SEF006W</p>        | CL<br>MT<br>AT        |
|               |            |                                             | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm</li> </ul>                                     | <p>0.1 - 0.4V</p>  <p style="text-align: right; font-size: small;">SEF007W</p>      | AX<br>SU<br>BR        |
| 67            | W/L        | Power supply for ECM (Back-up)              | <b>[Ignition switch "OFF"]</b>                                                                                                                      | BATTERY VOLTAGE<br>(11 - 14V)                                                                                                                                            | ST                    |
| 70            | BR/Y       | Engine coolant temperature sensor           | <b>[Engine is running]</b>                                                                                                                          | Approximately 0 - 4.8V<br>Output voltage varies with engine coolant temperature.                                                                                         | RS                    |
| 71            | GY         | Throttle position sensor signal output      | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Accelerator pedal fully released</li> </ul> | Approximately 0.4V                                                                                                                                                       | BT                    |
|               |            |                                             | <p><b>[Ignition switch "ON"]</b></p> <ul style="list-style-type: none"> <li>● Accelerator pedal fully depressed</li> </ul>                          | Approximately 4V                                                                                                                                                         | HA                    |
| 72            | R/B        | EGR temperature sensor                      | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>                       | Less than 4.5V                                                                                                                                                           | SC                    |
|               |            |                                             | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● EGR system is operating</li> </ul>          | 0 - 1.5V                                                                                                                                                                 | EL                    |
| 73            | G          | Mass air flow sensor ground                 | <b>[Engine is running]</b>                                                                                                                          | Approximately 0V                                                                                                                                                         | IDX                   |

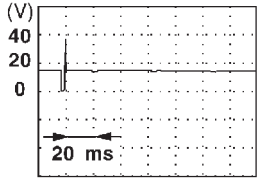
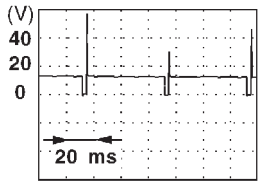
# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

| TERMINAL NO. | WIRE COLOR | ITEM                                       | CONDITION                                                                                                                                                                          | DATA (DC Voltage)                                                                                                          |
|--------------|------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 74           | R/L        | Refrigerant pressure sensor                | <b>[Engine is running]</b><br><ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Both A/C switch and blower switch are "ON" (Compressor operates)</li> </ul>    | 0.36 - 3.88V                                                                                                               |
| 81           | W          | Knock sensor                               | <b>[Engine is running]</b><br><ul style="list-style-type: none"> <li>● Idle speed</li> </ul>                                                                                       | Approximately 2.5V                                                                                                         |
| 82           | LG/R       | Fuel tank temperature sensor               | <b>[Engine is running]</b>                                                                                                                                                         | Approximately 0 - 4.8V<br>Output voltage varies with fuel tank temperature.                                                |
| 83           | G/R        | Fuel level sensor                          | <b>[Ignition switch "ON"]</b>                                                                                                                                                      | Approximately 0 - 4.8V<br>Output voltage varies with fuel level.                                                           |
| 84           | W          | EVAP control system pressure sensor        | <b>[Ignition switch "ON"]</b>                                                                                                                                                      | Approximately 3.4V                                                                                                         |
| 85           | B/W        | Camshaft position sensor (Position signal) | <b>[Engine is running]</b><br><ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>                                                          | Approximately 2.6V<br><br>SEF004W       |
|              |            |                                            | <b>[Engine is running]</b><br><ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm</li> </ul>                                                                        | Approximately 2.5V<br><br>SEF005W     |
| 86           | Y/G        | Vehicle speed sensor                       | <b>[Engine is running]</b><br><ul style="list-style-type: none"> <li>● Lift up the vehicle</li> <li>● In 2nd gear position</li> <li>● Vehicle speed is 40 km/h (25 MPH)</li> </ul> | 0 - Approximately 4.2V<br><br>SEF003W |
| 90           | B          | Fuel level sensor ground                   | <b>[Engine is running]</b><br><ul style="list-style-type: none"> <li>● Idle speed</li> </ul>                                                                                       | Approximately 0V                                                                                                           |
| 91           | PU         | A/T check signal                           | <b>[Ignition switch "ON"]</b>                                                                                                                                                      | 0 - Approximately 5V                                                                                                       |
| 92           | Y          | Throttle position sensor                   | <b>[Engine is running]</b><br><ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Accelerator pedal fully released</li> </ul>                                    | 0.15 - 0.85V                                                                                                               |
|              |            |                                            | <b>[Ignition switch "ON"]</b><br><ul style="list-style-type: none"> <li>● Accelerator pedal fully depressed</li> </ul>                                                             | 3.5 - 4.7V                                                                                                                 |

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

*ECM Terminals and Reference Value (Cont'd)*

| TER-MINAL NO.            | WIRE COLOR               | ITEM                                                                 | CONDITION                                                                                                                                    | DATA (DC Voltage)                                                                                                                                                   |
|--------------------------|--------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 101<br>103<br>105<br>107 | R/B<br>Y/B<br>G/B<br>L/B | Injector No. 1<br>Injector No. 2<br>Injector No. 3<br>Injector No. 4 | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>                | <p>BATTERY VOLTAGE<br/>(11 - 14V)</p>  <p style="text-align: right;">SEF011W</p> |
|                          |                          |                                                                      | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm</li> </ul> | <p>BATTERY VOLTAGE<br/>(11 - 14V)</p>  <p style="text-align: right;">SEF012W</p> |
| 102                      | PU/W                     | EVAP canister vent control valve                                     | <b>[Ignition switch "ON"]</b>                                                                                                                | BATTERY VOLTAGE<br>(11 - 14V)                                                                                                                                       |
| 106<br>108               | B<br>B                   | ECM ground                                                           | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>                                             | Engine ground                                                                                                                                                       |
| 110<br>112               | W<br>W                   | Power supply for ECM                                                 | <b>[Ignition switch "ON"]</b>                                                                                                                | BATTERY VOLTAGE<br>(11 - 14V)                                                                                                                                       |
| 111                      | P/L                      | Sensor's power supply                                                | <b>[Ignition switch "ON"]</b>                                                                                                                | Approximately 5V                                                                                                                                                    |
| 115                      | L/B                      | DATA link connector                                                  | <p><b>[Ignition switch "ON"]</b></p> <ul style="list-style-type: none"> <li>● CONSULT-II or GST is disconnected.</li> </ul>                  | Approximately 8V                                                                                                                                                    |

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# TROUBLE DIAGNOSIS — SPECIFICATION VALUE

Description

## Description

The specification (SP) value indicates the tolerance of the value that is displayed in “DATA MONITOR (SPEC)” mode of CONSULT-II during normal operation of the Engine Control System. When the value in “DATA MONITOR (SPEC)” mode is within the SP value, the Engine Control System is confirmed OK. When the value in “DATA MONITOR (SPEC)” mode is NOT within the SP value, the Engine Control System may have one or more malfunctions. NCEC0666

The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MIL.

The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1/B2 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

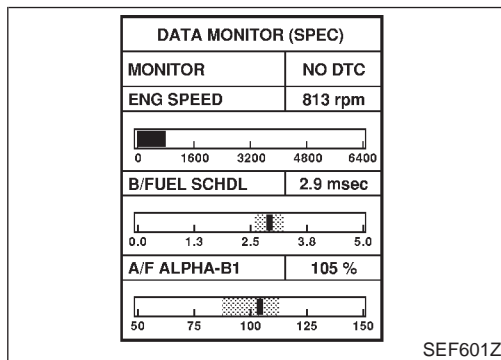
## Testing Condition

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm<sup>2</sup>, 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up\*1
- Electrical load: Not applied\*2
- Engine speed: Idle

NCEC0667

\*1: For A/T models, after the engine is warmed up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (A/T fluid temperature sensor signal) indicates less than 0.9V. For M/T models, drive vehicle for 5 minutes after the engine is warmed up to normal operating temperature.

\*2: Rear window defogger switch, air conditioner switch, lighting switch are “OFF”. Cooling fans are not operating. Steering wheel is straight ahead.



## Inspection Procedure

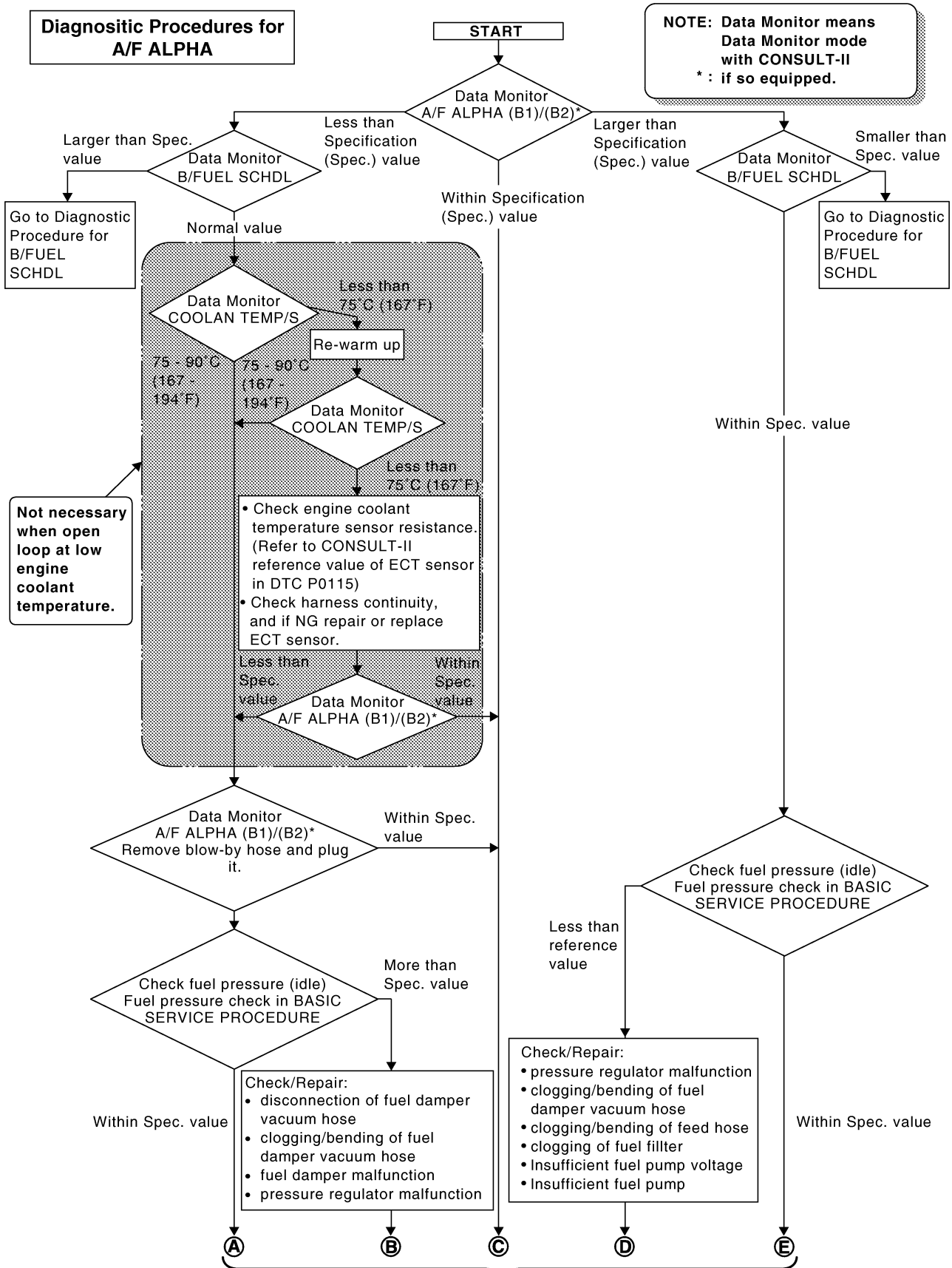
NCEC0668

### NOTE:

Perform “DATA MONITOR (SPEC)” mode in maximum scale display.

1. Perform “Basic Inspection”, EC-107.
2. Confirm that the testing conditions indicated above are met.
3. Select “B/FUEL SCHDL”, “A/F ALPHA-B1” and “MAS A/F SE-B1” in “DATA MONITOR (SPEC)” mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to “Diagnostic Procedure”, EC-143.

## Diagnostic Procedure



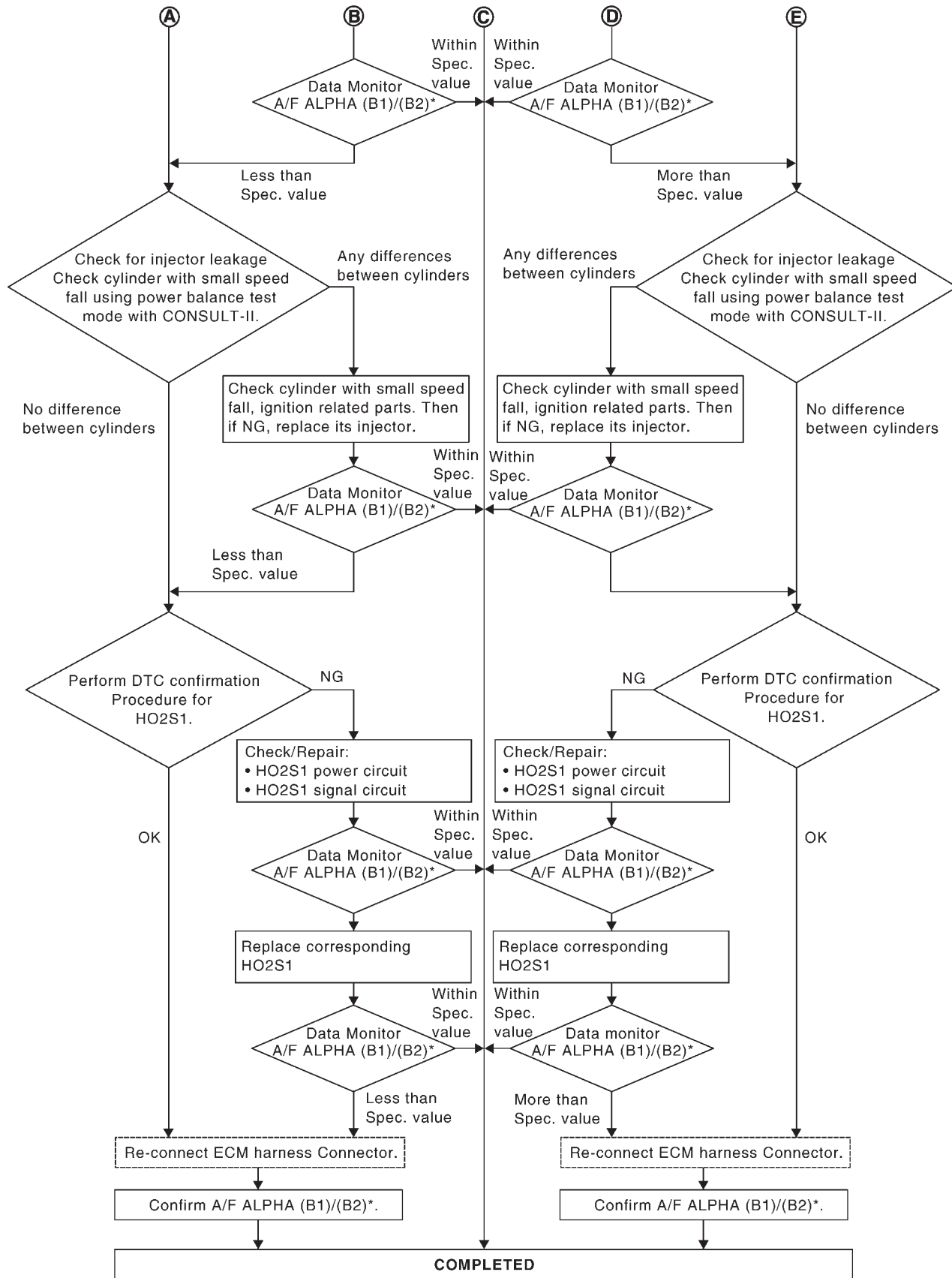
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# TROUBLE DIAGNOSIS — SPECIFICATION VALUE

Diagnostic Procedure (Cont'd)



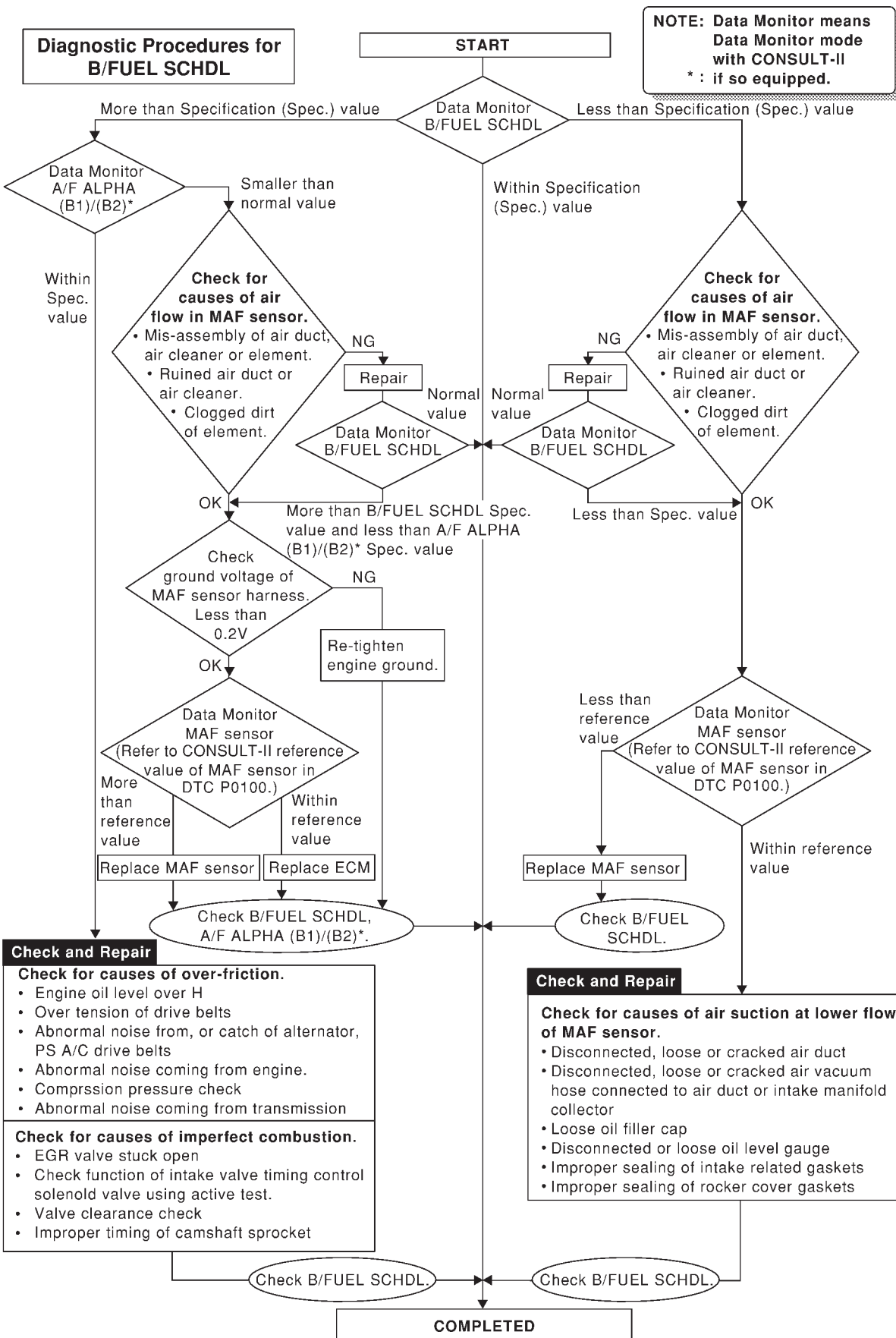
SEF768Z



# TROUBLE DIAGNOSIS — SPECIFICATION VALUE

Diagnostic Procedure (Cont'd)

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SEF615Z

# TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

Description

## Description

NCEC0045

Intermittent incidents (I/I) may occur. In many cases, the problem resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on DTC (1st trip) visits. Realize also that the most frequent cause of I/I occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific problem area.

## COMMON I/I REPORT SITUATIONS

NCEC0045S01

| STEP in Work Flow | Situation                                                                                    |
|-------------------|----------------------------------------------------------------------------------------------|
| II                | The CONSULT-II is used. The SELF-DIAG RESULTS screen shows time data other than "0" or "1t". |
| III               | The symptom described by the customer does not recur.                                        |
| IV                | (1st trip) DTC data does not appear during the DTC CONFIRMATION PROCEDURE.                   |
| VI                | The TROUBLE DIAGNOSIS for PXXXX does not indicate the problem area.                          |

## Diagnostic Procedure

NCEC0046

|                                                                                     |                         |
|-------------------------------------------------------------------------------------|-------------------------|
| <b>1</b>                                                                            | <b>INSPECTION START</b> |
| Erase (1st trip) DTCs. Refer to "HOW TO ERASE EMISSION-RELATED INFORMATION", EC-79. |                         |
| ▶                                                                                   | GO TO 2.                |

|                                                                                                |                               |
|------------------------------------------------------------------------------------------------|-------------------------------|
| <b>2</b>                                                                                       | <b>CHECK GROUND TERMINALS</b> |
| Check ground terminals for corroding or loose connection. Refer to GI-30, "GROUND INSPECTION". |                               |
| <b>OK or NG</b>                                                                                |                               |
| OK                                                                                             | ▶ GO TO 3.                    |
| NG                                                                                             | ▶ Repair or replace.          |

|                                              |                                       |
|----------------------------------------------|---------------------------------------|
| <b>3</b>                                     | <b>SEARCH FOR ELECTRICAL INCIDENT</b> |
| Refer to GI-25, "Incident Simulation Tests". |                                       |
| <b>OK or NG</b>                              |                                       |
| OK                                           | ▶ GO TO 4.                            |
| NG                                           | ▶ Repair or replace.                  |

|                                                                     |                                  |
|---------------------------------------------------------------------|----------------------------------|
| <b>4</b>                                                            | <b>CHECK CONNECTOR TERMINALS</b> |
| Refer to GI-22, "How to Check Enlarged Contact Spring of Terminal". |                                  |
| <b>OK or NG</b>                                                     |                                  |
| OK                                                                  | ▶ <b>INSPECTION END</b>          |
| NG                                                                  | ▶ Repair or replace connector.   |

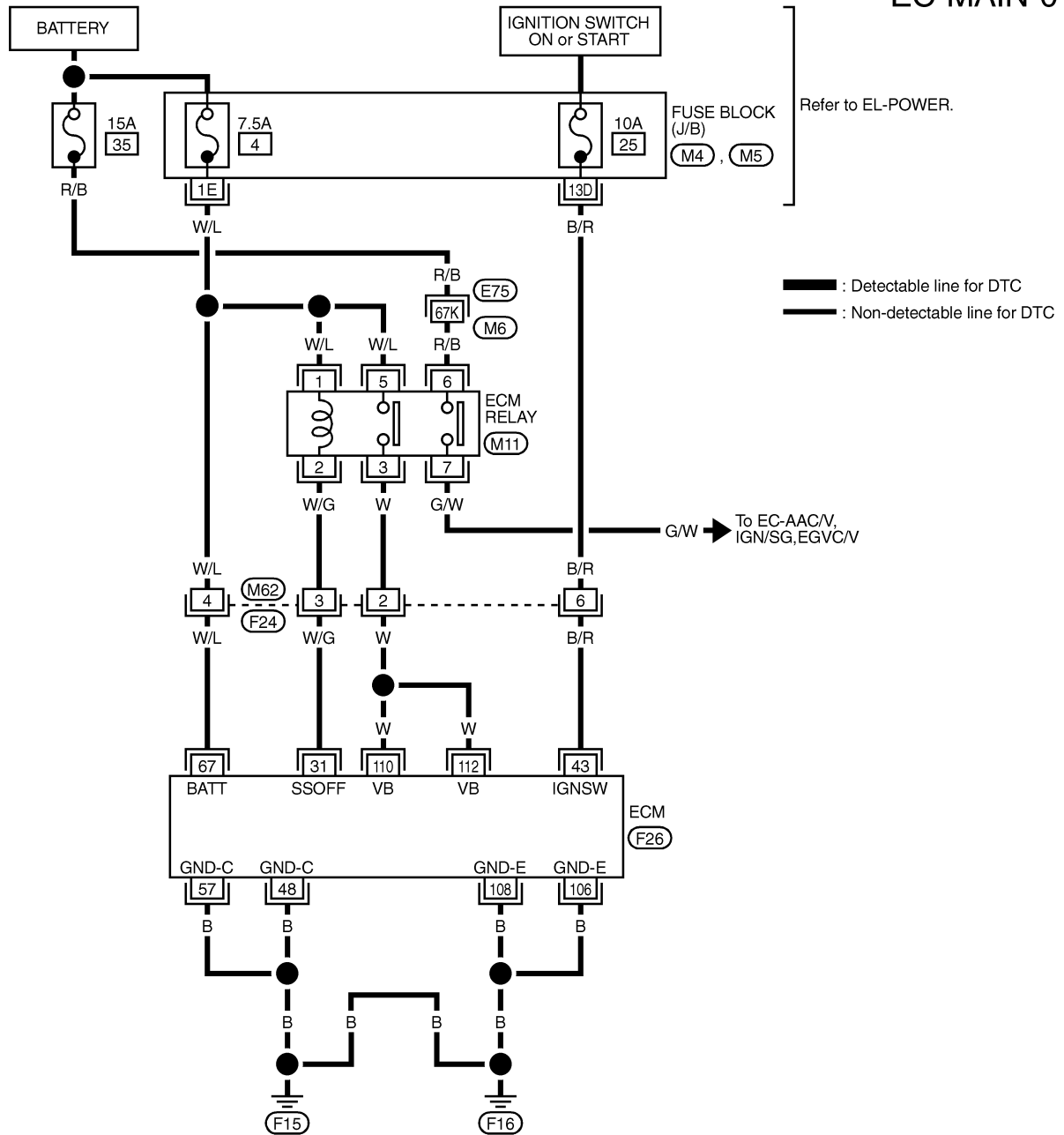
# TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit

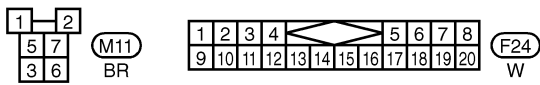
## Main Power Supply and Ground Circuit WIRING DIAGRAM

NCEC0047

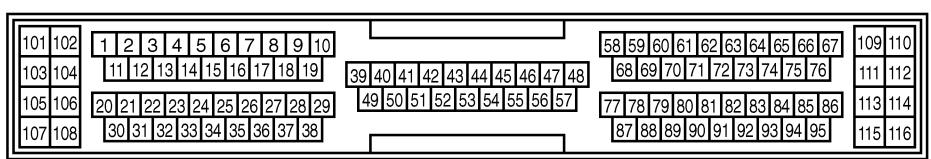
EC-MAIN-01



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REFER TO THE FOLLOWING.  
 (E75) -SUPER MULTIPLE JUNCTION (SMJ)  
 (M4), (M5) -FUSE BLOCK-JUNCTION BOX (J/B)



# TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

## ECM TERMINALS AND REFERENCE VALUE

NCEC0048

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                              | CONDITION                                                                                             | DATA (DC Voltage)             |
|----------------------|---------------|-----------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------|
| 31                   | W/G           | ECM relay (Self shut-off)         | [Engine is running]<br>[Ignition switch "OFF"]<br>● For 5 seconds after turning ignition switch "OFF" | 0 - 1V                        |
|                      |               |                                   | [Ignition switch "OFF"]<br>● 5 seconds passed after turning ignition switch "OFF"                     | BATTERY VOLTAGE<br>(11 - 14V) |
| 43                   | B/R           | Ignition switch                   | [Ignition switch "OFF"]                                                                               | 0V                            |
|                      |               |                                   | [Ignition switch "ON"]                                                                                | BATTERY VOLTAGE<br>(11 - 14V) |
| 48                   | B             | ECM ground                        | [Engine is running]<br>● Idle speed                                                                   | Engine ground                 |
| 57                   | B             | ECM ground                        | [Engine is running]<br>● Idle speed                                                                   | Engine ground                 |
| 67                   | W/L           | Power supply for ECM<br>(Back-up) | [Ignition switch "OFF"]                                                                               | BATTERY VOLTAGE<br>(11 - 14V) |
| 106                  | B             | ECM ground                        | [Engine is running]<br>● Idle speed                                                                   | Engine ground                 |
| 108                  | B             | ECM ground                        | [Engine is running]<br>● Idle speed                                                                   | Engine ground                 |
| 110<br>112           | W<br>W        | Power supply for ECM              | [Ignition switch "ON"]                                                                                | BATTERY VOLTAGE<br>(11 - 14V) |

## DIAGNOSTIC PROCEDURE

NCEC0049

|                                     |                         |          |
|-------------------------------------|-------------------------|----------|
| <b>1</b>                            | <b>INSPECTION START</b> |          |
| Start engine.<br>Is engine running? |                         |          |
| Yes or No                           |                         |          |
| Yes                                 | ▶                       | GO TO 8. |
| No                                  | ▶                       | GO TO 2. |

# TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

|                                                                                                                                                         |                                         |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------|
| <b>2</b>                                                                                                                                                | <b>CHECK ECM POWER SUPPLY CIRCUIT-I</b> |          |
| <p>1. Turn ignition switch "OFF" and then "ON".<br/>                 2. Check voltage between ECM terminal 43 and ground with CONSULT-II or tester.</p> |                                         |          |
|                                                                                                                                                         |                                         |          |
| SEF291X                                                                                                                                                 |                                         |          |
| OK                                                                                                                                                      | ▶                                       | GO TO 4. |
| NG                                                                                                                                                      | ▶                                       | GO TO 3. |

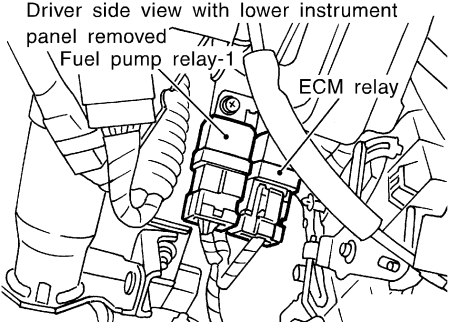
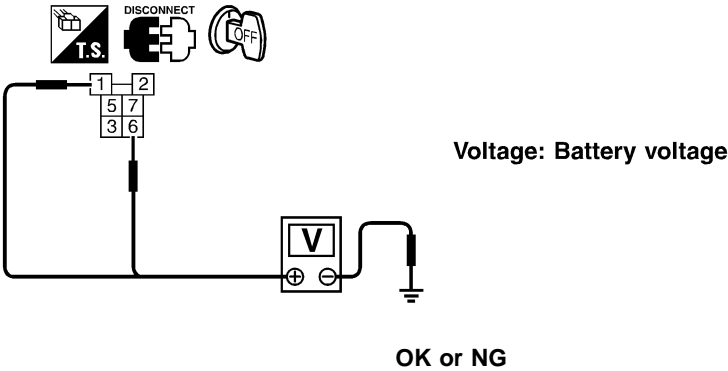
|                                                                                                                                                                           |                                   |                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------|
| <b>3</b>                                                                                                                                                                  | <b>DETECT MALFUNCTIONING PART</b> |                               |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M62, F24</li> <li>● Harness for open or short between ECM and 10A fuse</li> </ul> |                                   |                               |
| ▶                                                                                                                                                                         |                                   | Repair harness or connectors. |

|                                                                                                                                                                                                                                                                                                                                                              |                                                      |                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                                     | <b>CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I</b> |                                                                 |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect ECM harness connector.<br/>                 3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground.<br/>                 Refer to WIRING DIAGRAM.<br/> <b>Continuity should exist.</b><br/>                 4. Also check harness for short to power.</p> |                                                      |                                                                 |
| OK or NG                                                                                                                                                                                                                                                                                                                                                     |                                                      |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                           | ▶                                                    | GO TO 5.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                           | ▶                                                    | Repair open circuit or short to power in harness or connectors. |

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# TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

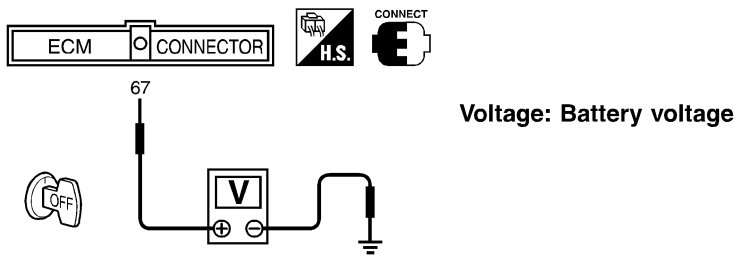
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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>CHECK ECM POWER SUPPLY CIRCUIT-II</b> |
| <p>1. Disconnect ECM relay.</p> <div style="text-align: center;">  <p>Driver side view with lower instrument panel removed<br/>Fuel pump relay-1<br/>ECM relay</p> </div> <p style="text-align: right;">SEF185XA</p> <p>2. Check voltage between ECM relay terminals 1, 6 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> <p>OK or NG</p> <p style="text-align: right;">SEF101Y</p> </div> |                                          |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶ GO TO 7.                               |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶ GO TO 6.                               |

|                                                                                                                                                                                                                 |                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>6</b>                                                                                                                                                                                                        | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● 15A fuse and 7.5A fuse</li> <li>● Harness connectors E75, M6</li> <li>● Harness for open or short between ECM relay and battery</li> </ul> |                                                                                    |
| ▶                                                                                                                                                                                                               | Repair open circuit or short to ground or short to power in harness or connectors. |

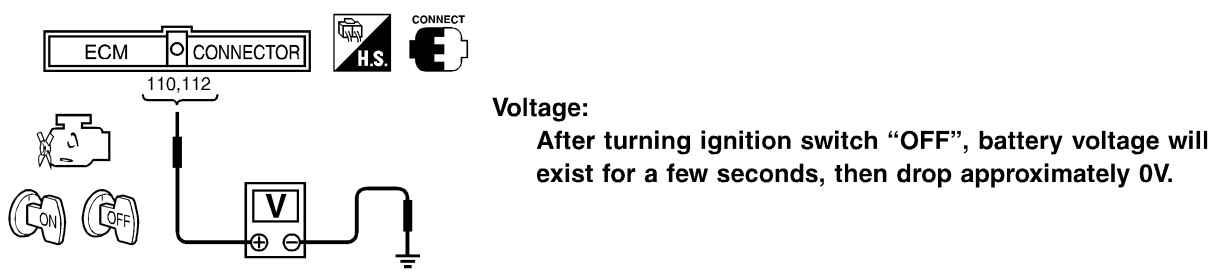
|                                                                                                                                                                                                                                                  |                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>7</b>                                                                                                                                                                                                                                         | <b>CHECK OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b>                                |
| <p>1. Check harness continuity between ECM terminal 31 and ECM relay terminal 2.<br/><b>Continuity should exist.</b></p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                      |
| OK                                                                                                                                                                                                                                               | ▶ Go to "IGNITION SIGNAL", EC-566.                                                   |
| NG                                                                                                                                                                                                                                               | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

# TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

|                                                                                                                                                     |                                           |           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------|
| <b>8</b>                                                                                                                                            | <b>CHECK ECM POWER SUPPLY CIRCUIT-III</b> |           |
| <p>1. Stop engine.<br/>2. Check voltage between ECM terminal 67 and ground with CONSULT-II or tester.</p>                                           |                                           |           |
|  <p style="text-align: right;"><b>Voltage: Battery voltage</b></p> |                                           |           |
| SEF293X                                                                                                                                             |                                           |           |
| <b>OK or NG</b>                                                                                                                                     |                                           |           |
| OK                                                                                                                                                  | ▶                                         | GO TO 10. |
| NG                                                                                                                                                  | ▶                                         | GO TO 9.  |

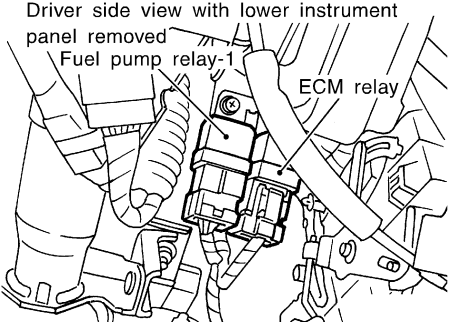
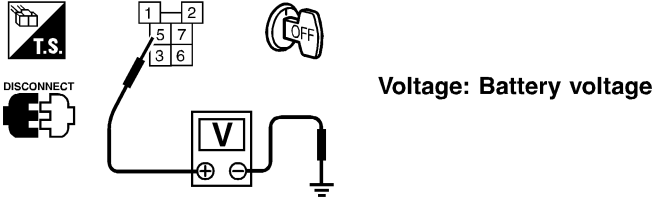
|                                                                                                                                                                                                                                              |                                   |                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------|
| <b>9</b>                                                                                                                                                                                                                                     | <b>DETECT MALFUNCTIONING PART</b> |                               |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M62, F24</li> <li>● Fuse block (J/B) connector M4, M5</li> <li>● 7.5A fuse</li> <li>● Harness for open or short between ECM and 7.5A fuse</li> </ul> |                                   |                               |
| ▶                                                                                                                                                                                                                                            |                                   | Repair harness or connectors. |

|                                                                                                                                                                                                                                                                 |                                          |           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------|
| <b>10</b>                                                                                                                                                                                                                                                       | <b>CHECK ECM POWER SUPPLY CIRCUIT-IV</b> |           |
| <p>1. Turn ignition switch "ON" and then "OFF".<br/>2. Check voltage between ECM terminals 110, 112 and ground with CONSULT-II or tester.</p>                                                                                                                   |                                          |           |
|  <p style="text-align: right;"><b>Voltage:</b><br/><b>After turning ignition switch "OFF", battery voltage will exist for a few seconds, then drop approximately 0V.</b></p> |                                          |           |
| SEF294X                                                                                                                                                                                                                                                         |                                          |           |
| <b>OK or NG</b>                                                                                                                                                                                                                                                 |                                          |           |
| OK                                                                                                                                                                                                                                                              | ▶                                        | GO TO 16. |
| NG (Battery voltage does not exist.)                                                                                                                                                                                                                            | ▶                                        | GO TO 11. |
| NG (Battery voltage exists for more than a few seconds.)                                                                                                                                                                                                        | ▶                                        | GO TO 13. |

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# TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>11</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>CHECK ECM POWER SUPPLY CIRCUIT-V</b> |
| <p>1. Disconnect ECM relay.</p> <div style="text-align: center;">  <p>Driver side view with lower instrument panel removed<br/>Fuel pump relay-1<br/>ECM relay</p> </div> <p style="text-align: right;">SEF185XA</p> <p>2. Check voltage between ECM relay terminal 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> <p style="text-align: right;">SEF916Z</p> </div> <p style="text-align: center;"><b>OK or NG</b></p> |                                         |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶ GO TO 13.                             |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶ GO TO 12.                             |

|                                                                  |                                                                                    |
|------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>12</b>                                                        | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| Check harness for open or short between ECM relay and 7.5A fuse. |                                                                                    |
| ▶                                                                | Repair open circuit or short to ground or short to power in harness or connectors. |

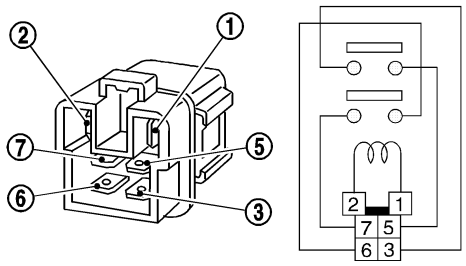
|                                                                                                                                                                                                                                                                                      |                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>13</b>                                                                                                                                                                                                                                                                            | <b>CHECK HARNESS CONTINUITY BETWEEN ECM RELAY AND ECM FOR OPEN AND SHORT</b> |
| <p>1. Check harness continuity between ECM terminals 110, 112 and ECM relay terminal 3.<br/>Refer to WIRING DIAGRAM.<br/><b>Continuity should exist.</b></p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                              |
| OK                                                                                                                                                                                                                                                                                   | ▶ GO TO 15.                                                                  |
| NG                                                                                                                                                                                                                                                                                   | ▶ GO TO 14.                                                                  |

|                                                                                                                                                                            |                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>14</b>                                                                                                                                                                  | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M62, F24</li> <li>● Harness for open or short between ECM and ECM relay</li> </ul> |                                                                                    |
| ▶                                                                                                                                                                          | Repair open circuit or short to ground or short to power in harness or connectors. |



# TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

|                                                                                                                                                                                               |                        |                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------|
| <b>15</b>                                                                                                                                                                                     | <b>CHECK ECM RELAY</b> |                    |
| <ol style="list-style-type: none"> <li>1. Apply 12V direct current between ECM relay terminals 1 and 2.</li> <li>2. Check continuity between ECM relay terminals 3 and 5, 6 and 7.</li> </ol> |                        |                    |
|                                                                                                             |                        |                    |
| <p><b>12V (1 - 2) applied: Continuity exists.</b><br/> <b>No voltage applied: No continuity</b></p> <p style="text-align: center;"><b>OK or NG</b></p>                                        |                        |                    |
| OK                                                                                                                                                                                            | ▶                      | GO TO 16.          |
| NG                                                                                                                                                                                            | ▶                      | Replace ECM relay. |

SEC202BC

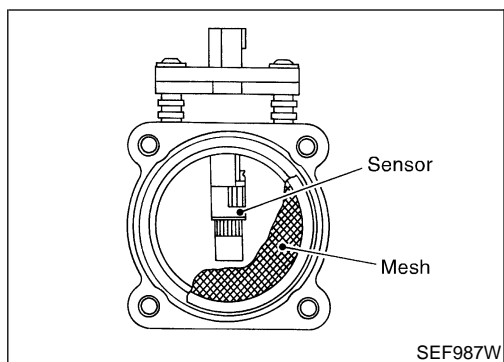
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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>16</b>                                                                                                                                                                                                                                                                                                                                                             | <b>CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II</b> |                                                                                    |
| <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Disconnect ECM harness connector.</li> <li>3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>4. Also check harness for short to ground and short to power.</li> </ol> |                                                       |                                                                                    |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                       |                                                       |                                                                                    |
| OK                                                                                                                                                                                                                                                                                                                                                                    | ▶                                                     | GO TO 17.                                                                          |
| NG                                                                                                                                                                                                                                                                                                                                                                    | ▶                                                     | Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                                |                                    |                       |
|----------------------------------------------------------------|------------------------------------|-----------------------|
| <b>17</b>                                                      | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                       |
| ▶                                                              |                                    | <b>INSPECTION END</b> |

# DTC P0100 MASS AIR FLOW SENSOR (MAFS)

## Component Description



## Component Description

NCEC0050

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot wire that is supplied with electric current from the ECM. The temperature of the hot wire is controlled by the ECM a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the ECM must supply more electric current to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0051

Specification data are reference values.

| MONITOR ITEM  | CONDITION                                                                                                                                                            |           | SPECIFICATION    |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------|
| MAS A/F SE-B1 | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N"</li> <li>● No-load</li> </ul> | Idle      | 1.3 - 1.7V       |
|               |                                                                                                                                                                      | 2,500 rpm | 1.8 - 2.4V       |
| CAL/LD VALUE  | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N"</li> <li>● No-load</li> </ul> | Idle      | 20.0 - 35.5%     |
|               |                                                                                                                                                                      | 2,500 rpm | 17.0 - 30.0%     |
| MASS AIRFLOW  | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N"</li> <li>● No-load</li> </ul> | Idle      | 2.5 - 5.0 g·m/s  |
|               |                                                                                                                                                                      | 2,500 rpm | 7.1 - 12.5 g·m/s |

## ECM Terminals and Reference Value

NCEC0052

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-NAL NO. | WIRE COLOR | ITEM                        | CONDITION                                                                                                                             | DATA (DC Voltage) |
|---------------|------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 61            | L          | Mass air flow sensor        | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>                | 1.3 - 1.7V        |
|               |            |                             | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,500 rpm</li> </ul> | 1.8 - 2.4V        |
| 73            | G          | Mass air flow sensor ground | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>                | Approximately 0V  |

# DTC P0100 MASS AIR FLOW SENSOR (MAFS)

On Board Diagnosis Logic

## On Board Diagnosis Logic

NCEC0053

| DTC No. | Malfunction is detected when ... |                                                                                        | Check Items (Possible Cause)                                                                                                                                                   |
|---------|----------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0100   | A)                               | An excessively high voltage from the sensor is sent to ECM when engine is not running. | <ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Mass air flow sensor</li> </ul>                             |
|         | C)                               | A high voltage from the sensor is sent to ECM under light load driving condition.      |                                                                                                                                                                                |
|         | B)                               | An excessively low voltage from the sensor is sent to ECM* when engine is running.     | <ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air leaks</li> <li>● Mass air flow sensor</li> </ul> |
|         | D)                               | A low voltage from the sensor is sent to ECM under heavy load driving condition.       |                                                                                                                                                                                |
|         | E)                               | A voltage from the sensor exists constantly approx. 1.0V when engine is running.       |                                                                                                                                                                                |

\*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

| Detected items               | Engine operating condition in fail-safe mode                        |
|------------------------------|---------------------------------------------------------------------|
| Mass air flow sensor circuit | Engine speed will not rise more than 2,400 rpm due to the fuel cut. |

## DTC Confirmation Procedure

NCEC0054

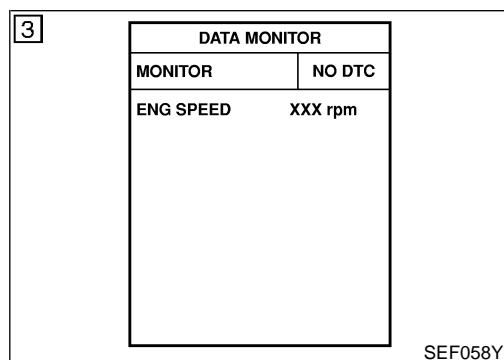
Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B and E". If there is no problem on "PROCEDURE FOR MALFUNCTION B and E", perform "PROCEDURE FOR MALFUNCTION C". If there is no problem on "PROCEDURE FOR MALFUNCTION C", perform "PROCEDURE FOR MALFUNCTION D".

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.



## PROCEDURE FOR MALFUNCTION A

NCEC0054S01

### With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-159.

### With GST

Follow the procedure "With CONSULT-II" above.

# DTC P0100 MASS AIR FLOW SENSOR (MAFS)

DTC Confirmation Procedure (Cont'd)

3

| DATA MONITOR |         |
|--------------|---------|
| MONITOR      | NO DTC  |
| ENG SPEED    | XXX rpm |

SEF058Y

## PROCEDURE FOR MALFUNCTION B AND E

NCEC0054S02

### With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait 5 seconds at most.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-159.

### With GST

Follow the procedure "With CONSULT-II" above.

### NOTE:

If 1st trip DTC is confirmed after more than 5 seconds, there may be malfunction C.

4

| DATA MONITOR  |         |
|---------------|---------|
| MONITOR       | NO DTC  |
| ENG SPEED     | XXX rpm |
| COOLAN TEMP/S | XXX °C  |

SEF174Y

## PROCEDURE FOR MALFUNCTION C

NCEC0054S03

### NOTE:

If engine will not start or stops soon wait at least 10 seconds with engine stopped (Ignition switch "ON") instead of running engine at idle speed.

### With CONSULT-II

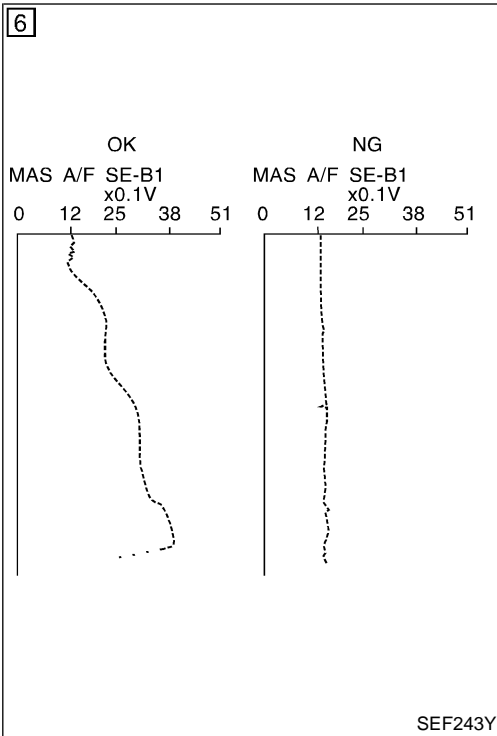
- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and warm it up to normal operating temperature.
- 4) Run engine for at least 10 seconds at idle speed.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-159.

### With GST

Follow the procedure "With CONSULT-II" above.

# DTC P0100 MASS AIR FLOW SENSOR (MAFS)

DTC Confirmation Procedure (Cont'd)



7

| DATA MONITOR  |          |
|---------------|----------|
| MONITOR       | NO DTC   |
| ENG SPEED     | XXX rpm  |
| VHCL SPEED SE | XXX km/h |
| THRTL POS SEN | XXX V    |

SEF175Y

|              |                   |
|--------------|-------------------|
| CALC LOAD    | 20%               |
| COOLANT TEMP | 95°C              |
| SHORT FT #1  | 2%                |
| LONG FT #1   | 0%                |
| SHORT FT #2  | 4%                |
| LONG FT #2   | 0%                |
| ENGINE SPD   | 2637RPM           |
| VEHICLE SPD  | 0MPH              |
| IGN ADVANCE  | 41.0°             |
| INTAKE AIR   | 41°C              |
| <b>MAF</b>   | <b>14.1gm/sec</b> |
| THROTTLE POS | 3%                |

SEF534P

## PROCEDURE FOR MALFUNCTION D

NCEC0054S04

### With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature. If engine cannot be started, go to "Diagnostic Procedure", EC-159.
- 3) Select "DATA MONITOR" mode with CONSULT-II.
- 4) Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
- 5) Increases engine speed to about 4,000 rpm.
- 6) Monitor the linear voltage rise in response to engine speed increases.  
If NG, go to "Diagnostic Procedure", EC-159.  
If OK, go to following step.
- 7) Maintain the following conditions for at least 10 consecutive seconds.

|                  |                                                                                                                  |
|------------------|------------------------------------------------------------------------------------------------------------------|
| ENG SPEED        | More than 2,000 rpm                                                                                              |
| THRTL POS SEN    | More than 3V                                                                                                     |
| Selector lever   | Suitable position                                                                                                |
| Driving location | Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test. |

- 8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-159.

## Overall Function Check

NCEC0055

Use this procedure to check the overall function of the mass air flow sensor circuit. During this check, a 1st trip DTC might not be confirmed.

## PROCEDURE FOR MALFUNCTION D

NCEC0055S01

### With GST

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature.
- 3) Select "MODE 1" with GST.
- 4) Check the mass air flow sensor signal with "MODE 1".
- 5) Check for linear mass air flow rise in response to increases to about 4,000 rpm in engine speed.
- 6) If NG, go to "Diagnostic Procedure", EC-159.

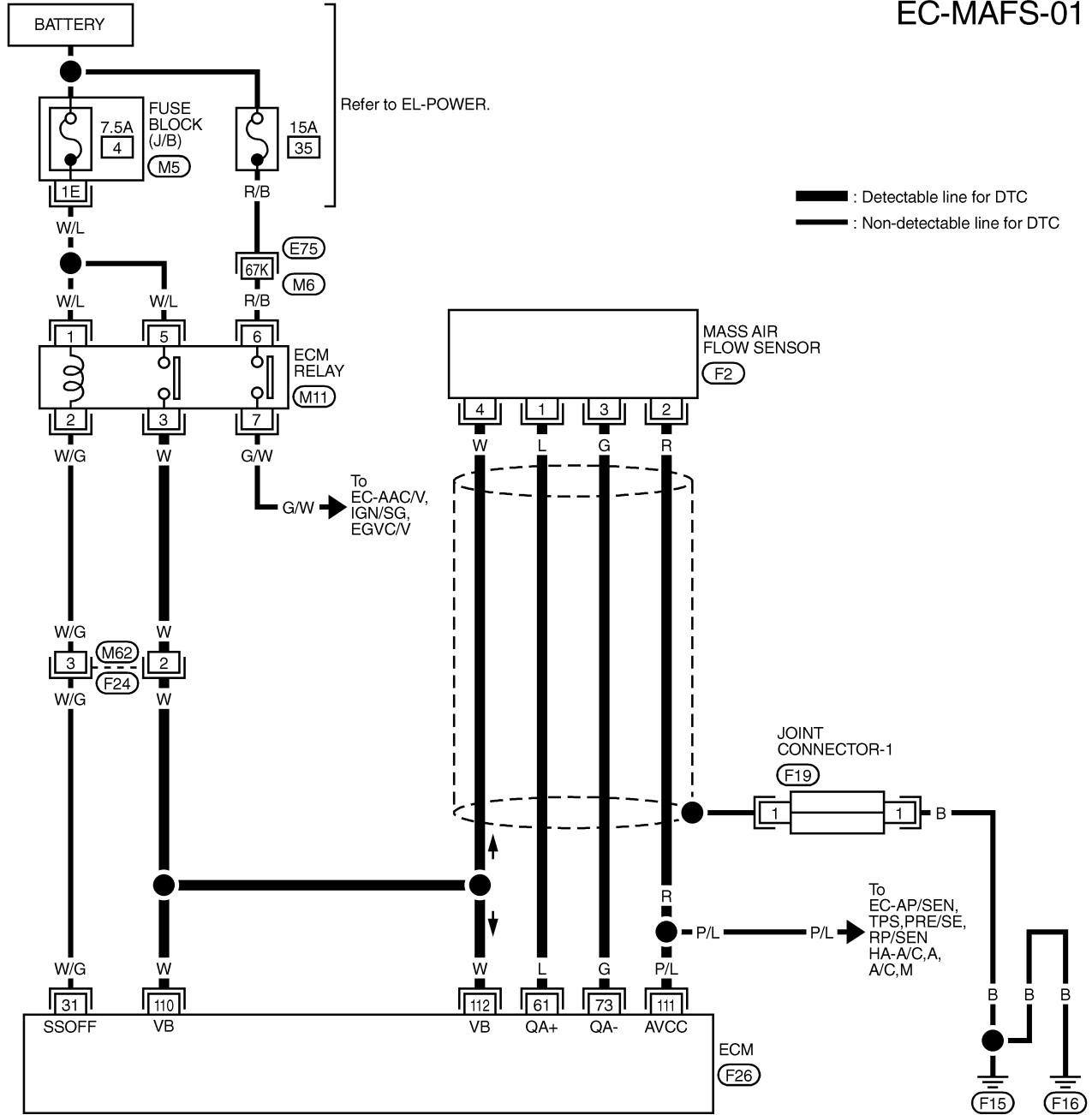
# DTC P0100 MASS AIR FLOW SENSOR (MAFS)

Wiring Diagram

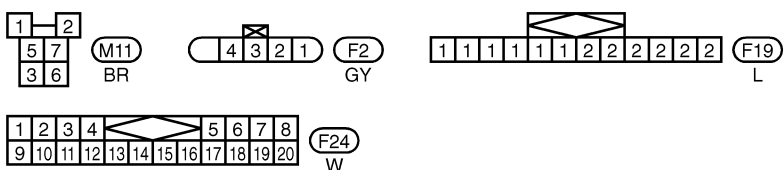
## Wiring Diagram

NCEC0056

EC-MAFS-01

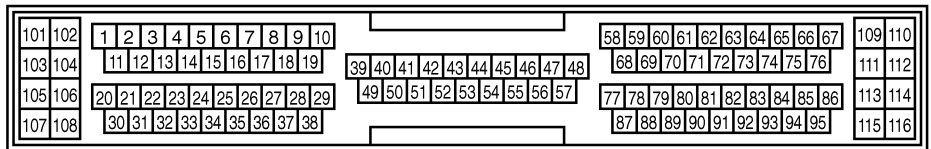


: Detectable line for DTC  
 : Non-detectable line for DTC



REFER TO THE FOLLOWING.

- (E75) -SUPER MULTIPLE JUNCTION (SMJ)
- (M5) -FUSE BLOCK-JUNCTION BOX (J/B)



TEC697

## Diagnostic Procedure

NCEC0057

| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>INSPECTION START</b> |          |             |      |            |   |               |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------|-------------|------|------------|---|---------------|----|
| Which malfunction (A, B, C or D) is duplicated?                                                                                                                                                                                                                                                                                                                                                                            |                         |          |             |      |            |   |               |    |
| <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">MALFUNCTION</th> <th style="text-align: center;">Type</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A and/or C</td> <td style="text-align: center;">I</td> </tr> <tr> <td style="text-align: center;">B, D and/or E</td> <td style="text-align: center;">II</td> </tr> </tbody> </table> |                         |          | MALFUNCTION | Type | A and/or C | I | B, D and/or E | II |
| MALFUNCTION                                                                                                                                                                                                                                                                                                                                                                                                                | Type                    |          |             |      |            |   |               |    |
| A and/or C                                                                                                                                                                                                                                                                                                                                                                                                                 | I                       |          |             |      |            |   |               |    |
| B, D and/or E                                                                                                                                                                                                                                                                                                                                                                                                              | II                      |          |             |      |            |   |               |    |
| MTBL0373                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |          |             |      |            |   |               |    |
| <b>Type I or Type II</b>                                                                                                                                                                                                                                                                                                                                                                                                   |                         |          |             |      |            |   |               |    |
| Type I                                                                                                                                                                                                                                                                                                                                                                                                                     | ▶                       | GO TO 3. |             |      |            |   |               |    |
| Type II                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶                       | GO TO 2. |             |      |            |   |               |    |

GI

MA

EM

LC

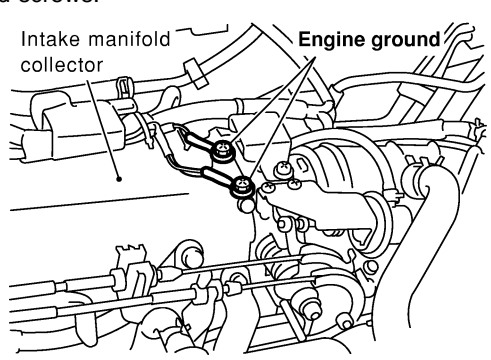
**EC**

|                                                                                                                                                  |                            |                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------|
| <b>2</b>                                                                                                                                         | <b>CHECK INTAKE SYSTEM</b> |                      |
| Check the followings for connection.                                                                                                             |                            |                      |
| <ul style="list-style-type: none"> <li>● Air duct</li> <li>● Vacuum hoses</li> <li>● Intake air passage between air duct to collector</li> </ul> |                            |                      |
| <b>OK or NG</b>                                                                                                                                  |                            |                      |
| OK                                                                                                                                               | ▶                          | GO TO 3.             |
| NG                                                                                                                                               | ▶                          | Reconnect the parts. |

FE

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MT

|                                                                                                                                         |                                |            |
|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------|
| <b>3</b>                                                                                                                                | <b>RETIGHTEN GROUND SCREWS</b> |            |
| <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Loosen and retighten engine ground screws.</li> </ol> |                                |            |
|                                                     |                                |            |
| SEF839X                                                                                                                                 |                                |            |
|                                                                                                                                         |                                | ▶ GO TO 4. |

AT

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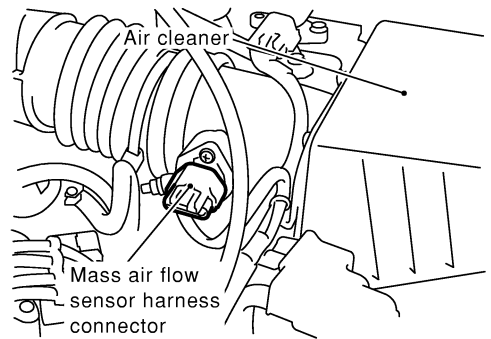
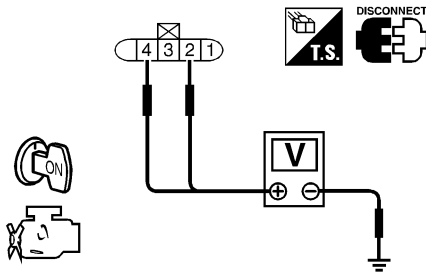
SC

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IDX

# DTC P0100 MASS AIR FLOW SENSOR (MAFS)

Diagnostic Procedure (Cont'd)

| <b>4</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>CHECK POWER SUPPLY</b> |   |          |          |         |   |                 |   |                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---|----------|----------|---------|---|-----------------|---|-----------------|
| <p>1. Disconnect mass air flow sensor harness connector.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Air cleaner</p> <p style="margin-left: 100px;">Mass air flow sensor harness connector</p> </div> <p style="text-align: right;">SEF840X</p> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between MAFS terminal 4 and ground with CONSULT-II or tester.</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;">  </div> <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Terminal</th> <th style="width: 15%;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Approximately 5</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Battery voltage</td> </tr> </tbody> </table> </div> <p style="text-align: right;">SEF297X</p> <p style="text-align: center; margin-top: 10px;"><b>OK or NG</b></p> |                           |   |          | Terminal | Voltage | 2 | Approximately 5 | 4 | Battery voltage |
| Terminal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Voltage                   |   |          |          |         |   |                 |   |                 |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Approximately 5           |   |          |          |         |   |                 |   |                 |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Battery voltage           |   |          |          |         |   |                 |   |                 |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           | ▶ | GO TO 6. |          |         |   |                 |   |                 |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           | ▶ | GO TO 5. |          |         |   |                 |   |                 |

|                                                                                                                                                                                                                                                                       |                                   |   |                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---|-------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                              | <b>DETECT MALFUNCTIONING PART</b> |   |                               |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M62, F24</li> <li>● Harness for open or short between ECM relay and mass air flow sensor</li> <li>● Harness for open or short between mass air flow sensor and ECM</li> </ul> |                                   |   |                               |
|                                                                                                                                                                                                                                                                       |                                   | ▶ | Repair harness or connectors. |

|                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |   |                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---|------------------------------------------------------------------------------------|
| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK GROUND CIRCUIT</b> |   |                                                                                    |
| <p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between MAFS terminal 3 and ECM terminal 73.<br/>Refer to Wiring Diagram.</p> <p style="color: blue; margin-left: 20px;"><b>Continuity should exist.</b></p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center; margin-top: 10px;"><b>OK or NG</b></p> |                             |   |                                                                                    |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                      |                             | ▶ | GO TO 7.                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                      |                             | ▶ | Repair open circuit or short to ground or short to power in harness or connectors. |



# DTC P0100 MASS AIR FLOW SENSOR (MAFS)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                          |                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>7</b>                                                                                                                                                                                                                                                                 | <b>CHECK INPUT SIGNAL CIRCUIT</b>                                                    |
| <p>1. Check harness continuity between MAFS terminal 1 and ECM terminal 61.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                      |
| OK                                                                                                                                                                                                                                                                       | ▶ GO TO 8.                                                                           |
| NG                                                                                                                                                                                                                                                                       | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

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|                                                                                                    |                                   |
|----------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>8</b>                                                                                           | <b>CHECK MASS AIR FLOW SENSOR</b> |
| <p>Refer to "Component Inspection", EC-162.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                   |
| OK                                                                                                 | ▶ GO TO 9.                        |
| NG                                                                                                 | ▶ Replace mass air flow sensor.   |

**EC**

FE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>9</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>CHECK SHIELD CIRCUIT</b>                                       |
| <p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect joint connector-1.</p> <p>3. Check the following.</p> <ul style="list-style-type: none"> <li>● Continuity between joint connector-1 terminal 1 and ground</li> <li>● Joint connector-1<br/>(Refer to EL-314, "HARNESS LAYOUT".)<br/><b>Continuity should exist.</b></li> </ul> <p>4. Also check harness for short to power.</p> <p>5. Then reconnect joint connector-1.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                   |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 10.                                                       |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ Repair open circuit or short to power in harness or connectors. |

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|                                                                       |                                    |
|-----------------------------------------------------------------------|------------------------------------|
| <b>10</b>                                                             | <b>CHECK INTERMITTENT INCIDENT</b> |
| <p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p> |                                    |
|                                                                       | ▶ <b>INSPECTION END</b>            |

ST

RS

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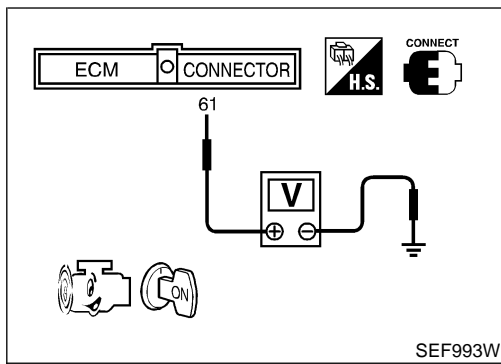
SC

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# DTC P0100 MASS AIR FLOW SENSOR (MAFS)

## Component Inspection



## Component Inspection

=NCEC0058

### MASS AIR FLOW SENSOR

NCEC0058S01

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 61 (Mass air flow sensor signal) and ground.

| Conditions                                                       | Voltage V                |
|------------------------------------------------------------------|--------------------------|
| Ignition switch "ON" (Engine stopped.)                           | Less than 1.0            |
| Idle (Engine is warmed-up to normal operating temperature.)      | 1.3 - 1.7                |
| 2,500 rpm (Engine is warmed-up to normal operating temperature.) | 1.8 - 2.4                |
| Idle to about 4,000 rpm*                                         | 1.3 - 1.7 to Approx. 4.0 |

\*: Check for linear voltage rise in response to increases to about 4,000 rpm in engine speed.

4. If the voltage is out of specification, disconnect mass air flow sensor harness connector and connect it again. Repeat above check.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.

# DTC P0105 ABSOLUTE PRESSURE SENSOR

Component Description

## Component Description

The absolute pressure sensor is built into the ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the micro computer. As the pressure increases, the voltage rises.

NCEC0059

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MA

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LC

## On Board Diagnosis Logic

NCEC0060

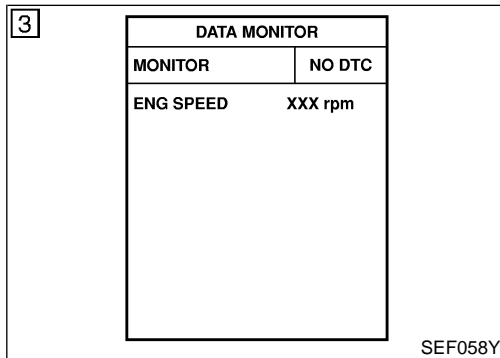
| DTC No. | Malfunction is detected when ...                                                  | Check Items (Possible Cause) |
|---------|-----------------------------------------------------------------------------------|------------------------------|
| P0105   | An excessively low or high voltage from the sensor is sent to the micro computer. | ● ECM                        |

EC

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## DTC Confirmation Procedure

NCEC0061

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

AT

AX

### Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-164.

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### Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

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# DTC P0105 ABSOLUTE PRESSURE SENSOR

Diagnostic Procedure

## Diagnostic Procedure

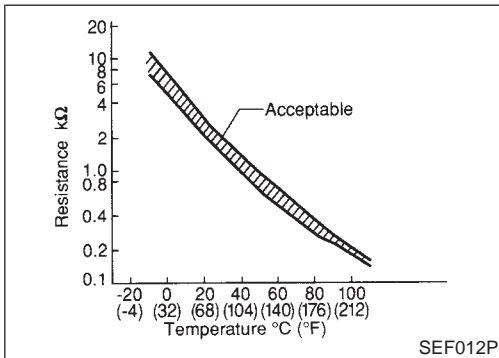
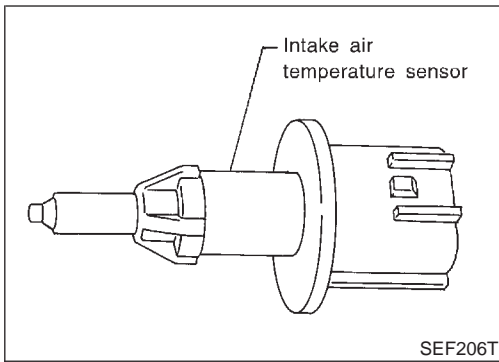
NCEC0670

|                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                         | <b>INSPECTION START</b> |                       |
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "ON".</li> <li>2. Select "SELF DIAG RESULTS" mode with CONSULT-II.</li> <li>3. Touch "ERASE".</li> <li>4. Perform "DTC Confirmation Procedure".<br/>See EC-163.</li> <li>5. Is the 1st trip DTC P0105 displayed again?</li> </ol> |                         |                       |
| <p> <b>With GST</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "ON".</li> <li>2. Select MODE 4 with GST.</li> <li>3. Touch "ERASE".</li> <li>4. Perform "DTC Confirmation Procedure".<br/>See EC-163.</li> <li>5. Is the 1st trip DTC P0105 displayed again?</li> </ol>                                 |                         |                       |
| <b>Yes or No</b>                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                       |
| Yes                                                                                                                                                                                                                                                                                                                                                                                                              | ▶                       | GO TO 2.              |
| No                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                       | <b>INSPECTION END</b> |

|                                                                                                                                                                                                                                                                                                                                                       |                    |                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                                                                                                              | <b>REPLACE ECM</b> |                                                        |
| <ol style="list-style-type: none"> <li>1. Replace ECM.</li> <li>2. Perform initialization of IVIS (NATS) system and registration of all IVIS (NATS) ignition key IDs. Refer to "IVIS (INFINITI VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-81.</li> <li>3. Perform "Idle Air Volume Learning", EC-65,<br/><b>Is the result CMPLT or INCMP?</b></li> </ol> |                    |                                                        |
| <b>CMPLT or INCMP</b>                                                                                                                                                                                                                                                                                                                                 |                    |                                                        |
| CMPLT                                                                                                                                                                                                                                                                                                                                                 | ▶                  | <b>INSPECTION END</b>                                  |
| INCMP                                                                                                                                                                                                                                                                                                                                                 | ▶                  | Follow the construction of "Idle Air Volume Learning". |

# DTC P0110 INTAKE AIR TEMPERATURE SENSOR

Component Description



## Component Description

NCEC0066

The intake air temperature sensor is mounted to the air duct housing. The sensor detects intake air temperature and transmits a signal to the ECM.

The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.

### <Reference data>

| Intake air temperature<br>°C (°F) | Voltage*<br>V | Resistance<br>kΩ |
|-----------------------------------|---------------|------------------|
| 20 (68)                           | 3.5           | 2.1 - 2.9        |
| 80 (176)                          | 1.23          | 0.27 - 0.38      |

\*: These data are reference values and are measured between ECM terminal 64 (Intake air temperature sensor) and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

## On Board Diagnosis Logic

NCEC0067

| DTC No. | Malfunction is detected when ... |                                                                                                                                       | Check Items (Possible Cause)                                                                                                                                |
|---------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0110   | A)                               | An excessively low or high voltage from the sensor is sent to ECM.                                                                    | <ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air temperature sensor</li> </ul> |
|         | B)                               | Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor. |                                                                                                                                                             |

## DTC Confirmation Procedure

NCEC0068

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B".

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

# DTC P0110 INTAKE AIR TEMPERATURE SENSOR

DTC Confirmation Procedure (Cont'd)

|   |              |         |
|---|--------------|---------|
| 3 | DATA MONITOR |         |
|   | MONITOR      | NO DTC  |
|   | ENG SPEED    | XXX rpm |

SEF058Y

## PROCEDURE FOR MALFUNCTION A

NCEC0068S01

### With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-168.

### With GST

Follow the procedure "With CONSULT-II" above.

|               |               |          |
|---------------|---------------|----------|
| 5             | DATA MONITOR  |          |
|               | MONITOR       | NO DTC   |
|               | COOLAN TEMP/S | XXX °C   |
| VHCL SPEED SE |               | XXX km/h |

SEF176Y

## PROCEDURE FOR MALFUNCTION B

NCEC0068S02

### CAUTION:

Always drive vehicle at a safe speed.

### TESTING CONDITION:

This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

### With CONSULT-II

- 1) Wait until engine coolant temperature is less than 90°C (194°F).
- a) Turn ignition switch "ON".
- b) Select "DATA MONITOR" mode with CONSULT-II.
- c) Check the engine coolant temperature.
- d) If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.
  - Perform the following steps before engine coolant temperature is above 90°C (194°F).
- 2) Turn ignition switch "ON".
- 3) Select "DATA MONITOR" mode with CONSULT-II.
- 4) Start engine.
- 5) Hold vehicle speed more than 70 km/h (43 MPH) for 105 consecutive seconds.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-168.

### With GST

Follow the procedure "With CONSULT-II" above.

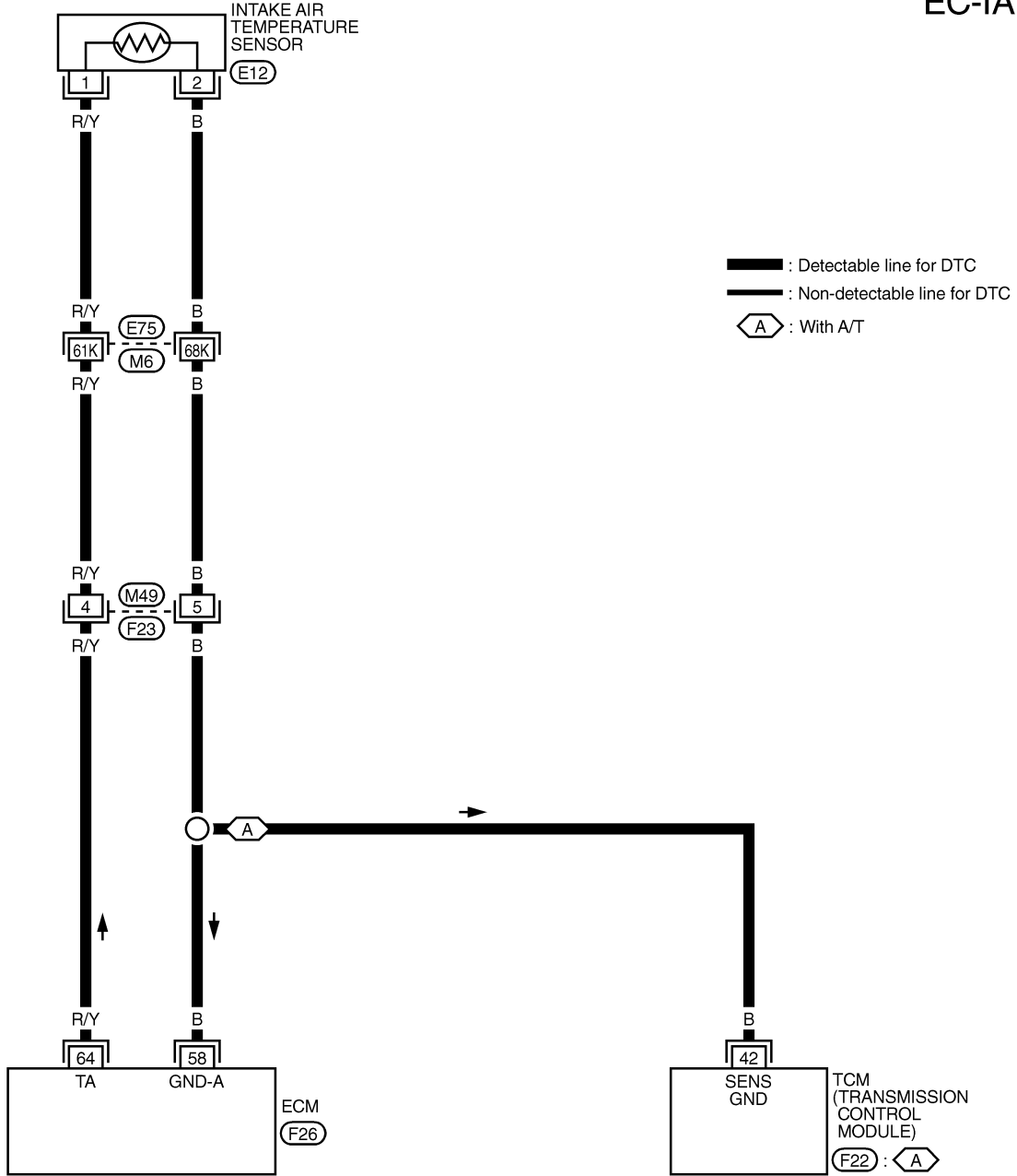
# DTC P0110 INTAKE AIR TEMPERATURE SENSOR

Wiring Diagram

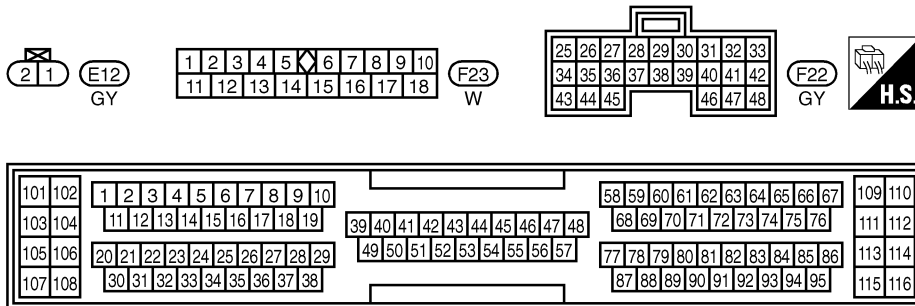
## Wiring Diagram

NCEC0069

EC-IATS-01



GI  
MA  
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**EC**  
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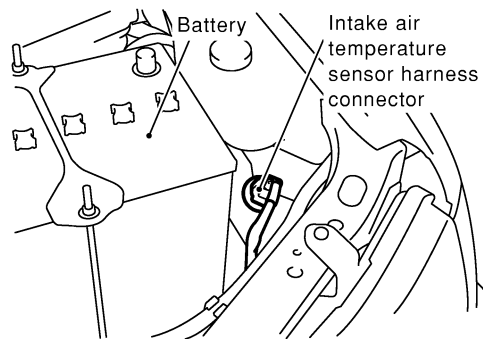
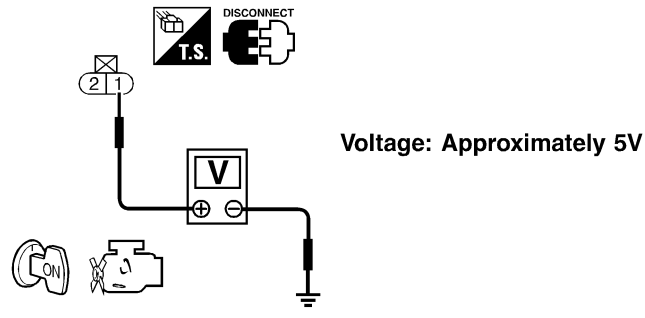
TEC699

# DTC P0110 INTAKE AIR TEMPERATURE SENSOR

Diagnostic Procedure

## Diagnostic Procedure

NCEC0070

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>CHECK POWER SUPPLY</b> |
| <p>1. Turn ignition switch "OFF".<br/>2. Disconnect intake air temperature sensor harness connector.</p>  <p>3. Turn ignition switch "ON".<br/>4. Check voltage between intake air temperature sensor terminal 1 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;"><b>OK or NG</b></p> |                           |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶ GO TO 3.                |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶ GO TO 2.                |

SEF842X

SEF301X

|                                                                                                                                                                                                                                  |                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>2</b>                                                                                                                                                                                                                         | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"><li>● Harness connectors E75, M6</li><li>● Harness connectors M49, F23</li><li>● Harness for open or short between ECM and intake air temperature sensor</li></ul> |                                   |
| ▶                                                                                                                                                                                                                                | Repair harness or connectors.     |



# DTC P0110 INTAKE AIR TEMPERATURE SENSOR

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                        |                             |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                               | <b>CHECK GROUND CIRCUIT</b> |          |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Check harness continuity between terminal 2 and engine ground.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF204W</p> <p style="text-align: center;"><b>Continuity should exist.</b></p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                             |          |
| OK                                                                                                                                                                                                                                                                                                                                                                                     | ▶                           | GO TO 5. |
| NG                                                                                                                                                                                                                                                                                                                                                                                     | ▶                           | GO TO 4. |

GI

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EC

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|                                                                                                                                                                                                                                                                                                                                                       |                                   |                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                              | <b>DETECT MALFUNCTIONING PART</b> |                                                                 |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E75, M6</li> <li>● Harness connectors M49, F23</li> <li>● Harness for open or short between ECM and intake air temperature sensor</li> <li>● Harness for open or short between intake air temperature sensor and TCM (Transmission control module)</li> </ul> |                                   |                                                                 |
| ▶                                                                                                                                                                                                                                                                                                                                                     |                                   | Repair open circuit or short to power in harness or connectors. |

MT

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|                                                                                                    |                                            |                                        |
|----------------------------------------------------------------------------------------------------|--------------------------------------------|----------------------------------------|
| <b>5</b>                                                                                           | <b>CHECK INTAKE AIR TEMPERATURE SENSOR</b> |                                        |
| <p>Refer to "Component Inspection", EC-170.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                            |                                        |
| OK                                                                                                 | ▶                                          | GO TO 6.                               |
| NG                                                                                                 | ▶                                          | Replace intake air temperature sensor. |

SU

BR

ST

|                                                                       |                                    |                       |
|-----------------------------------------------------------------------|------------------------------------|-----------------------|
| <b>6</b>                                                              | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| <p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p> |                                    |                       |
| ▶                                                                     |                                    | <b>INSPECTION END</b> |

RS

BT

HA

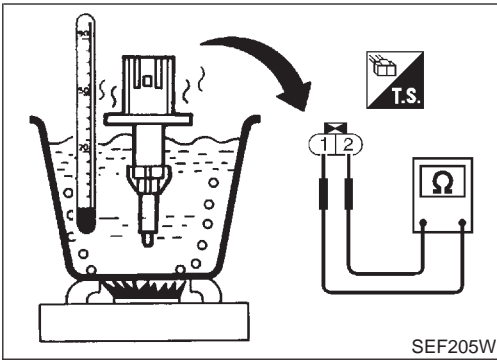
SC

EL

IDX

# DTC P0110 INTAKE AIR TEMPERATURE SENSOR

## Component Inspection

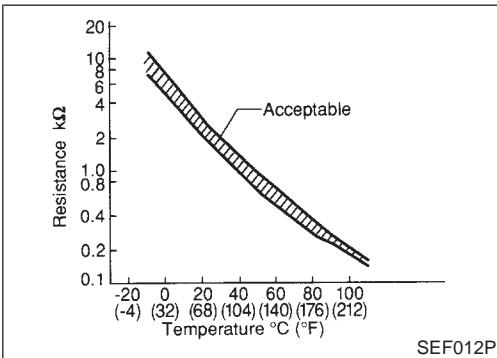


## Component Inspection INTAKE AIR TEMPERATURE SENSOR

Check resistance as shown in the figure.

=NCEC0071

NCEC0071S01



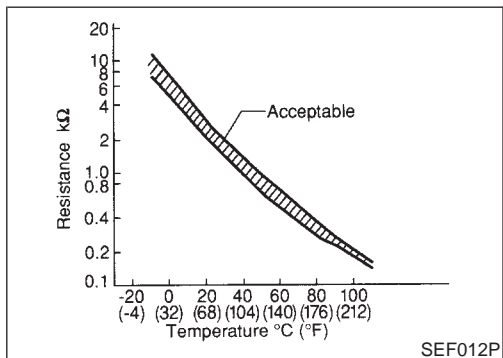
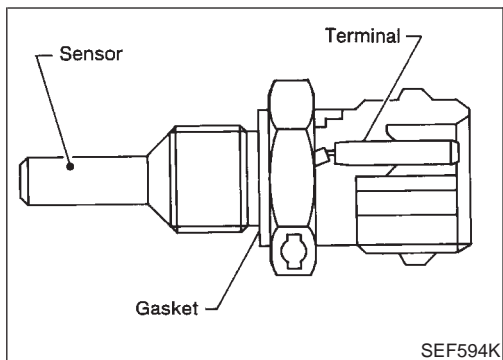
### <Reference data>

| Intake air temperature<br>°C (°F) | Resistance kΩ |
|-----------------------------------|---------------|
| 20 (68)                           | 2.1 - 2.9     |
| 80 (176)                          | 0.27 - 0.38   |

If NG, replace intake air temperature sensor.

# DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

Component Description



## Component Description

NCEC0072

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

GI  
MA  
EM  
LC

### <Reference data>

| Engine coolant temperature<br>°C (°F) | Voltage*<br>V | Resistance<br>kΩ |
|---------------------------------------|---------------|------------------|
| -10 (14)                              | 4.4           | 7.0 - 11.4       |
| 20 (68)                               | 3.5           | 2.1 - 2.9        |
| 50 (122)                              | 2.2           | 0.68 - 1.00      |
| 90 (194)                              | 0.9           | 0.236 - 0.260    |

EC  
FE  
CL

\*: These data are reference values and are measured between ECM terminal 70 (Engine coolant temperature sensor) and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

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## CONSULT-II Reference Value in Data Monitor Mode

NCEC0073

| MONITOR ITEM  | CONDITION                  | SPECIFICATION          |
|---------------|----------------------------|------------------------|
| COOLAN TEMP/S | ● Engine: After warming up | More than 70°C (158°F) |

RS  
BT

## On Board Diagnosis Logic

NCEC0074

| DTC No. | Malfunction is detected when ...                                      | Check Items (Possible Cause)                                                                                                                                    |
|---------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0115   | ● An excessively high or low voltage from the sensor is sent to ECM.* | <ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Engine coolant temperature sensor</li> </ul> |

HA  
SC

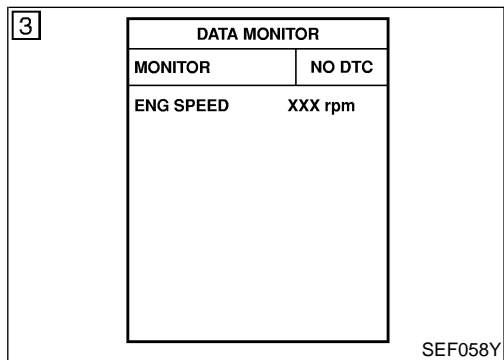
\*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

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# DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

On Board Diagnosis Logic (Cont'd)

| Detected items                                                                                                                      | Engine operating condition in fail-safe mode                                                                                                                                                |                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Engine coolant temperature sensor circuit                                                                                           | Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START".<br>CONSULT-II displays the engine coolant temperature decided by ECM. |                                                         |
|                                                                                                                                     | Condition                                                                                                                                                                                   | Engine coolant temperature decided (CONSULT-II display) |
|                                                                                                                                     | Just as ignition switch is turned ON or Start                                                                                                                                               | 40°C (104°F)                                            |
|                                                                                                                                     | More than approx. 4 minutes after ignition ON or Start                                                                                                                                      | 80°C (176°F)                                            |
|                                                                                                                                     | Except as shown above                                                                                                                                                                       | 40 - 80°C (104 - 176°F)<br>(Depends on the time)        |
| When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while the engine is running. |                                                                                                                                                                                             |                                                         |



## DTC Confirmation Procedure

NCEC0075

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-174.

#### Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

# DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

Wiring Diagram

## Wiring Diagram

NCEC0076

EC-ECTS-01

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**EC**

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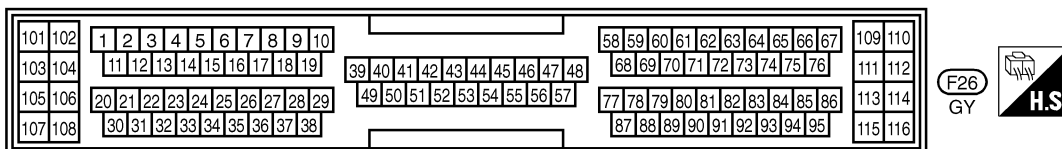
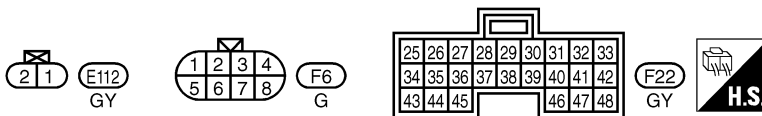
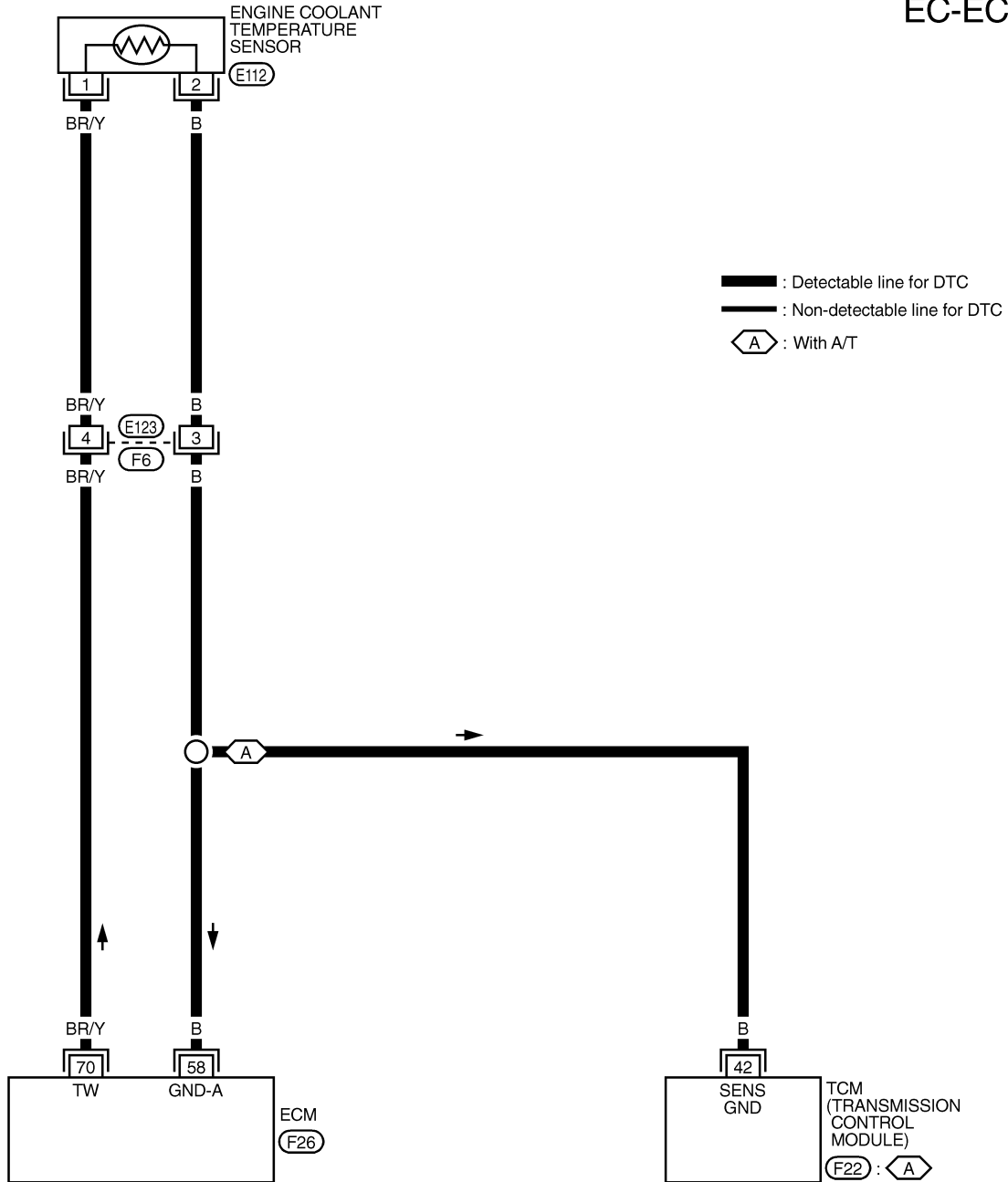
BT

HA

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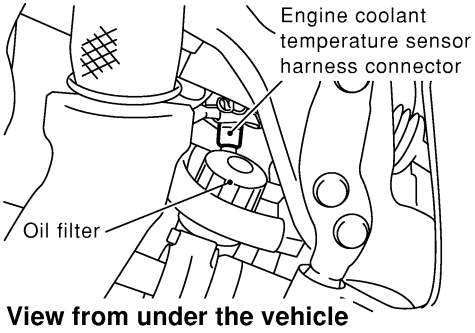
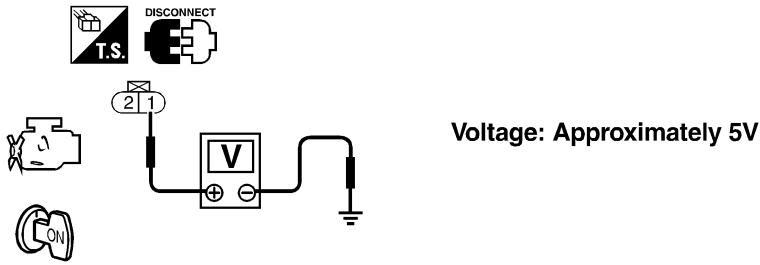
TEC700

# DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0077

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>CHECK POWER SUPPLY</b> |
| <p>1. Turn ignition switch "OFF".<br/>2. Disconnect engine coolant temperature sensor (ECTS) harness connector.</p> <div style="text-align: center;"><p><b>View from under the vehicle</b></p></div> <p>3. Turn ignition switch "ON".<br/>4. Check voltage between ECTS terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;"><p><b>Voltage: Approximately 5V</b></p></div> <p style="text-align: center;"><b>OK or NG</b></p> |                           |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶ GO TO 3.                |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶ GO TO 2.                |

SEF843X

SEF585X

|                                                                                                                                                                                                 |                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>2</b>                                                                                                                                                                                        | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"><li>● Harness connectors E123, F6</li><li>● Harness for open or short between ECM and engine coolant temperature sensor</li></ul> |                                   |
| ▶                                                                                                                                                                                               | Repair harness or connectors.     |

# DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                             |                             |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                    | <b>CHECK GROUND CIRCUIT</b> |          |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Check harness continuity between ECTS terminal 2 and engine ground.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF207W</p> <p style="text-align: center;"><b>Continuity should exist.</b></p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                             |          |
| OK                                                                                                                                                                                                                                                                                                                                                                                          | ▶                           | GO TO 5. |
| NG                                                                                                                                                                                                                                                                                                                                                                                          | ▶                           | GO TO 4. |

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                | <b>DETECT MALFUNCTIONING PART</b> |                                                                 |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E123, F6</li> <li>● Harness for open or short between ECM and engine coolant temperature sensor</li> <li>● Harness for open or short between engine coolant temperature sensor and TCM (Transmission control module)</li> </ul> |                                   |                                                                 |
| ▶                                                                                                                                                                                                                                                                                                                       |                                   | Repair open circuit or short to power in harness or connectors. |

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|                                                                                                    |                                                |                                            |
|----------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------|
| <b>5</b>                                                                                           | <b>CHECK ENGINE COOLANT TEMPERATURE SENSOR</b> |                                            |
| <p>Refer to "Component Inspection", EC-176.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                |                                            |
| OK                                                                                                 | ▶                                              | GO TO 6.                                   |
| NG                                                                                                 | ▶                                              | Replace engine coolant temperature sensor. |

SU

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|                                                                       |                                    |                       |
|-----------------------------------------------------------------------|------------------------------------|-----------------------|
| <b>6</b>                                                              | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| <p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p> |                                    |                       |
| ▶                                                                     |                                    | <b>INSPECTION END</b> |

RS

BT

HA

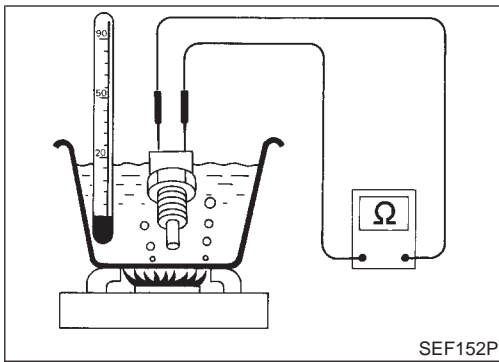
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# DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

## Component Inspection



## Component Inspection

### ENGINE COOLANT TEMPERATURE SENSOR

NCEC0078

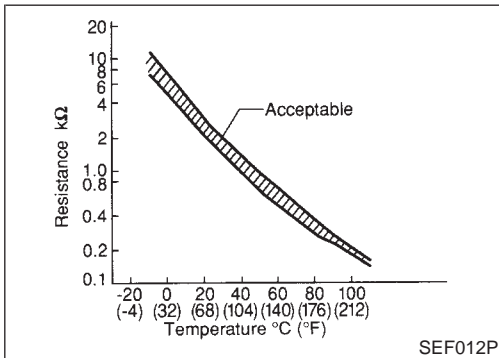
NCEC0078S01

Check resistance as shown in the figure.

<Reference data>

| Temperature °C (°F) | Resistance kΩ |
|---------------------|---------------|
| 20 (68)             | 2.1 - 2.9     |
| 50 (122)            | 0.68 - 1.00   |
| 90 (194)            | 0.236 - 0.260 |

If NG, replace engine coolant temperature sensor.





# DTC P0120 THROTTLE POSITION SENSOR

Component Description

## Component Description

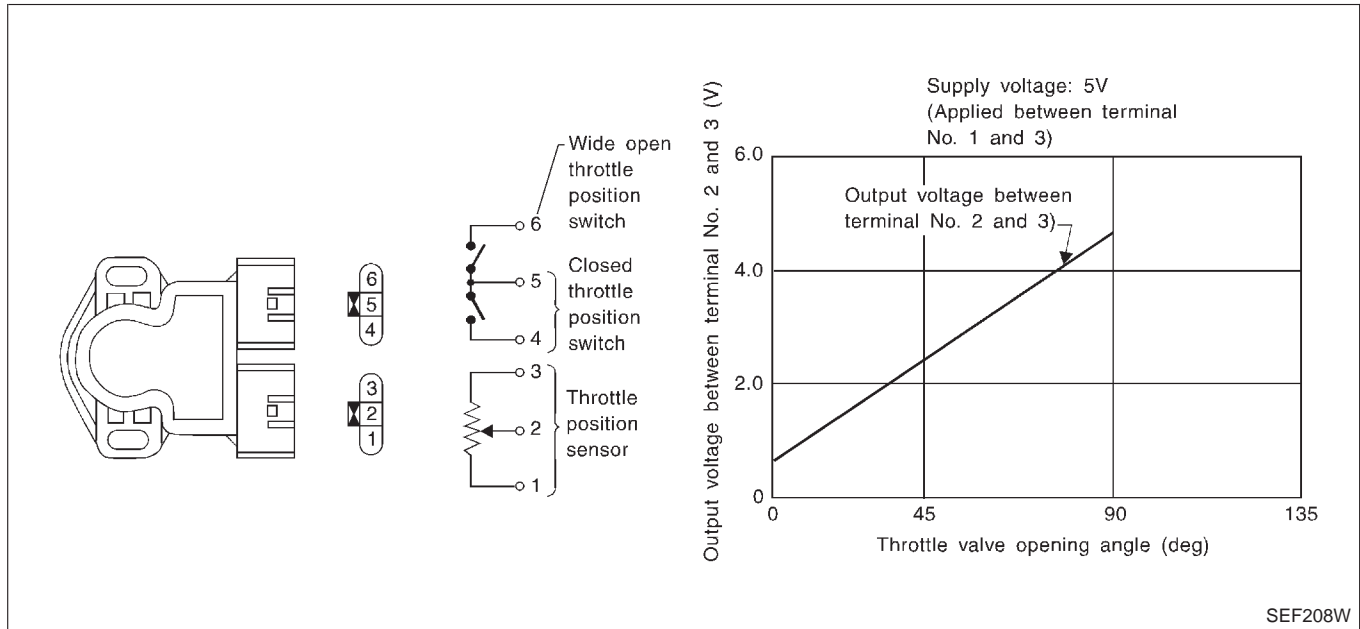
NCEC0079

**NOTE:**

If DTC P0120 is displayed with DTC P0510, first perform trouble diagnosis for DTC P0510, EC-432.

The throttle position sensor responds to the accelerator pedal movement. This sensor is a kind of potentiometer which transforms the throttle position into output voltage, and emits the voltage signal to the ECM. In addition, the sensor detects the opening and closing speed of the throttle valve and feeds the voltage signal to the ECM.

Idle position of the throttle valve is determined by the ECM receiving the signal from the throttle position sensor. This sensor controls engine operation such as fuel cut. On the other hand, the "Wide open and closed throttle position switch", which is built into the throttle position sensor unit, is not used for engine control.



## CONSULT-II Reference Value in Data Monitor Mode

NCEC0080

Specification data are reference values.

| MONITOR ITEM  | CONDITION                                                            |                              | SPECIFICATION |
|---------------|----------------------------------------------------------------------|------------------------------|---------------|
| THRTL POS SEN | ● Engine: After warming up, idle the engine                          | Throttle valve: fully closed | 0.15 - 0.85V  |
|               | ● Engine: After warming up<br>● Ignition switch: ON (Engine stopped) | Throttle valve: fully opened | 3.5 - 4.7V    |
| ABSOL TH-P/S  | ● Engine: After warming up, idle the engine                          | Throttle valve: fully closed | 0.0%          |
|               | ● Engine: After warming up<br>● Ignition switch: ON (Engine stopped) | Throttle valve: fully opened | Approx. 88.0% |

# DTC P0120 THROTTLE POSITION SENSOR

ECM Terminals and Reference Value

## ECM Terminals and Reference Value

=NCEC0081

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                     | CONDITION                                                                           | DATA (DC Voltage) |
|----------------------|---------------|--------------------------|-------------------------------------------------------------------------------------|-------------------|
| 92                   | Y             | Throttle position sensor | [Ignition switch "ON"]<br>● Warm-up condition<br>● Accelerator pedal fully released | 0.15 - 0.85V      |
|                      |               |                          | [Ignition switch "ON"]<br>● Accelerator pedal fully depressed                       | 3.5 - 4.7V        |
| 111                  | P/L           | Sensors' power supply    | [Ignition switch "ON"]                                                              | Approximately 5V  |
| 58                   | B             | Sensors' ground          | [Engine is running]<br>● Idle speed                                                 | Approximately 0V  |

## On Board Diagnosis Logic

NCEC0082

| DTC No. | Malfunction is detected when ... |                                                                                   | Check Items (Possible Cause)                                                                                                                                                                                                                                          |
|---------|----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0120   | A)                               | An excessively low or high voltage from the sensor is sent to ECM.*               | <ul style="list-style-type: none"> <li>● Harness or connectors (The throttle position sensor circuit is open or shorted.)</li> <li>● Throttle position sensor</li> </ul>                                                                                              |
|         | B)                               | A high voltage from the sensor is sent to ECM under light load driving condition. | <ul style="list-style-type: none"> <li>● Harness or connectors (The throttle position sensor circuit is open or shorted.)</li> <li>● Throttle position sensor</li> <li>● Fuel injector</li> <li>● Camshaft position sensor</li> <li>● Mass air flow sensor</li> </ul> |
|         | C)                               | A low voltage from the sensor is sent to ECM under heavy load driving condition.  | <ul style="list-style-type: none"> <li>● Harness or connectors (The throttle position sensor circuit is open or shorted.)</li> <li>● Intake air leaks</li> <li>● Throttle position sensor</li> </ul>                                                                  |

\*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

| Detected items                   | Engine operating condition in fail-safe mode                                                                                       |                   |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Throttle position sensor circuit | Throttle position will be determined based on the injected fuel amount and the engine speed. Therefore, acceleration will be poor. |                   |
|                                  | Condition                                                                                                                          | Driving condition |
|                                  | When engine is idling                                                                                                              | Normal            |
|                                  | When accelerating                                                                                                                  | Poor acceleration |

## DTC Confirmation Procedure

NCEC0083

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B". If there is no problem on "PROCEDURE FOR MALFUNCTION B", perform "PROCEDURE FOR MALFUNCTION C".

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

## PROCEDURE FOR MALFUNCTION A

NCEC0083S01

### CAUTION:

Always drive vehicle at a safe speed.

### TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 10V at idle.
- This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

| DATA MONITOR  |          |
|---------------|----------|
| MONITOR       | NO DTC   |
| ENG SPEED     | XXX rpm  |
| VHCL SPEED SE | XXX km/h |
| P/N POSI SW   | OFF      |

SEF065Y

### With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and maintain the following conditions for at least 5 consecutive seconds.

|                |                                              |
|----------------|----------------------------------------------|
| VHCL SPEED SE  | More than 4 km/h (2 MPH)                     |
| Selector lever | Suitable position except "P" or "N" position |

- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-184.

### With GST

Follow the procedure "With CONSULT-II" above.

| DATA MONITOR |         |
|--------------|---------|
| MONITOR      | NO DTC  |
| ENG SPEED    | XXX rpm |

SEF058Y

## PROCEDURE FOR MALFUNCTION B

NCEC0083S02

### With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 10 seconds. If idle speed is over 1,000 rpm, maintain the following conditions for at least 10 seconds to keep engine speed below 1,000 rpm.

# DTC P0120 THROTTLE POSITION SENSOR

DTC Confirmation Procedure (Cont'd)

|           |                   |                                                                                                          |
|-----------|-------------------|----------------------------------------------------------------------------------------------------------|
| A/T model | Selector lever    | Suitable position except "P" or "N" position                                                             |
|           | Brake pedal       | Depressed                                                                                                |
|           | Vehicle speed     | 0 km/h (0 MPH)                                                                                           |
| M/T model | Selector lever    | Suitable position except "N" (Higher gear position such as 3rd or 4th is better to keep low engine rpm.) |
|           | Accelerator pedal | Released                                                                                                 |
|           | Vehicle speed     | As slow as possible                                                                                      |

- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-184.



### With GST

Follow the procedure "With CONSULT-II" above.

| DATA MONITOR  |        |
|---------------|--------|
| MONITOR       | NO DTC |
| THRTL POS SEN | XXX V  |
| ABSOL TH-P/S  | XXX %  |

SEF177Y

## PROCEDURE FOR MALFUNCTION C

NCEC0083S03

### CAUTION:

Always drive vehicle at a safe speed.

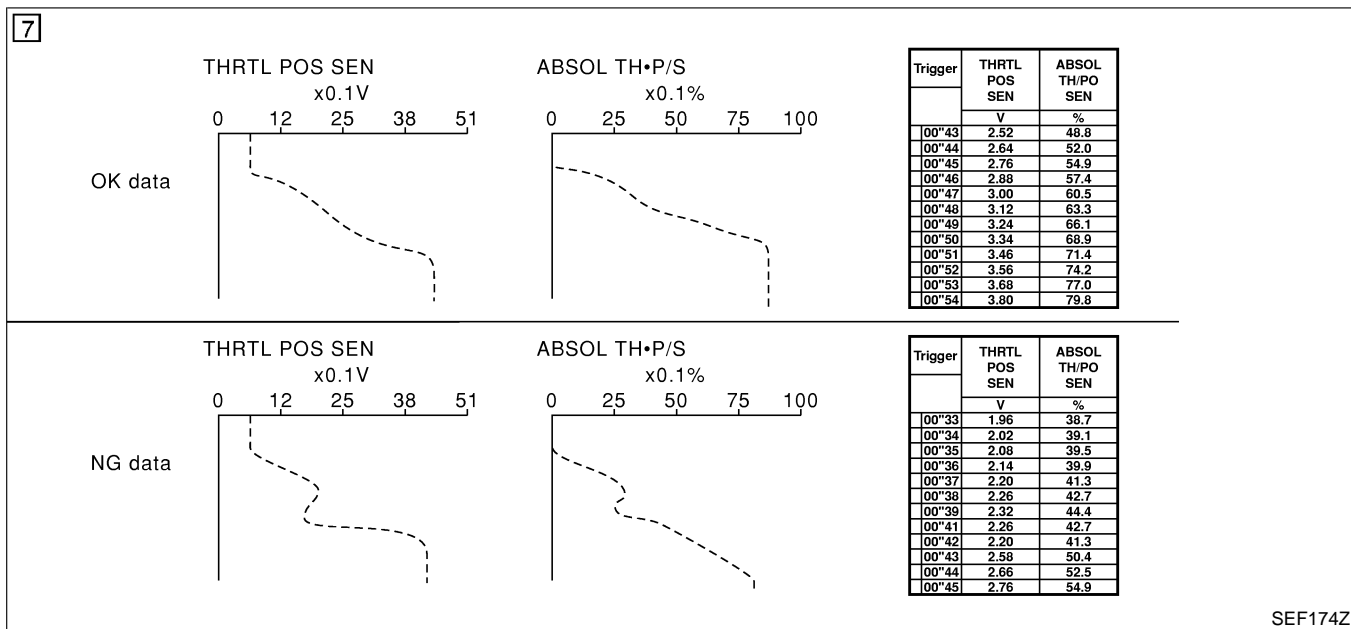


### With CONSULT-II

- Start engine and warm it up to normal operating temperature.
  - Turn ignition switch "OFF" and wait at least 10 seconds.
  - Turn ignition switch "ON".
  - Select "MANU TRIG" in "DATA MONITOR" mode with CONSULT-II.
  - Select "THRTL POS SEN" and "ABSOL TH-P/S" in "DATA MONITOR" mode with CONSULT-II.
  - Press RECORD on CONSULT-II SCREEN at the same time accelerator pedal is depressed.
  - Print out the recorded graph and check the following:
    - The voltage rise is linear in response to accelerator pedal depression.
    - The voltage when accelerator pedal is fully depressed is approximately 4V.
- If NG, go to "Diagnostic Procedure", EC-184.  
If OK, go to following step.

# DTC P0120 THROTTLE POSITION SENSOR

DTC Confirmation Procedure (Cont'd)



9

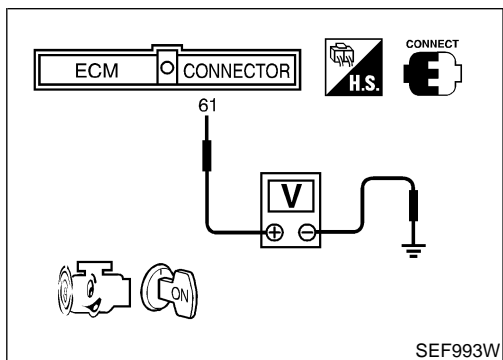
| DATA MONITOR  |         |
|---------------|---------|
| MONITOR       | NO DTC  |
| ENG SPEED     | XXX rpm |
| MAS A/F SE-B1 | XXX V   |
| COOLAN TEMP/S | XXX °C  |

SEF178Y

- 8) Select "AUTO TRIG" in "DATA MONITOR" mode with CONSULT-II.
- 9) Maintain the following conditions for at least 10 consecutive seconds.

|                  |                                                                                                                  |
|------------------|------------------------------------------------------------------------------------------------------------------|
| ENG SPEED        | More than 2,000 rpm                                                                                              |
| MAS A/F SE-B1    | More than 3V                                                                                                     |
| COOLAN TEMP/S    | More than 70°C (158°F)                                                                                           |
| Selector lever   | Suitable position                                                                                                |
| Driving location | Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test. |

- 10) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-184.



**With GST**

- 1) Maintain the following conditions for at least 10 consecutive seconds.

|                                                                          |                        |
|--------------------------------------------------------------------------|------------------------|
| Gear position                                                            | Suitable position      |
| Engine speed                                                             | More than 2,000 rpm    |
| Engine coolant temperature                                               | More than 70°C (158°F) |
| Voltage between ECM terminal 61 (Mass air flow sensor signal) and ground | More than 3V           |

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## DTC P0120 THROTTLE POSITION SENSOR

*DTC Confirmation Procedure (Cont'd)*

---

- 2) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-184.

# DTC P0120 THROTTLE POSITION SENSOR

Wiring Diagram

## Wiring Diagram

NCEC0084

EC-TPS-01

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**EC**

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RS

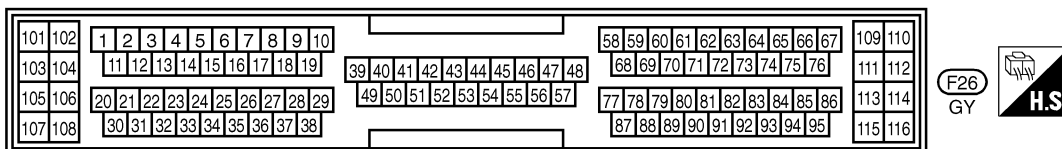
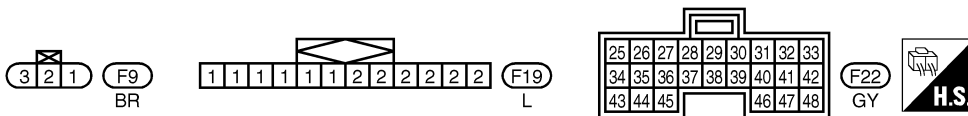
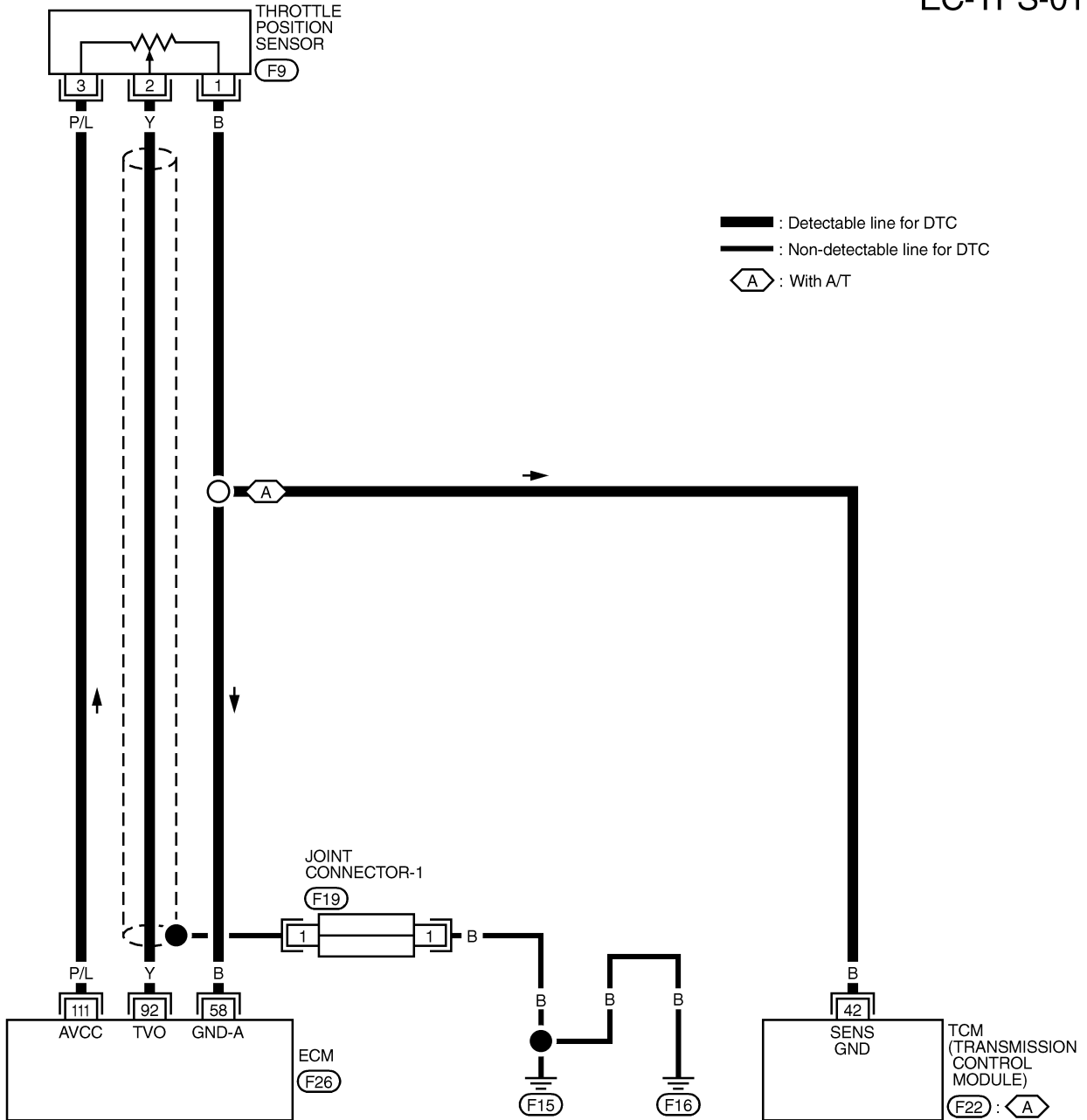
BT

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IDX



TEC701

# DTC P0120 THROTTLE POSITION SENSOR

Diagnostic Procedure

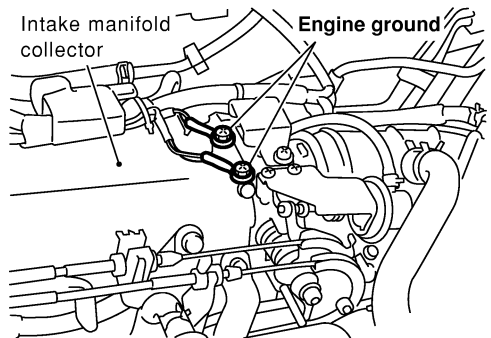
## Diagnostic Procedure

NCEC0085

| <b>1</b>                                                                                                                                                                                  | <b>INSPECTION START</b> |             |      |   |   |   |   |   |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------|------|---|---|---|---|---|---|
| Which malfunction A, B or C is duplicated?                                                                                                                                                |                         |             |      |   |   |   |   |   |   |
| <table border="1"><thead><tr><th>MALFUNCTION</th><th>Type</th></tr></thead><tbody><tr><td>A</td><td>A</td></tr><tr><td>B</td><td>B</td></tr><tr><td>C</td><td>C</td></tr></tbody></table> |                         | MALFUNCTION | Type | A | A | B | B | C | C |
| MALFUNCTION                                                                                                                                                                               | Type                    |             |      |   |   |   |   |   |   |
| A                                                                                                                                                                                         | A                       |             |      |   |   |   |   |   |   |
| B                                                                                                                                                                                         | B                       |             |      |   |   |   |   |   |   |
| C                                                                                                                                                                                         | C                       |             |      |   |   |   |   |   |   |
| MTBL0066                                                                                                                                                                                  |                         |             |      |   |   |   |   |   |   |
| <b>Type A, B or C</b>                                                                                                                                                                     |                         |             |      |   |   |   |   |   |   |
| Type A or B                                                                                                                                                                               | ▶ GO TO 4.              |             |      |   |   |   |   |   |   |
| Type C                                                                                                                                                                                    | ▶ GO TO 2.              |             |      |   |   |   |   |   |   |

|                                     |                                        |
|-------------------------------------|----------------------------------------|
| <b>2</b>                            | <b>ADJUST THROTTLE POSITION SENSOR</b> |
| Perform "Basic Inspection", EC-107. |                                        |
| <b>OK or NG</b>                     |                                        |
| OK                                  | ▶ GO TO 3.                             |

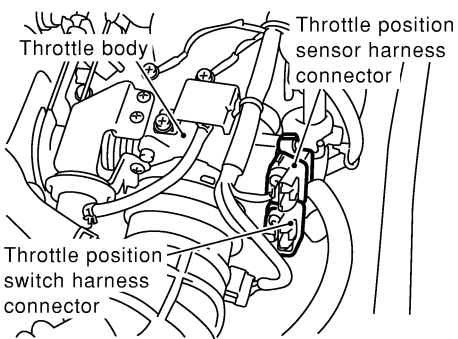
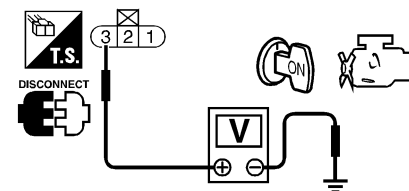
|                                                                                                                                                              |                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <b>3</b>                                                                                                                                                     | <b>CHECK INTAKE SYSTEM</b> |
| Check the followings for connection.                                                                                                                         |                            |
| <ul style="list-style-type: none"><li>● Air duct</li><li>● Vacuum hoses</li><li>● Intake air passage between air duct to intake manifold collector</li></ul> |                            |
| <b>OK or NG</b>                                                                                                                                              |                            |
| OK                                                                                                                                                           | ▶ GO TO 4.                 |
| NG                                                                                                                                                           | ▶ Reconnect the parts.     |

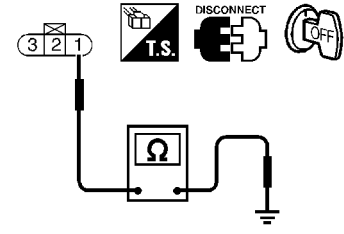
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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                                                                             | <b>RETIGHTEN GROUND SCREWS</b> |
| <ol style="list-style-type: none"><li>1. Turn ignition switch "OFF".</li><li>2. Loosen and retighten engine ground screws.</li></ol>                                                                                                                                                                                                                                                                 |                                |
|  <p>The diagram shows a cross-section of an engine compartment. Two screws are highlighted with circles and arrows. One screw is labeled 'Intake manifold collector' and the other is labeled 'Engine ground'. The diagram illustrates the location of these screws on the engine block and intake manifold.</p> |                                |
| SEF839X                                                                                                                                                                                                                                                                                                                                                                                              |                                |
|                                                                                                                                                                                                                                                                                                                                                                                                      | ▶ GO TO 5.                     |



# DTC P0120 THROTTLE POSITION SENSOR

Diagnostic Procedure (Cont'd)

|          |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                            |
|----------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>5</b> | <b>CHECK POWER SUPPLY</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                            |
|          |                           | <p>1. Disconnect throttle position sensor harness connector.</p>  <p>Throttle body<br/>Throttle position sensor harness connector<br/>Throttle position switch harness connector</p> <p style="text-align: right;">SEF837X</p> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between throttle position sensor terminal 3 and ground with CONSULT-II or tester.</p>  <p style="text-align: right;">Voltage: Approximately 5V</p> <p style="text-align: right;">SEF306X</p> <p style="text-align: center;"><b>OK or NG</b></p> | <p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p><b>EC</b></p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> |
|          | OK                        | ▶ GO TO 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                            |
|          | NG                        | ▶ Repair harness or connectors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                            |

|          |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                       |
|----------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>6</b> | <b>CHECK GROUND CIRCUIT</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                       |
|          |                             | <p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between throttle position sensor terminal 1 and engine ground.</p>  <p style="text-align: right;">SEF210W</p> <p style="color: blue;"><b>Continuity should exist.</b></p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> | <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> |
|          | OK                          | ▶ GO TO 8.                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                       |
|          | NG                          | ▶ GO TO 7.                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                       |

IDX

# DTC P0120 THROTTLE POSITION SENSOR

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                      |                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>7</b>                                                                                                                                                                                                                                             | <b>DETECT MALFUNCTIONING PART</b>                                 |
| Check the following. <ul style="list-style-type: none"><li>● Harness for open or short between ECM and throttle position sensor</li><li>● Harness for open or short between throttle position sensor and TCM (Transmission control module)</li></ul> |                                                                   |
|                                                                                                                                                                                                                                                      | ▶ Repair open circuit or short to power in harness or connectors. |

|                                                                                                                                                                                                                                                                      |                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>8</b>                                                                                                                                                                                                                                                             | <b>CHECK INPUT SIGNAL CIRCUIT</b>                                                    |
| 1. Disconnect ECM harness connector.<br>2. Check harness continuity between ECM terminal 92 and throttle position sensor terminal 2.<br>Refer to Wiring Diagram.<br><b>Continuity should exist.</b><br>3. Also check harness for short to ground and short to power. |                                                                                      |
| <b>OK or NG</b>                                                                                                                                                                                                                                                      |                                                                                      |
| OK                                                                                                                                                                                                                                                                   | ▶ GO TO 9.                                                                           |
| NG                                                                                                                                                                                                                                                                   | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

|                                          |                                                                                       |
|------------------------------------------|---------------------------------------------------------------------------------------|
| <b>9</b>                                 | <b>CHECK THROTTLE POSITION SENSOR</b>                                                 |
| Refer to "Component Inspection", EC-188. |                                                                                       |
| <b>OK or NG</b>                          |                                                                                       |
| OK (Type B in step1)                     | ▶ GO TO 10.                                                                           |
| OK (Type A or C in step1)                | ▶ GO TO 13.                                                                           |
| NG                                       | ▶ Replace throttle position sensor. To adjust it, perform "Basic Inspection", EC-107. |

|                                          |                                   |
|------------------------------------------|-----------------------------------|
| <b>10</b>                                | <b>CHECK MASS AIR FLOW SENSOR</b> |
| Refer to "Component Inspection", EC-162. |                                   |
| <b>OK or NG</b>                          |                                   |
| OK                                       | ▶ GO TO 11.                       |
| NG                                       | ▶ Replace mass air flow sensor.   |

|                                          |                                       |
|------------------------------------------|---------------------------------------|
| <b>11</b>                                | <b>CHECK CAMSHAFT POSITION SENSOR</b> |
| Refer to "Component Inspection", EC-333. |                                       |
| <b>OK or NG</b>                          |                                       |
| OK                                       | ▶ GO TO 12.                           |
| NG                                       | ▶ Replace camshaft position sensor.   |

# DTC P0120 THROTTLE POSITION SENSOR

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                    |                            |                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------|
| <b>12</b>                                                                                                                                                          | <b>CHECK FUEL INJECTOR</b> |                        |
| <ol style="list-style-type: none"> <li>1. Disconnect injector harness connector.</li> <li>2. Check resistance between terminals as shown in the figure.</li> </ol> |                            |                        |
|                                                                                                                                                                    |                            |                        |
| OK                                                                                                                                                                 | ▶                          | GO TO 13.              |
| NG                                                                                                                                                                 | ▶                          | Replace fuel injector. |

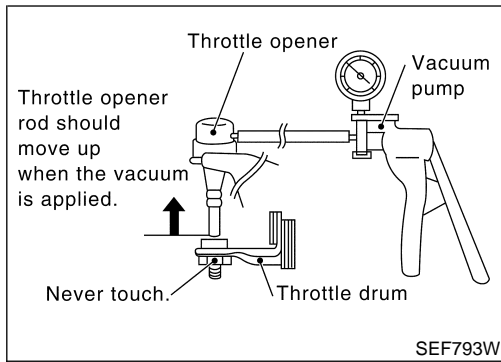
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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|
| <b>13</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>CHECK SHIELD CIRCUIT</b> |                                                                 |
| <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Disconnect joint connector-1.</li> <li>3. Check the following. <ul style="list-style-type: none"> <li>• Continuity between joint connector-1 terminal 1 and ground<br/>Refer to Wiring Diagram.</li> <li>• Joint connector-1<br/>(Refer to EL-314, "HARNESS LAYOUT".)<br/><b>Continuity should exist.</b></li> </ul> </li> <li>4. Also check harness for short to power.</li> <li>5. Then reconnect joint connector.</li> </ol> |                             |                                                                 |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶                           | GO TO 14.                                                       |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶                           | Repair open circuit or short to power in harness or connectors. |

|                                                                |                                    |                       |
|----------------------------------------------------------------|------------------------------------|-----------------------|
| <b>14</b>                                                      | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                       |
|                                                                | ▶                                  | <b>INSPECTION END</b> |

GI  
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AT  
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BR  
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BT  
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SC  
EL  
IDX

# DTC P0120 THROTTLE POSITION SENSOR

## Component Inspection



| DATA MONITOR  |         |
|---------------|---------|
| MONITOR       | NO DTC  |
| ENG SPEED     | XXX rpm |
| COOLAN TEMP/S | XXX °C  |
| THRTL POS SEN | XXX V   |

SEF179Y

## Component Inspection THROTTLE POSITION SENSOR

NCEC0086

NCEC0086S01

### With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine (ignition switch OFF).
- 3) Remove the vacuum hose connected to the throttle opener.
- 4) Connect suitable vacuum hose to the vacuum pump and the opener.
- 5) Apply vacuum [more than  $-40.0$  kPa ( $-300$  mmHg,  $11.81$  inHg)] until the throttle drum becomes free from the rod of the throttle opener.
- 6) Turn ignition switch ON.
- 7) Select "DATA MONITOR" mode with CONSULT-II.
- 8) Check voltage of "THRTL POS SEN" under the following conditions.

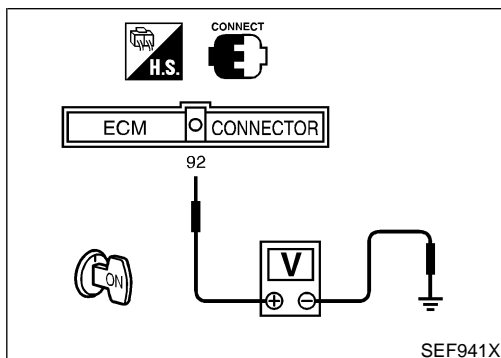
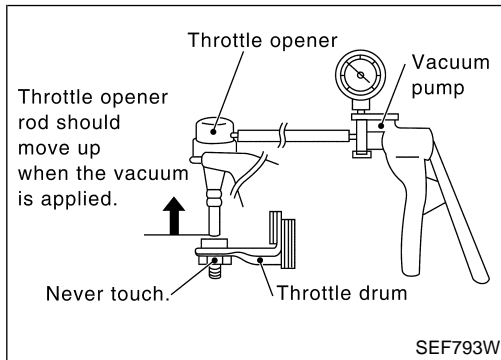
### NOTE:

**Voltage measurement must be made with throttle position sensor installed in vehicle.**

| Throttle valve conditions | Voltage V           |
|---------------------------|---------------------|
| Completely closed         | 0.15 - 0.85 (a)     |
| Partially open            | Between (a) and (b) |
| Completely open           | 3.5 - 4.7 (b)       |

If NG, adjust closed throttle position switch. Refer to "Basic Inspection", EC-179.

- 9) If it is impossible to adjust closed throttle position switch in "Basic Inspection", replace throttle position sensor.



### Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine (ignition switch OFF).
- 3) Remove the vacuum hose connected to the throttle opener.
- 4) Connect suitable vacuum hose to the vacuum pump and the opener.
- 5) Apply vacuum [more than  $-40.0$  kPa ( $-300$  mmHg,  $11.81$  inHg)] until the throttle drum becomes free from the rod of the throttle opener.
- 6) Turn ignition switch ON.
- 7) Check voltage between ECM terminal 92 (Throttle position sensor signal) and ground under the following conditions.

### NOTE:

**Voltage measurement must be made with throttle position sensor installed in vehicle.**

| Throttle valve conditions | Voltage V           |
|---------------------------|---------------------|
| Completely closed         | 0.15 - 0.85 (a)     |
| Partially open            | Between (a) and (b) |
| Completely open           | 3.5 - 4.7 (b)       |

# DTC P0120 THROTTLE POSITION SENSOR

*Component Inspection (Cont'd)*

If NG, adjust closed throttle position switch. Refer to "Basic Inspection", EC-179.

- 8) If it is impossible to adjust closed throttle position switch in "Basic Inspection", replace throttle position sensor.

GI

MA

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LC

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FE

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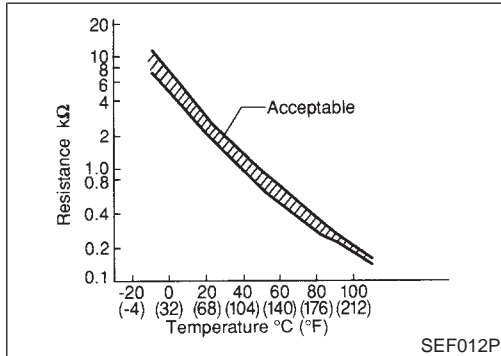
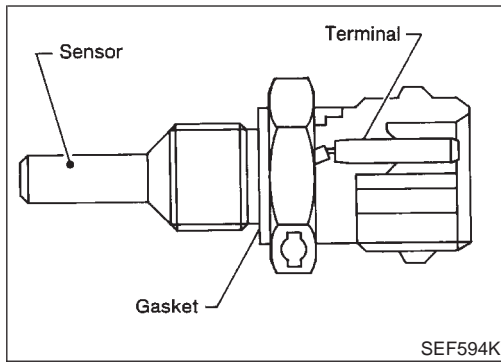
SC

EL

IDX

# DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

## Component Description



## Component Description

NCEC0087

### NOTE:

If DTC P0125 is displayed with P0115, first perform trouble diagnosis for DTC P0115, EC-171.

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

### <Reference data>

| Engine coolant temperature<br>°C (°F) | Voltage*<br>V | Resistance<br>kΩ |
|---------------------------------------|---------------|------------------|
| -10 (14)                              | 4.4           | 7.0 - 11.4       |
| 20 (68)                               | 3.5           | 2.1 - 2.9        |
| 50 (122)                              | 2.2           | 0.68 - 1.00      |
| 90 (194)                              | 0.9           | 0.236 - 0.260    |

\*: These data are reference values and are measured between ECM terminal 70 (Engine coolant temperature sensor) and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0088

| MONITOR ITEM  | CONDITION                  | SPECIFICATION          |
|---------------|----------------------------|------------------------|
| COOLAN TEMP/S | ● Engine: After warming up | More than 70°C (158°F) |

## On Board Diagnosis Logic

NCEC0089

| DTC No. | Malfunction is detected when ...                                                                                                                                                                                                                        | Check Items (Possible Cause)                                                                                                                                                  |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0125   | <ul style="list-style-type: none"> <li>● Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine.</li> <li>● Engine coolant temperature is insufficient for closed loop fuel control.</li> </ul> | <ul style="list-style-type: none"> <li>● Harness or connectors (High resistance in the circuit)</li> <li>● Engine coolant temperature sensor</li> <li>● Thermostat</li> </ul> |

# DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

DTC Confirmation Procedure

=NCEC0090

3

| DATA MONITOR  |         |
|---------------|---------|
| MONITOR       | NO DTC  |
| ENG SPEED     | XXX rpm |
| COOLAN TEMP/S | XXX °C  |

SEF174Y

## DTC Confirmation Procedure

### CAUTION:

Be careful not to overheat engine.

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Check that "COOLAN TEMP/S" is above 15°C (59°F).  
**If it is above 15°C (59°F), the test result will be OK. If it is below 15°C (59°F), go to following step.**
- 4) Start engine and run it for 65 minutes at idle speed.  
**If "COOLAN TEMP/S" increases to more than 15°C (59°F) within 65 minutes, stop engine because the test result will be OK.**
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-193.

#### Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

GI

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LC

EC

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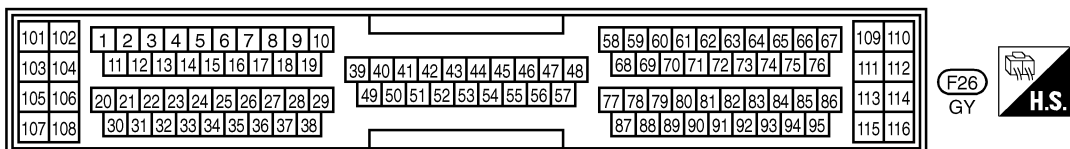
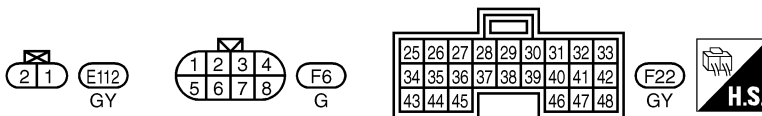
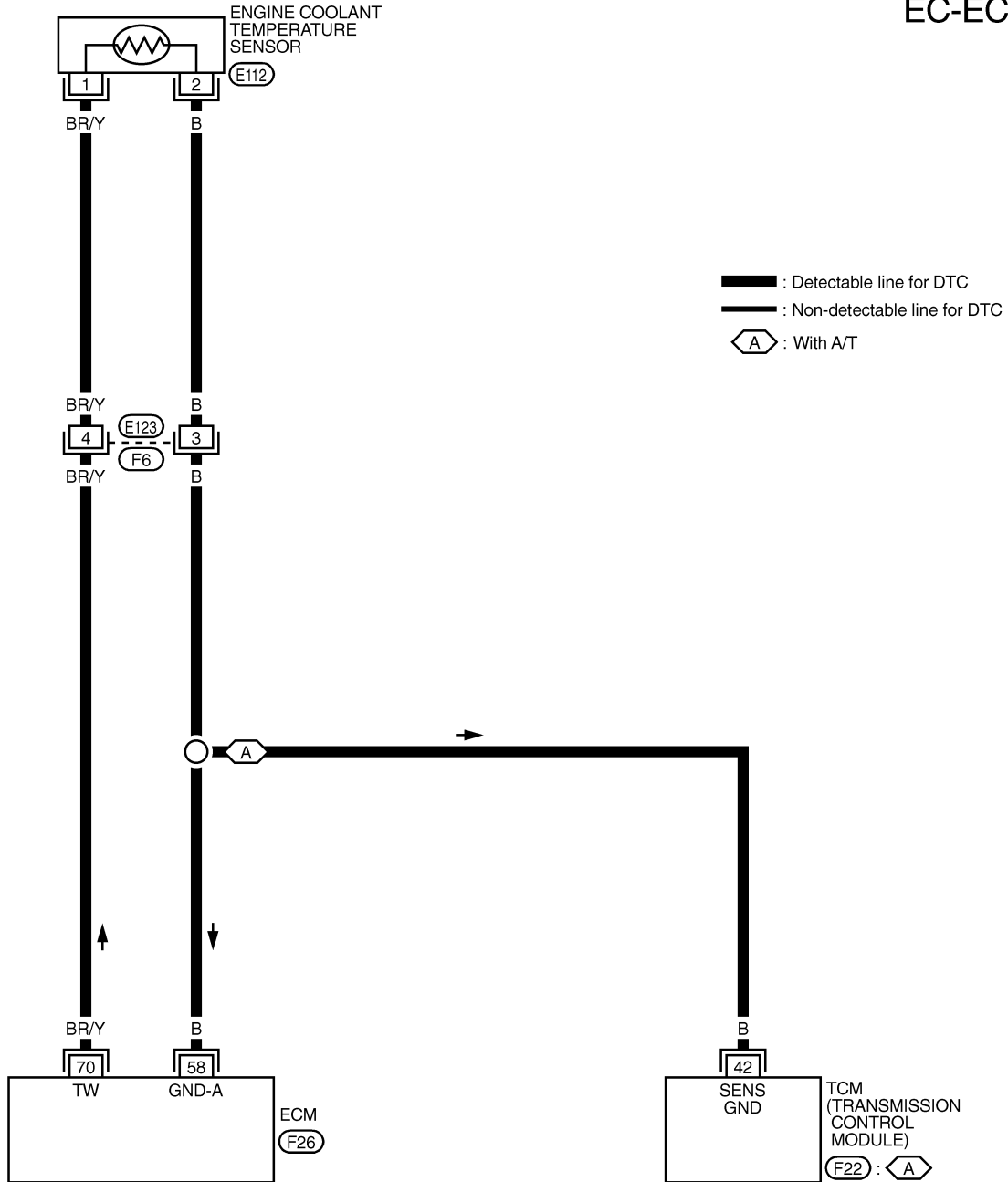
# DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Wiring Diagram

## Wiring Diagram

NCEC0091

EC-ECTS-01



TEC700

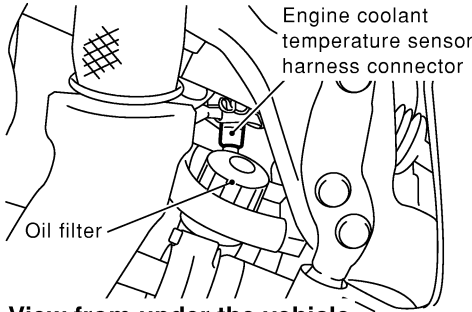
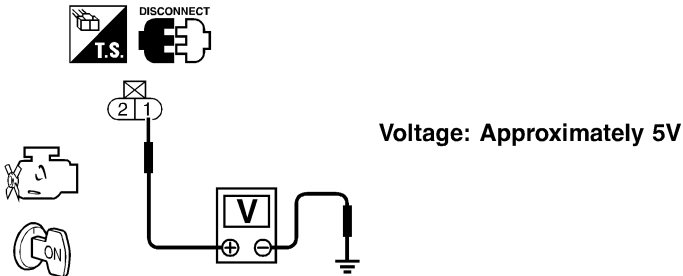


# DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Diagnostic Procedure

## Diagnostic Procedure

NCEC0092

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>CHECK POWER SUPPLY</b> | GI<br>MA<br>EM<br>LC<br><b>EC</b><br>FE<br>CL<br>MT<br>AT<br>AX<br>SU<br>BR |
| <p>1. Turn ignition switch "OFF".<br/>2. Disconnect engine coolant temperature sensor harness connector.</p>  <p style="text-align: center;"><b>View from under the vehicle</b></p> <p style="text-align: right;">SEF843X</p> <p>3. Turn ignition switch "ON".<br/>4. Check voltage between ECTS terminal 1 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;"><b>Voltage: Approximately 5V</b></p> <p style="text-align: center;">SEF303X</p> <p style="text-align: center;"><b>OK or NG</b></p> |                           |                                                                             |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ▶ GO TO 3.                |                                                                             |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ▶ GO TO 2.                |                                                                             |

|                                                                                                                                                                                                    |                                   |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------|
| <b>2</b>                                                                                                                                                                                           | <b>DETECT MALFUNCTIONING PART</b> | ST<br>RS<br>BT<br>HA<br>SC<br>EL<br>IDX |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E123, F6</li> <li>● Harness for open or short between ECM and engine coolant temperature sensor</li> </ul> |                                   |                                         |
|                                                                                                                                                                                                    | ▶ Repair harness or connectors.   |                                         |

# DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Diagnostic Procedure (Cont'd)

|                                                                                                                                   |                             |          |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|
| <b>3</b>                                                                                                                          | <b>CHECK GROUND CIRCUIT</b> |          |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Check harness continuity between ECTS terminal 2 and engine ground.</p> |                             |          |
|                                                                                                                                   |                             |          |
| <p><b>Continuity should exist.</b></p>                                                                                            |                             |          |
| <p>3. Also check harness for short to power.</p>                                                                                  |                             |          |
| <p><b>OK or NG</b></p>                                                                                                            |                             |          |
| OK                                                                                                                                | ▶                           | GO TO 5. |
| NG                                                                                                                                | ▶                           | GO TO 4. |

SEF207W

|                                                                                                                                                                                                                                                                                                                         |                                   |                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                | <b>DETECT MALFUNCTIONING PART</b> |                                                                 |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E123, F6</li> <li>● Harness for open or short between ECM and engine coolant temperature sensor</li> <li>● Harness for open or short between engine coolant temperature sensor and TCM (Transmission control module)</li> </ul> |                                   |                                                                 |
| ▶                                                                                                                                                                                                                                                                                                                       |                                   | Repair open circuit or short to power in harness or connectors. |

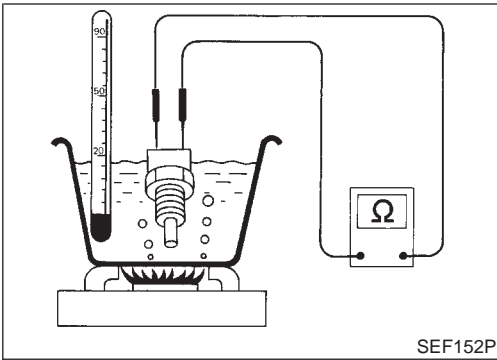
|                                                 |                                                |                                            |
|-------------------------------------------------|------------------------------------------------|--------------------------------------------|
| <b>5</b>                                        | <b>CHECK ENGINE COOLANT TEMPERATURE SENSOR</b> |                                            |
| <p>Refer to "Component Inspection", EC-195.</p> |                                                |                                            |
| <p><b>OK or NG</b></p>                          |                                                |                                            |
| OK                                              | ▶                                              | GO TO 6.                                   |
| NG                                              | ▶                                              | Replace engine coolant temperature sensor. |

|                                                                                                                                               |                                   |                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------|
| <b>6</b>                                                                                                                                      | <b>CHECK THERMOSTAT OPERATION</b> |                                                             |
| <p>When the engine is cooled [lower than 82°C (180°F)], condition grasp lower radiator hose and confirm the engine coolant does not flow.</p> |                                   |                                                             |
| <p><b>OK or NG</b></p>                                                                                                                        |                                   |                                                             |
| OK                                                                                                                                            | ▶                                 | GO TO 7.                                                    |
| NG                                                                                                                                            | ▶                                 | Repair or replace thermostat. Refer to LC-12, "Thermostat". |

|                                                                       |                                    |                       |
|-----------------------------------------------------------------------|------------------------------------|-----------------------|
| <b>7</b>                                                              | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| <p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p> |                                    |                       |
| ▶                                                                     |                                    | <b>INSPECTION END</b> |

# DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Component Inspection



## Component Inspection

### ENGINE COOLANT TEMPERATURE SENSOR

NCEC0093

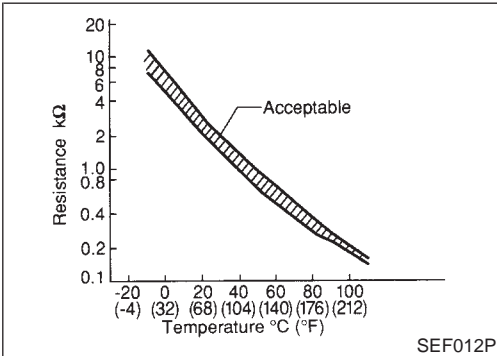
NCEC0093S01

Check resistance as shown in the figure.

<Reference data>

| Temperature °C (°F) | Resistance kΩ |
|---------------------|---------------|
| 20 (68)             | 2.1 - 2.9     |
| 50 (122)            | 0.68 - 1.0    |
| 90 (194)            | 0.236 - 0.260 |

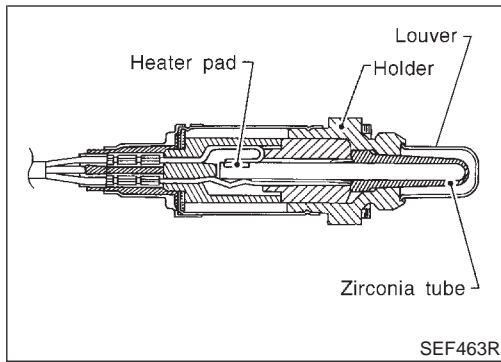
If NG, replace engine coolant temperature sensor.



- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX

# DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

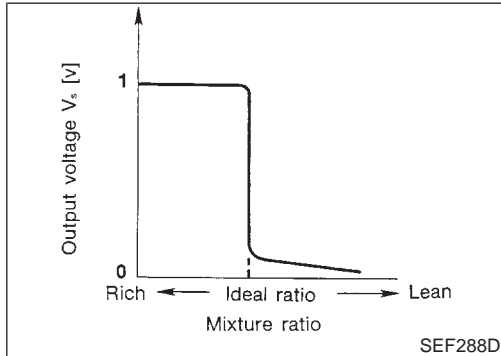
## Component Description



## Component Description

NCEC0094

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



## CONSULT-II Reference Value in Data Monitor Mode

NCEC0095

Specification data are reference values.

| MONITOR ITEM    | CONDITION                                                                  |                                       | SPECIFICATION                                               |
|-----------------|----------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------|
| HO2S1 (B1)      |                                                                            |                                       | 0 - 0.3V ↔ Approx. 0.6 - 1.0V                               |
| HO2S1 MNTR (B1) | <ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> | Maintaining engine speed at 2,000 rpm | LEAN ↔ RICH<br>Changes more than 5 times during 10 seconds. |

## ECM Terminals and Reference Value

NCEC0096

Specification data are reference values and are measured between each terminal and ground.

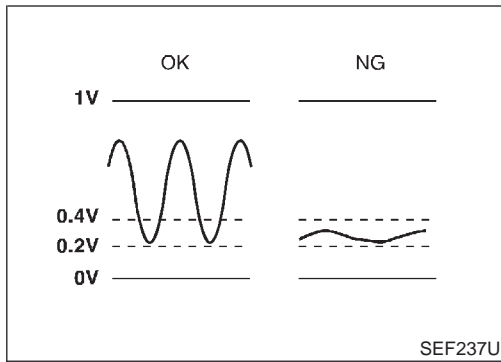
### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-NAL NO. | WIRE COLOR | ITEM                           | CONDITION                                                                                                                                                          | DATA (DC Voltage)                            |
|---------------|------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 62            | W          | Heated oxygen sensor 1 (front) | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>After warming up to normal operating temperature and engine speed is 2,000 rpm</li> </ul> | <p>0 - Approximately 1.0V</p> <p>SEF059V</p> |

# DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

On Board Diagnosis Logic



## On Board Diagnosis Logic

Under the condition in which the heated oxygen sensor 1 (front) signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.

NCEC0097

| DTC No. | Malfunction is detected when ...                                                                          | Check Items (Possible Cause)                                                                                                                             |
|---------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0130   | <ul style="list-style-type: none"> <li>The voltage from the sensor is constantly approx. 0.3V.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Heated oxygen sensor 1 (front)</li> </ul> |

|   |                  |          |
|---|------------------|----------|
| 5 | HO2S1 (B1) P0130 |          |
|   | OUT OF CONDITION |          |
|   | MONITOR          |          |
|   | ENG SPEED        | XXX rpm  |
|   | B/FUEL SCHDL     | XXX msec |
|   | THRTL POS SEN    | XXX V    |

SEF643Y

## DTC Confirmation Procedure

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

#### Ⓜ With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Select "HO2S1 (B1) P0130" of "HO2S1" in "DTC WORK SUPPORT" mode with CONSULT-II.
- Touch "START".
- Let it idle for at least 3.5 minutes.

### NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 4.

- When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 10 to 60 seconds.)

|                |                            |
|----------------|----------------------------|
| ENG SPEED      | 1,500 - 3,200 rpm          |
| Vehicle speed  | More than 65 km/h (40 MPH) |
| B/FUEL SCHDL   | 2.4 - 11.0 msec            |
| Selector lever | Suitable position          |

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- Make sure that "OK" is displayed after touching "SELF-DIAG"

|   |                  |          |
|---|------------------|----------|
| 5 | HO2S1 (B1) P0130 |          |
|   | TESTING          |          |
|   | MONITOR          |          |
|   | ENG SPEED        | XXX rpm  |
|   | B/FUEL SCHDL     | XXX msec |
|   | THRTL POS SEN    | XXX V    |

SEF644Y

|   |                  |  |
|---|------------------|--|
| 5 | HO2S1 (B1) P0130 |  |
|   | COMPLETED        |  |

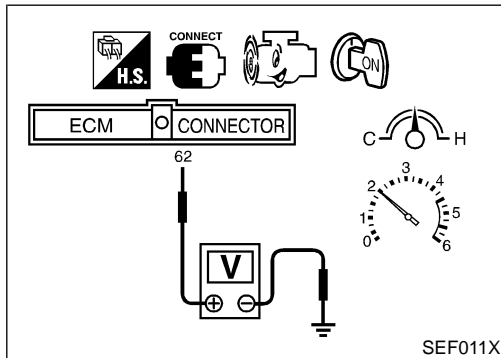
SEF645Y

## DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

DTC Confirmation Procedure (Cont'd)

RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-200.

During this test, P1148 may be displayed on CONSULT-II screen.



### Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed. NCEC0099

#### With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
  - The voltage does not remain in the range of 0.2 - 0.4V.
- 4) If NG, go to "Diagnostic Procedure", EC-200.

# DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

Wiring Diagram

## Wiring Diagram

NCEC0100

EC-HO2S1-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

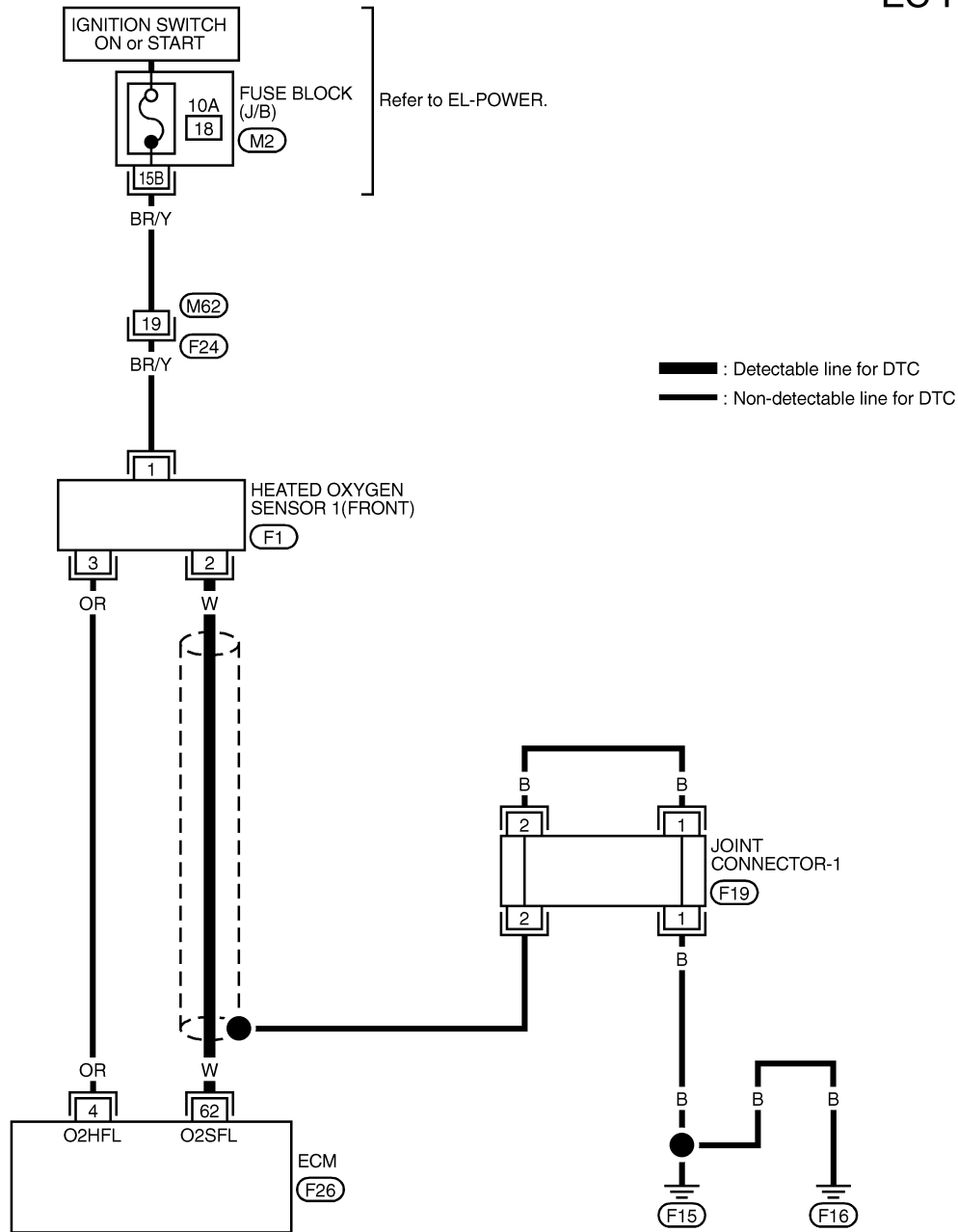
BT

HA

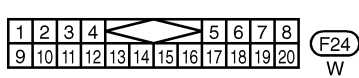
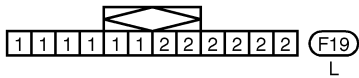
SC

EL

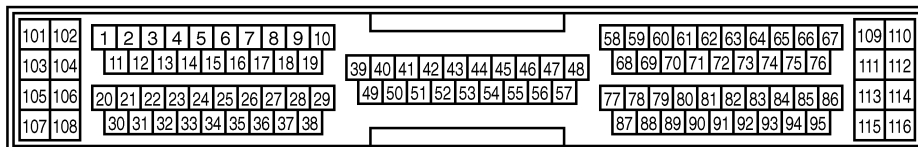
IDX



: Detectable line for DTC  
 : Non-detectable line for DTC



REFER TO THE FOLLOWING.  
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)



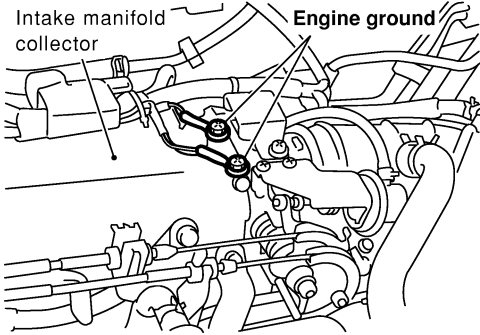
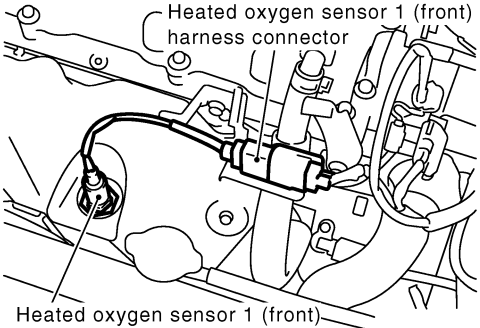
TEC778

# DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0101

|                                                                                                                                                                                   |                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>1</b>                                                                                                                                                                          | <b>INSPECTION START</b> |
| <p>1. Turn ignition switch "OFF".<br/>2. Loosen and retighten engine ground screws.</p>                                                                                           |                         |
|  <p>Intake manifold collector      Engine ground</p>                                            |                         |
| <p>3. Disconnect heated oxygen sensor 1 (front) harness connector.</p>                                                                                                            |                         |
|  <p>Heated oxygen sensor 1 (front) harness connector</p> <p>Heated oxygen sensor 1 (front)</p> |                         |
| SEF839X                                                                                                                                                                           |                         |
| SEF917Z                                                                                                                                                                           |                         |
| ▶                                                                                                                                                                                 | GO TO 2.                |

|                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK INPUT SIGNAL CIRCUIT</b>                                                    |
| <p>1. Disconnect ECM harness connector.<br/>2. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b><br/>3. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should not exist.</b><br/>4. Also check harness for short to power.</p> |                                                                                      |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                      |
| OK                                                                                                                                                                                                                                                                                                                                                                                                      | ▶ GO TO 3.                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                      | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

|                                          |                                             |
|------------------------------------------|---------------------------------------------|
| <b>3</b>                                 | <b>CHECK HEATED OXYGEN SENSOR 1 (FRONT)</b> |
| Refer to "Component Inspection", EC-202. |                                             |
| <b>OK or NG</b>                          |                                             |
| OK                                       | ▶ GO TO 4.                                  |
| NG                                       | ▶ Replace heated oxygen sensor 1 (front).   |



# DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

Diagnostic Procedure (Cont'd)

|          |                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                 |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>4</b> | <b>CHECK SHIELD CIRCUIT</b>                                                                                                                                                                                                                                                                                                                                                                            |                                                                 |
|          | 1. Turn ignition switch "OFF".<br>2. Disconnect joint connector-1.<br>3. Check the following. <ul style="list-style-type: none"> <li>● Continuity between joint connector-1 terminal 2 and ground</li> <li>● Joint connector-1<br/>(Refer to EL-314, "HARNESS LAYOUT".)<br/><b>Continuity should exist.</b></li> </ul> 4. Also check harness for short to power.<br>5. Then reconnect joint connector. |                                                                 |
|          | <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                        |                                                                 |
| OK       | ▶                                                                                                                                                                                                                                                                                                                                                                                                      | GO TO 5.                                                        |
| NG       | ▶                                                                                                                                                                                                                                                                                                                                                                                                      | Repair open circuit or short to power in harness or connectors. |

GI  
MA  
EM  
LC

**EC**

|          |                                                                |                       |
|----------|----------------------------------------------------------------|-----------------------|
| <b>5</b> | <b>CHECK INTERMITTENT INCIDENT</b>                             |                       |
|          | Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                       |
|          | ▶                                                              | <b>INSPECTION END</b> |

FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

# DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

## Component Inspection

| DATA MONITOR    |         |
|-----------------|---------|
| MONITOR         | NO DTC  |
| ENG SPEED       | XXX rpm |
| MAS A/F SE-B1   | XXX V   |
| COOLAN TEMP/S   | XXX °C  |
| HO2S1 (B1)      | XXX V   |
| HO2S1 MNTR (B1) | LEAN    |

SEF646Y

cycle | 1 | 2 | 3 | 4 | 5 |  
 HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R

R means HO2S1 MNTR (B1) indicates RICH  
 L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA

## Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

=NCEC0102

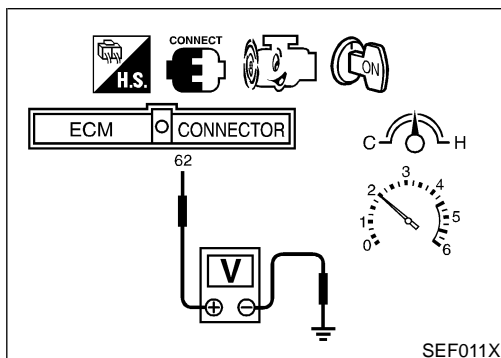
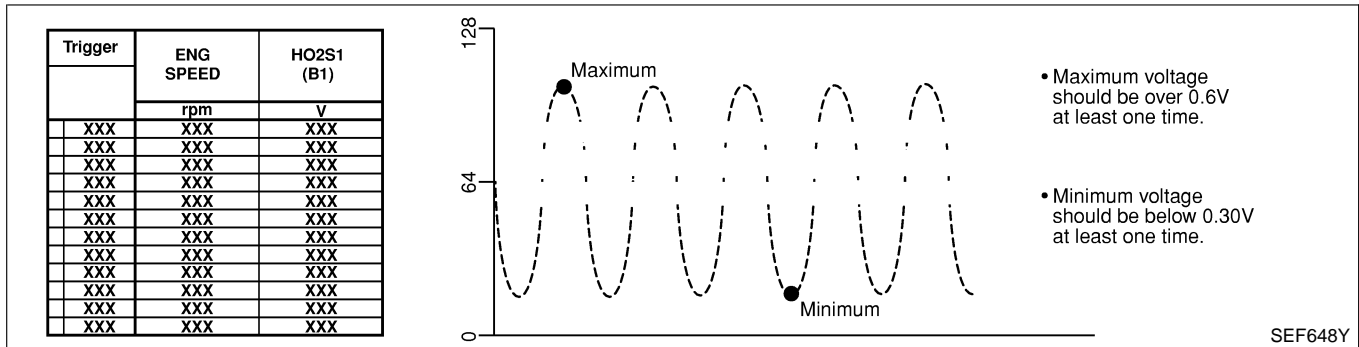
NCEC0102S01

### With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown below:  
 R = "HO2S1 MNTR (B1)", "RICH"  
 L = "HO2S1 MNTR (B1)", "LEAN"
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.

### CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



### Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
  - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than five times within 10 seconds.  
**1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**  
**2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**

# DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

Component Inspection (Cont'd)

- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

GI

## CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

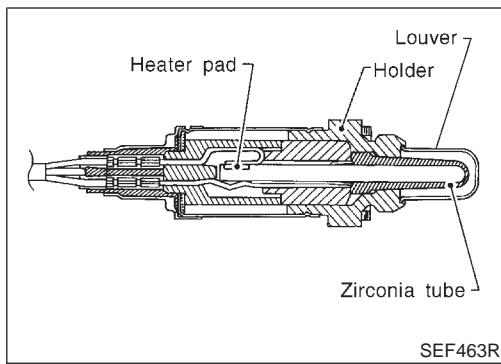
SC

EL

IDX

# DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

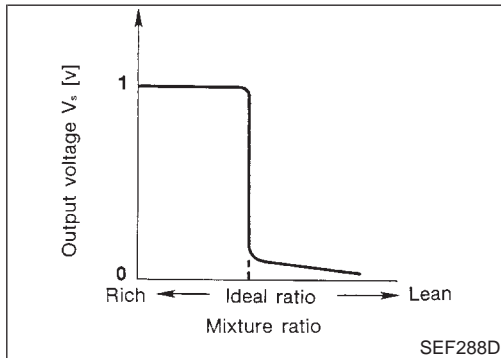
## Component Description



## Component Description

NCEC0103

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



## CONSULT-II Reference Value in Data Monitor Mode

NCEC0104

Specification data are reference values.

| MONITOR ITEM    | CONDITION                                                                  |                                       | SPECIFICATION                                               |
|-----------------|----------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------|
| HO2S1 (B1)      |                                                                            |                                       | 0 - 0.3V ↔ Approx. 0.6 - 1.0V                               |
| HO2S1 MNTR (B1) | <ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> | Maintaining engine speed at 2,000 rpm | LEAN ↔ RICH<br>Changes more than 5 times during 10 seconds. |

## ECM Terminals and Reference Value

NCEC0105

Specification data are reference values and are measured between each terminal and ground.

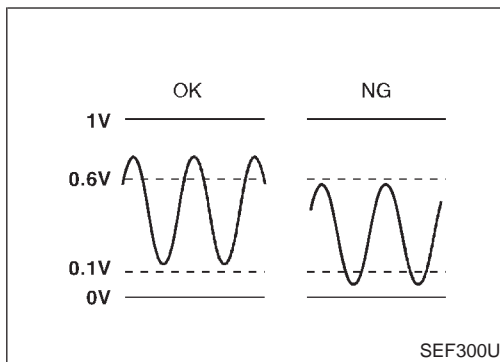
### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                           | CONDITION                                                                                                                                                          | DATA (DC Voltage)                            |
|----------------------|---------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 62                   | W             | Heated oxygen sensor 1 (front) | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>After warming up to normal operating temperature and engine speed is 2,000 rpm</li> </ul> | <p>0 - Approximately 1.0V</p> <p>SEF059V</p> |

# DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

On Board Diagnosis Logic



## On Board Diagnosis Logic

NCEC0106

To judge the malfunction, the output from the heated oxygen sensor 1 (front) is monitored to determine whether the “rich” output is sufficiently high and whether the “lean” output is sufficiently low. When both the outputs are shifting to the lean side, the malfunction will be detected.

| DTC No. | Malfunction is detected when ...                                                                                                              | Check Items (Possible Cause)                                                                                                                                                                        |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0131   | <ul style="list-style-type: none"> <li>The maximum and minimum voltages from the sensor are not reached to the specified voltages.</li> </ul> | <ul style="list-style-type: none"> <li>Heated oxygen sensor 1 (front)</li> <li>Heated oxygen sensor 1 heater (front)</li> <li>Fuel pressure</li> <li>Injectors</li> <li>Intake air leaks</li> </ul> |

|                  |                                                                                                                                                                                                                                                                                                                          |                  |  |                  |  |         |  |           |         |              |          |               |       |         |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--|------------------|--|---------|--|-----------|---------|--------------|----------|---------------|-------|---------|
| 6                | <table border="1"> <tr> <td colspan="2">HO2S1 (B1) P0131</td> </tr> <tr> <td colspan="2">OUT OF CONDITION</td> </tr> <tr> <td colspan="2">MONITOR</td> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>B/FUEL SCHDL</td> <td>XXX msec</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> </table> | HO2S1 (B1) P0131 |  | OUT OF CONDITION |  | MONITOR |  | ENG SPEED | XXX rpm | B/FUEL SCHDL | XXX msec | THRTL POS SEN | XXX V | SEF649Y |
| HO2S1 (B1) P0131 |                                                                                                                                                                                                                                                                                                                          |                  |  |                  |  |         |  |           |         |              |          |               |       |         |
| OUT OF CONDITION |                                                                                                                                                                                                                                                                                                                          |                  |  |                  |  |         |  |           |         |              |          |               |       |         |
| MONITOR          |                                                                                                                                                                                                                                                                                                                          |                  |  |                  |  |         |  |           |         |              |          |               |       |         |
| ENG SPEED        | XXX rpm                                                                                                                                                                                                                                                                                                                  |                  |  |                  |  |         |  |           |         |              |          |               |       |         |
| B/FUEL SCHDL     | XXX msec                                                                                                                                                                                                                                                                                                                 |                  |  |                  |  |         |  |           |         |              |          |               |       |         |
| THRTL POS SEN    | XXX V                                                                                                                                                                                                                                                                                                                    |                  |  |                  |  |         |  |           |         |              |          |               |       |         |

|                  |                                                                                                                                                                                                                                                                                                                 |                  |  |         |  |         |  |           |         |              |          |               |       |         |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--|---------|--|---------|--|-----------|---------|--------------|----------|---------------|-------|---------|
| 6                | <table border="1"> <tr> <td colspan="2">HO2S1 (B1) P0131</td> </tr> <tr> <td colspan="2">TESTING</td> </tr> <tr> <td colspan="2">MONITOR</td> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>B/FUEL SCHDL</td> <td>XXX msec</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> </table> | HO2S1 (B1) P0131 |  | TESTING |  | MONITOR |  | ENG SPEED | XXX rpm | B/FUEL SCHDL | XXX msec | THRTL POS SEN | XXX V | SEF650Y |
| HO2S1 (B1) P0131 |                                                                                                                                                                                                                                                                                                                 |                  |  |         |  |         |  |           |         |              |          |               |       |         |
| TESTING          |                                                                                                                                                                                                                                                                                                                 |                  |  |         |  |         |  |           |         |              |          |               |       |         |
| MONITOR          |                                                                                                                                                                                                                                                                                                                 |                  |  |         |  |         |  |           |         |              |          |               |       |         |
| ENG SPEED        | XXX rpm                                                                                                                                                                                                                                                                                                         |                  |  |         |  |         |  |           |         |              |          |               |       |         |
| B/FUEL SCHDL     | XXX msec                                                                                                                                                                                                                                                                                                        |                  |  |         |  |         |  |           |         |              |          |               |       |         |
| THRTL POS SEN    | XXX V                                                                                                                                                                                                                                                                                                           |                  |  |         |  |         |  |           |         |              |          |               |       |         |

|                  |                                                                                                                        |                  |  |           |  |         |
|------------------|------------------------------------------------------------------------------------------------------------------------|------------------|--|-----------|--|---------|
| 6                | <table border="1"> <tr> <td colspan="2">HO2S1 (B1) P0131</td> </tr> <tr> <td colspan="2">COMPLETED</td> </tr> </table> | HO2S1 (B1) P0131 |  | COMPLETED |  | SEF651Y |
| HO2S1 (B1) P0131 |                                                                                                                        |                  |  |           |  |         |
| COMPLETED        |                                                                                                                        |                  |  |           |  |         |

## DTC Confirmation Procedure

NCEC0107

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

- Always perform at a temperature above  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

### With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Stop engine and wait at least 10 seconds.
- Turn ignition switch “ON” and select “HO2S1 (B1) P0131” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
- Touch “START”.
- Start engine and let it idle for at least 3.5 minutes.

### NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)

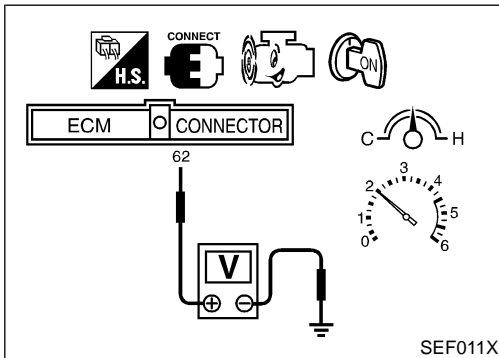
|                |                                                    |
|----------------|----------------------------------------------------|
| ENG SPEED      | 1,900 - 3,100 rpm (A/T)<br>2,000 - 3,100 rpm (M/T) |
| Vehicle speed  | Less than 120 km/h (75 MPH)                        |
| B/FUEL SCHDL   | 4.0 - 12.0 msec (A/T)<br>3.5 - 12.0 msec (M/T)     |
| Selector lever | Suitable position                                  |

# DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

DTC Confirmation Procedure (Cont'd)

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-206.



## Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed. NCEC0108

### With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
  - The maximum voltage is over 0.6V at least one time.
  - The minimum voltage is over 0.1V at least one time.
- 4) If NG, go to "Diagnostic Procedure", EC-206.

## Diagnostic Procedure

NCEC0109

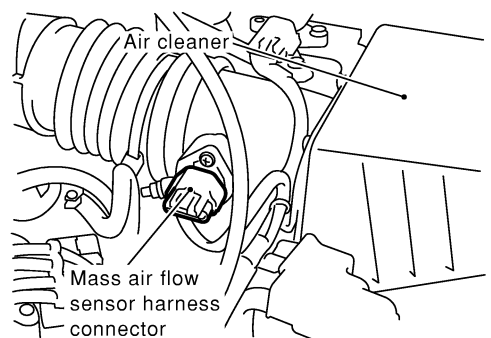
|                                                                                                                                                                              |                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>1</b>                                                                                                                                                                     | <b>RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)</b> |
| 1. Turn ignition switch "OFF".<br>2. Loosen and retighten heated oxygen sensor 1 (front).<br><b>Tightening torque:</b><br><b>40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)</b> |                                                 |
| ▶                                                                                                                                                                            |                                                 |
| GO TO 2.                                                                                                                                                                     |                                                 |

# DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

Diagnostic Procedure (Cont'd)

| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                            | <b>CLEAR THE SELF-LEARNING DATA.</b> |              |  |                    |            |  |  |       |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------|--|--------------------|------------|--|--|-------|--|
| <p><b>Ⓟ With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Start engine and warm it up to normal operating temperature.</li> <li>Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.</li> <li>Clear the self-learning control coefficient by touching "CLEAR".</li> </ol>                                                                                                               |                                      |              |  |                    |            |  |  |       |  |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px; text-align: center;">B1<br/>100%</td> </tr> <tr> <td colspan="2" style="height: 100px;"></td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 2px;">CLEAR</td> </tr> </table> |                                      | WORK SUPPORT |  | SELF-LEARNING CONT | B1<br>100% |  |  | CLEAR |  |
| WORK SUPPORT                                                                                                                                                                                                                                                                                                                                                                                                        |                                      |              |  |                    |            |  |  |       |  |
| SELF-LEARNING CONT                                                                                                                                                                                                                                                                                                                                                                                                  | B1<br>100%                           |              |  |                    |            |  |  |       |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |              |  |                    |            |  |  |       |  |
| CLEAR                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |              |  |                    |            |  |  |       |  |
| <p>4. Run engine for at least 10 minutes at idle speed.</p> <p style="text-align: right;">SEF215Z</p> <p><b>Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</b></p>                                                                                                                                                                                                                            |                                      |              |  |                    |            |  |  |       |  |

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------|
| <p><b>ⓧ Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Start engine and warm it up to normal operating temperature.</li> <li>Turn ignition switch "OFF".</li> <li>Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.</li> </ol>                                                                                                                                                                                                                        |     |                                                           |
|  <p style="font-size: small;">Air cleaner</p> <p style="font-size: small;">Mass air flow sensor harness connector</p>                                                                                                                                                                                                                                                                                                                                   |     |                                                           |
| <p>4. Stop engine and reconnect mass air flow sensor harness connector.</p> <p>5. Make sure 1st trip DTC P0100 is displayed.</p> <p>6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.</p> <p>7. Make sure DTC P0000 is displayed.</p> <p>8. Run engine for at least 10 minutes at idle speed.</p> <p style="text-align: right;">SEF840X</p> <p><b>Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</b></p> <p style="text-align: center;"><b>Yes or No</b></p> |     |                                                           |
| Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶▶▶ | Perform trouble diagnosis for DTC P0171. Refer to EC-272. |
| No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶▶▶ | GO TO 3.                                                  |

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 BT

|                                                                                                    |                                                    |                                         |
|----------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------|
| <b>3</b>                                                                                           | <b>CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)</b> |                                         |
| <p>Refer to "Component Inspection", EC-236.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                    |                                         |
| OK                                                                                                 | ▶▶▶                                                | GO TO 4.                                |
| NG                                                                                                 | ▶▶▶                                                | Replace heated oxygen sensor 1 (front). |

HA  
 SC  
 EL  
 IDX

# DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

Diagnostic Procedure (Cont'd)

|                                          |                                             |                                         |
|------------------------------------------|---------------------------------------------|-----------------------------------------|
| <b>4</b>                                 | <b>CHECK HEATED OXYGEN SENSOR 1 (FRONT)</b> |                                         |
| Refer to "Component Inspection", EC-208. |                                             |                                         |
| <b>OK or NG</b>                          |                                             |                                         |
| OK                                       | ▶                                           | GO TO 5.                                |
| NG                                       | ▶                                           | Replace heated oxygen sensor 1 (front). |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>CHECK SHIELD CIRCUIT</b> |                                                                 |
| 1. Turn ignition switch "OFF".<br>2. Disconnect joint connector-1.<br>3. For circuit, refer to "DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)", EC-199.<br>4. Check the following. <ul style="list-style-type: none"> <li>● Continuity between joint connector-1 terminal 2 and ground</li> <li>● Joint connector-1<br/>(Refer to EL-314, "HARNESS LAYOUT".)<br/><b>Continuity should exist.</b></li> </ul> 5. Also check harness for short to power.<br>6. Then reconnect joint connector-1. |                             |                                                                 |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶                           | GO TO 6.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶                           | Repair open circuit or short to power in harness or connectors. |

|                                                                                                                   |                                    |                       |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------|
| <b>6</b>                                                                                                          | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.<br>Refer to "Wiring Diagram", EC-199, for circuit. |                                    |                       |
| ▶                                                                                                                 |                                    | <b>INSPECTION END</b> |

| DATA MONITOR    |         |
|-----------------|---------|
| MONITOR         | NO DTC  |
| ENG SPEED       | XXX rpm |
| MAS A/F SE-B1   | XXX V   |
| COOLAN TEMP/S   | XXX °C  |
| HO2S1 (B1)      | XXX V   |
| HO2S1 MNTR (B1) | LEAN    |

SEF646Y

cycle | 1 | 2 | 3 | 4 | 5 |  
 HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R

R means HO2S1 MNTR (B1) indicates RICH  
 L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA

## Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

NCEC0110

NCEC0110S02

### With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.  
5 times (cycles) are counted as shown below:  
R = "HO2S1 MNTR (B1)", "RICH"  
L = "HO2S1 MNTR (B1)", "LEAN"
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.

### CAUTION:

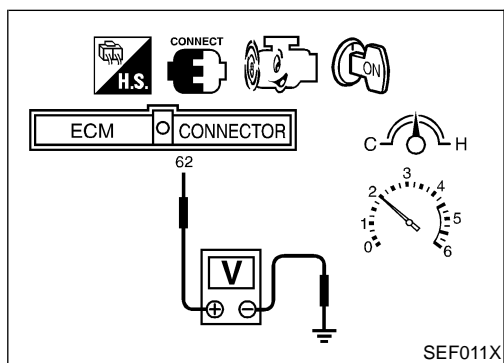
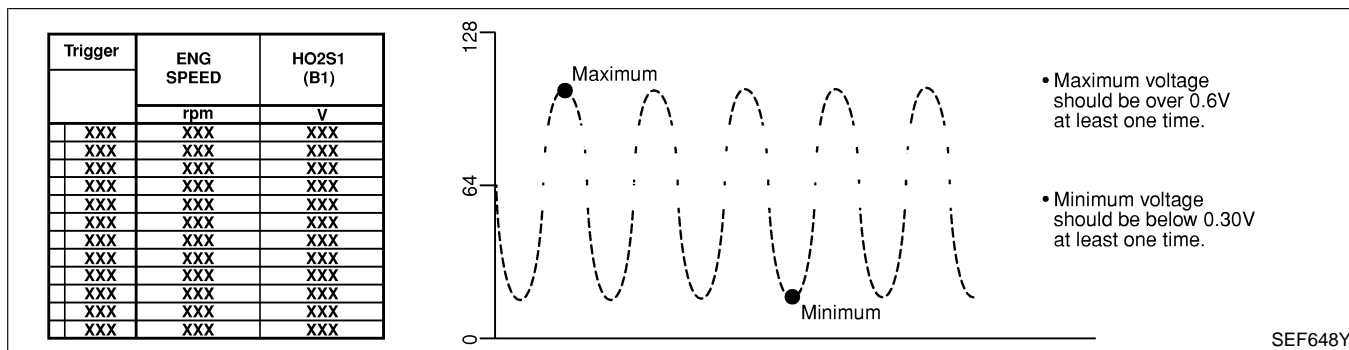
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.



# DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

Component Inspection (Cont'd)

- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



## ⊗ Without CONSULT-II

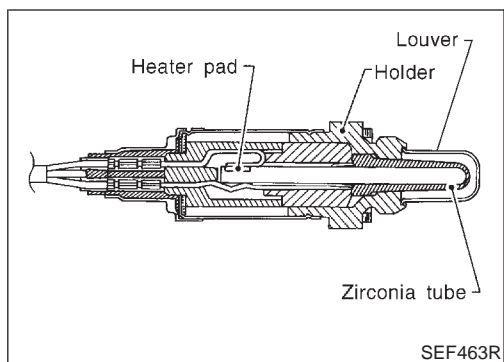
- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
  - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than five times within 10 seconds.  
**1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**  
**2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**
  - The maximum voltage is over 0.6V at least one time.
  - The minimum voltage is below 0.3V at least one time.
  - The voltage never exceeds 1.0V.

## CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

# DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

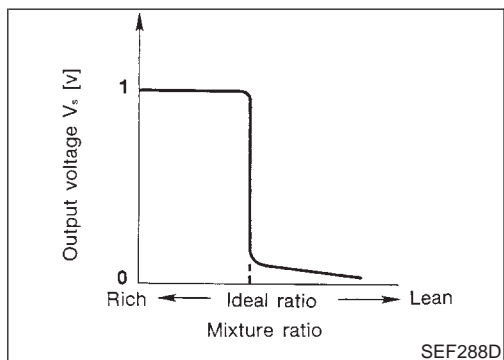
## Component Description



## Component Description

NCEC0111

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



## CONSULT-II Reference Value in Data Monitor Mode

NCEC0112

Specification data are reference values.

| MONITOR ITEM    | CONDITION                                                                  |                                       | SPECIFICATION                                               |
|-----------------|----------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------|
| HO2S1 (B1)      |                                                                            |                                       | 0 - 0.3V ↔ Approx. 0.6 - 1.0V                               |
| HO2S1 MNTR (B1) | <ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> | Maintaining engine speed at 2,000 rpm | LEAN ↔ RICH<br>Changes more than 5 times during 10 seconds. |

## ECM Terminals and Reference Value

NCEC0113

Specification data are reference values and are measured between each terminal and ground.

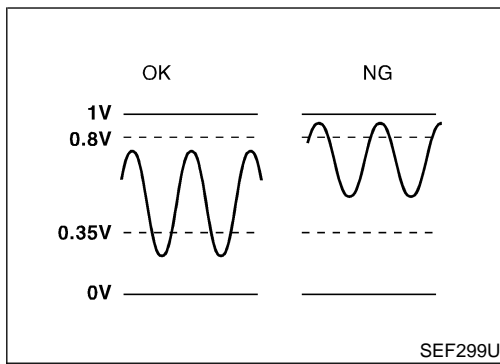
### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-NAL NO. | WIRE COLOR | ITEM                           | CONDITION                                                                                                                                                          | DATA (DC Voltage)                            |
|---------------|------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 62            | W          | Heated oxygen sensor 1 (front) | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>After warming up to normal operating temperature and engine speed is 2,000 rpm</li> </ul> | <p>0 - Approximately 1.0V</p> <p>SEF059V</p> |

# DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

On Board Diagnosis Logic



## On Board Diagnosis Logic

NCEC0114

To judge the malfunction, the output from the heated oxygen sensor 1 (front) is monitored to determine whether the “rich” output is sufficiently high. The “lean” output is sufficiently low. When both the outputs are shifting to the rich side, the malfunction will be detected.

| DTC No. | Malfunction is detected when ...                                                                                                      | Check Items (Possible Cause)                                                                                                                                              |
|---------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0132   | <ul style="list-style-type: none"> <li>The maximum and minimum voltages from the sensor are beyond the specified voltages.</li> </ul> | <ul style="list-style-type: none"> <li>Heated oxygen sensor 1 (front)</li> <li>Heated oxygen sensor 1 heater (front)</li> <li>Fuel pressure</li> <li>Injectors</li> </ul> |

6

|                  |          |
|------------------|----------|
| HO2S1 (B1) P0132 |          |
| OUT OF CONDITION |          |
| MONITOR          |          |
| ENG SPEED        | XXX rpm  |
| B/FUEL SCHDL     | XXX msec |
| THRTL POS SEN    | XXX V    |

SEF653Y

6

|                  |          |
|------------------|----------|
| HO2S1 (B1) P0132 |          |
| TESTING          |          |
| MONITOR          |          |
| ENG SPEED        | XXX rpm  |
| B/FUEL SCHDL     | XXX msec |
| THRTL POS SEN    | XXX V    |

SEF654Y

6

|                  |  |
|------------------|--|
| HO2S1 (B1) P0132 |  |
| COMPLETED        |  |

SEF655Y

## DTC Confirmation Procedure

NCEC0115

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

- Always perform at a temperature above  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

### With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Stop engine and wait at least 10 seconds.
- Turn ignition switch “ON” and select “HO2S1 (B1) P0132” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
- Touch “START”.
- Start engine and let it idle for at least 3.5 minutes.

### NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)

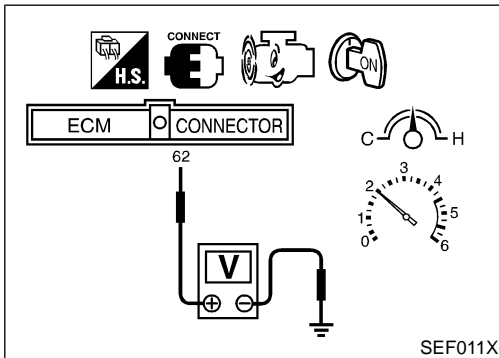
|                |                                                    |
|----------------|----------------------------------------------------|
| ENG SPEED      | 1,900 - 3,100 rpm (A/T)<br>2,000 - 3,100 rpm (M/T) |
| Vehicle speed  | Less than 120 km/h (75 MPH)                        |
| B/FUEL SCHDL   | 4.0 - 12.0 msec (A/T)<br>3.5 - 12.0 msec (M/T)     |
| Selector lever | Suitable position                                  |

# DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

DTC Confirmation Procedure (Cont'd)

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-213.



## Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed. NCEC0116

### With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
  - The maximum voltage is below 0.8V at least one time.
  - The minimum voltage is below 0.35V at least one time.
- 4) If NG, go to "Diagnostic Procedure", EC-213.

# DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)


Diagnostic Procedure

## Diagnostic Procedure

=NCEC0117

|                                                                                                                                                                                                                                     |                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>1</b>                                                                                                                                                                                                                            | <b>RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)</b> |
| <ol style="list-style-type: none"> <li>Turn ignition switch "OFF".</li> <li>Loosen and retighten heated oxygen sensor 1 (front).<br/> <b>Tightening torque:</b><br/> <b>40 - 60 N·m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)</b> </li> </ol> |                                                 |
| ▶                                                                                                                                                                                                                                   | GO TO 2.                                        |

GI  
MA  
EM

| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                              | <b>CLEAR THE SELF-LEARNING DATA</b> |              |  |                    |            |       |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------|--|--------------------|------------|-------|--|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Start engine and warm it up to normal operating temperature.</li> <li>Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.</li> <li>Clear the self-learning control coefficient by touching "CLEAR".</li> </ol> |                                     |              |  |                    |            |       |  |
| <table border="1"> <tr> <th colspan="2">WORK SUPPORT</th> </tr> <tr> <td>SELF-LEARNING CONT</td> <td>B1<br/>100%</td> </tr> <tr> <td colspan="2" style="text-align: center;">CLEAR</td> </tr> </table>                                                                                                                                                                                |                                     | WORK SUPPORT |  | SELF-LEARNING CONT | B1<br>100% | CLEAR |  |
| WORK SUPPORT                                                                                                                                                                                                                                                                                                                                                                          |                                     |              |  |                    |            |       |  |
| SELF-LEARNING CONT                                                                                                                                                                                                                                                                                                                                                                    | B1<br>100%                          |              |  |                    |            |       |  |
| CLEAR                                                                                                                                                                                                                                                                                                                                                                                 |                                     |              |  |                    |            |       |  |
| <p>4. Run engine for at least 10 minutes at idle speed.<br/> <b>Is the 1st trip DTC P0172 detected? Is it difficult to start engine?</b></p>                                                                                                                                                                                                                                          |                                     |              |  |                    |            |       |  |

LC

EC

FE


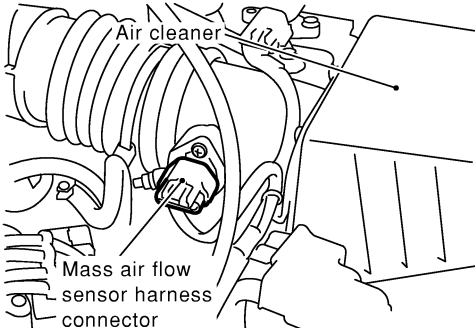
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SEF215Z

AX

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p> <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Start engine and warm it up to normal operating temperature.</li> <li>Turn ignition switch "OFF".</li> <li>Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.</li> </ol>                                                                                          |  |
|                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| <p>4. Stop engine and reconnect mass air flow sensor harness connector.</p> <p>5. Make sure 1st trip DTC P0100 is displayed.</p> <p>6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.</p> <p>7. Make sure DTC P0000 is displayed.</p> <p>8. Run engine for at least 10 minutes at idle speed.<br/> <b>Is the 1st trip DTC P0172 detected? Is it difficult to start engine?</b></p> <p style="text-align: center;"><b>Yes or No</b></p> |  |

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|     |   |                                                           |
|-----|---|-----------------------------------------------------------|
| Yes | ▶ | Perform trouble diagnosis for DTC P0172. Refer to EC-279. |
| No  | ▶ | GO TO 3.                                                  |

IDX

# DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                             |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>3</b>                                                                                                                                                                    | <b>CHECK HARNESS CONNECTOR</b>         |
| 1. Turn ignition switch "OFF".<br>2. Disconnect heated oxygen sensor 1 (front) harness connector.<br>3. Check harness connector for water.<br><b>Water should not exit.</b> |                                        |
| <b>OK or NG</b>                                                                                                                                                             |                                        |
| OK                                                                                                                                                                          | ▶ GO TO 4.                             |
| NG                                                                                                                                                                          | ▶ Repair or replace harness connector. |

|                                          |                                                    |
|------------------------------------------|----------------------------------------------------|
| <b>4</b>                                 | <b>CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)</b> |
| Refer to "Component Inspection", EC-236. |                                                    |
| <b>OK or NG</b>                          |                                                    |
| OK                                       | ▶ GO TO 5.                                         |
| NG                                       | ▶ Replace heated oxygen sensor 1 (front).          |

|                                          |                                             |
|------------------------------------------|---------------------------------------------|
| <b>5</b>                                 | <b>CHECK HEATED OXYGEN SENSOR 1 (FRONT)</b> |
| Refer to "Component Inspection", EC-215. |                                             |
| <b>OK or NG</b>                          |                                             |
| OK                                       | ▶ GO TO 6.                                  |
| NG                                       | ▶ Replace heated oxygen sensor 1 (front).   |

|                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                                      | <b>CHECK SHIELD CIRCUIT</b>                                       |
| 1. Turn ignition switch "OFF".<br>2. Disconnect joint connector-1.<br>3. For circuit, refer to "DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)", EC-199.<br>4. Check the following. <ul style="list-style-type: none"><li>● Continuity between joint connector-1 terminal 2 and ground</li><li>● Joint connector-1<br/>(Refer to EL-314, "HARNESS LAYOUT".)<br/><b>Continuity should exist.</b></li></ul> |                                                                   |
| 5. Also check harness for short to power.<br>6. Then reconnect joint connector-1.                                                                                                                                                                                                                                                                                                                             |                                                                   |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                               |                                                                   |
| OK                                                                                                                                                                                                                                                                                                                                                                                                            | ▶ GO TO 7.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                                                                            | ▶ Repair open circuit or short to power in harness or connectors. |

|                                                                                                                   |                                    |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>7</b>                                                                                                          | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.<br>Refer to "Wiring Diagram", EC-199, for circuit. |                                    |
|                                                                                                                   | ▶ <b>INSPECTION END</b>            |

# DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

Component Inspection

| DATA MONITOR    |         |
|-----------------|---------|
| MONITOR         | NO DTC  |
| ENG SPEED       | XXX rpm |
| MAS A/F SE-B1   | XXX V   |
| COOLAN TEMP/S   | XXX °C  |
| HO2S1 (B1)      | XXX V   |
| HO2S1 MNTR (B1) | LEAN    |

SEF646Y

cycle | 1 | 2 | 3 | 4 | 5 |  
 HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R

R means HO2S1 MNTR (B1) indicates RICH  
 L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA

## Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

NCEC0118

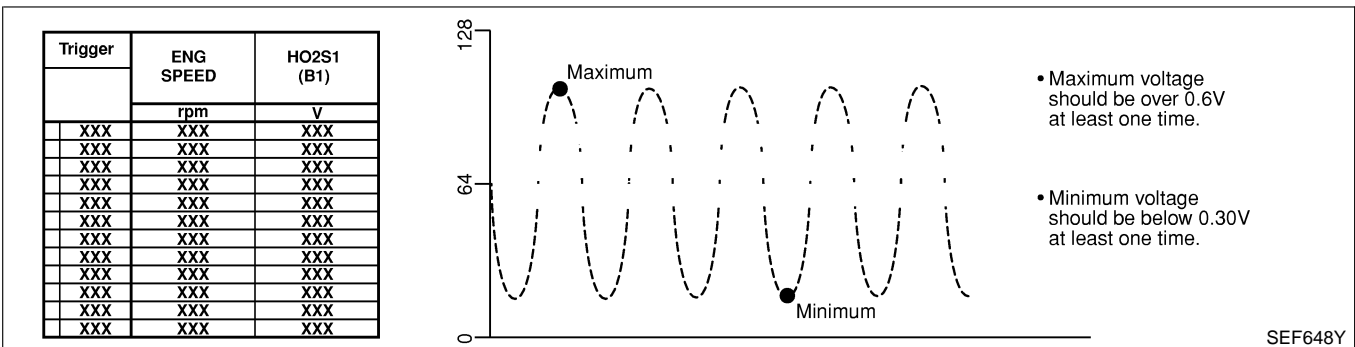
NCEC0118S02

### With CONSULT-II

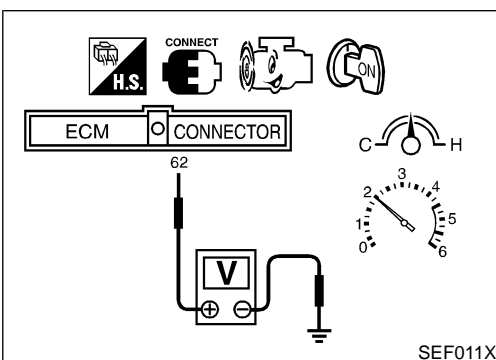
- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown below:  
 R = "HO2S1 MNTR (B1)", "RICH"  
 L = "HO2S1 MNTR (B1)", "LEAN"
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.

### CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



SEF648Y



SEF011X

### Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
  - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times when 10 seconds.  
 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V  
 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

GI  
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 AT  
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 EL  
 IDX

## DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

*Component Inspection (Cont'd)*

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- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

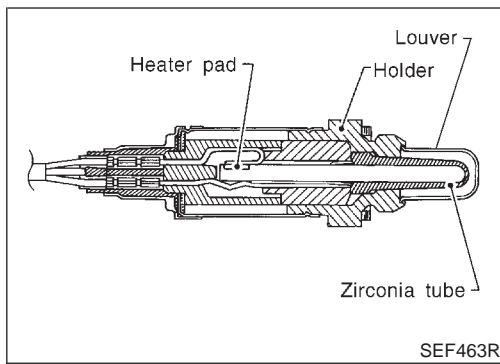
**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



# DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

Component Description

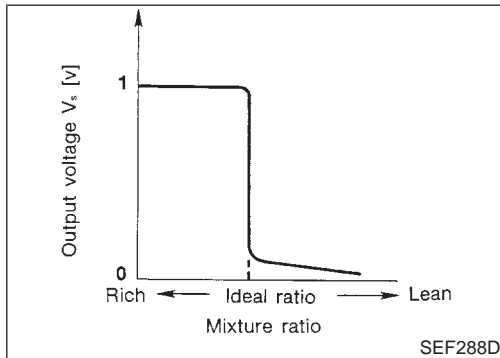


SEF463R

## Component Description

NCEC0119

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



SEF288D

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0120

Specification data are reference values.

| MONITOR ITEM    | CONDITION                                                                                                        | SPECIFICATION                                               |
|-----------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| HO2S1 (B1)      |                                                                                                                  | 0 - 0.3V ↔ Approx. 0.6 - 1.0V                               |
| HO2S1 MNTR (B1) | <ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> Maintaining engine speed at 2,000 rpm | LEAN ↔ RICH<br>Changes more than 5 times during 10 seconds. |

## ECM Terminals and Reference Value

NCEC0121

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

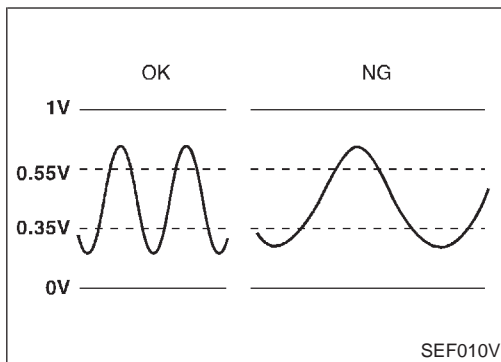
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-NAL NO. | WIRE COLOR | ITEM                           | CONDITION                                                                                                                                               | DATA (DC Voltage)          |
|---------------|------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 62            | W          | Heated oxygen sensor 1 (front) | [Engine is running]<br><ul style="list-style-type: none"> <li>After warming up to normal operating temperature and engine speed is 2,000 rpm</li> </ul> | 0 - Approximately 1.0V<br> |

SEF059V

# DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

On Board Diagnosis Logic



## On Board Diagnosis Logic

NCEC0122

To judge the malfunction of heated oxygen sensor 1 (front), this diagnosis measures response time of heated oxygen sensor 1 (front) signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 (front) temperature index. Judgment is based on whether the compensated time [heated oxygen sensor 1 (front) cycling time index] is inordinately long or not.

| DTC No. | Malfunction is detected when ...                                                                                                         | Check Items (Possible Cause)                                                                                                                                                                                                                                                                                                                      |
|---------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0133   | <ul style="list-style-type: none"> <li>The response of the voltage signal from the sensor takes more than the specified time.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Heated oxygen sensor 1 (front)</li> <li>Heated oxygen sensor 1 heater (front)</li> <li>Fuel pressure</li> <li>Injectors</li> <li>Intake air leaks</li> <li>Exhaust gas leaks</li> <li>PCV</li> <li>Mass air flow sensor</li> </ul> |

6 HO2S1 (B1) P0133

OUT OF CONDITION

MONITOR

|               |          |
|---------------|----------|
| ENG SPEED     | XXX rpm  |
| B/FUEL SCHDL  | XXX msec |
| THRTL POS SEN | XXX V    |

SEF656Y

6 HO2S1 (B1) P0133

TESTING

MONITOR

|               |          |
|---------------|----------|
| ENG SPEED     | XXX rpm  |
| B/FUEL SCHDL  | XXX msec |
| THRTL POS SEN | XXX V    |

SEF657Y

6 HO2S1 (B1) P0133

COMPLETED

SEF658Y

## DTC Confirmation Procedure

NCEC0123

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

- Always perform at a temperature above  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

### With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Stop engine and wait at least 10 seconds.
- Turn ignition switch "ON" and select "HO2S1 (B1) P0133" of "HO2S1" in "DTC WORK SUPPORT" mode with CONSULT-II.
- Touch "START".
- Start engine and let it idle for at least 3.5 minutes.

### NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 50 seconds.)

|                |                                                    |
|----------------|----------------------------------------------------|
| ENG SPEED      | 1,900 - 3,100 rpm (A/T)<br>2,000 - 3,100 rpm (M/T) |
| Vehicle speed  | More than 80 km/h (50 MPH)                         |
| B/FUEL SCHDL   | 4.0 - 12.0 msec (A/T)<br>3.5 - 12.0 msec (M/T)     |
| Selector lever | Suitable position                                  |

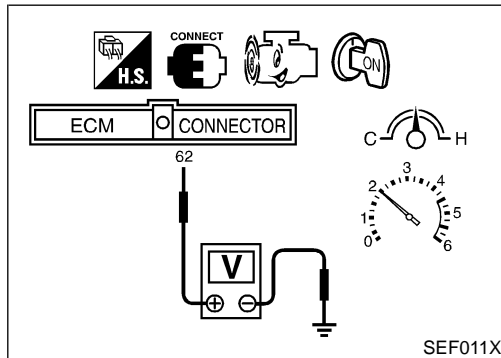
# DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

DTC Confirmation Procedure (Cont'd)

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-221.

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IDX



## Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed.

NCEC0124

### With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
  - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than five times within 10 seconds.  
**1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**  
**2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**
- 4) If NG, go to "Diagnostic Procedure", EC-221.

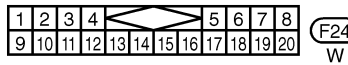
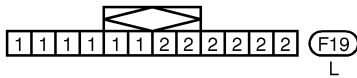
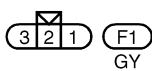
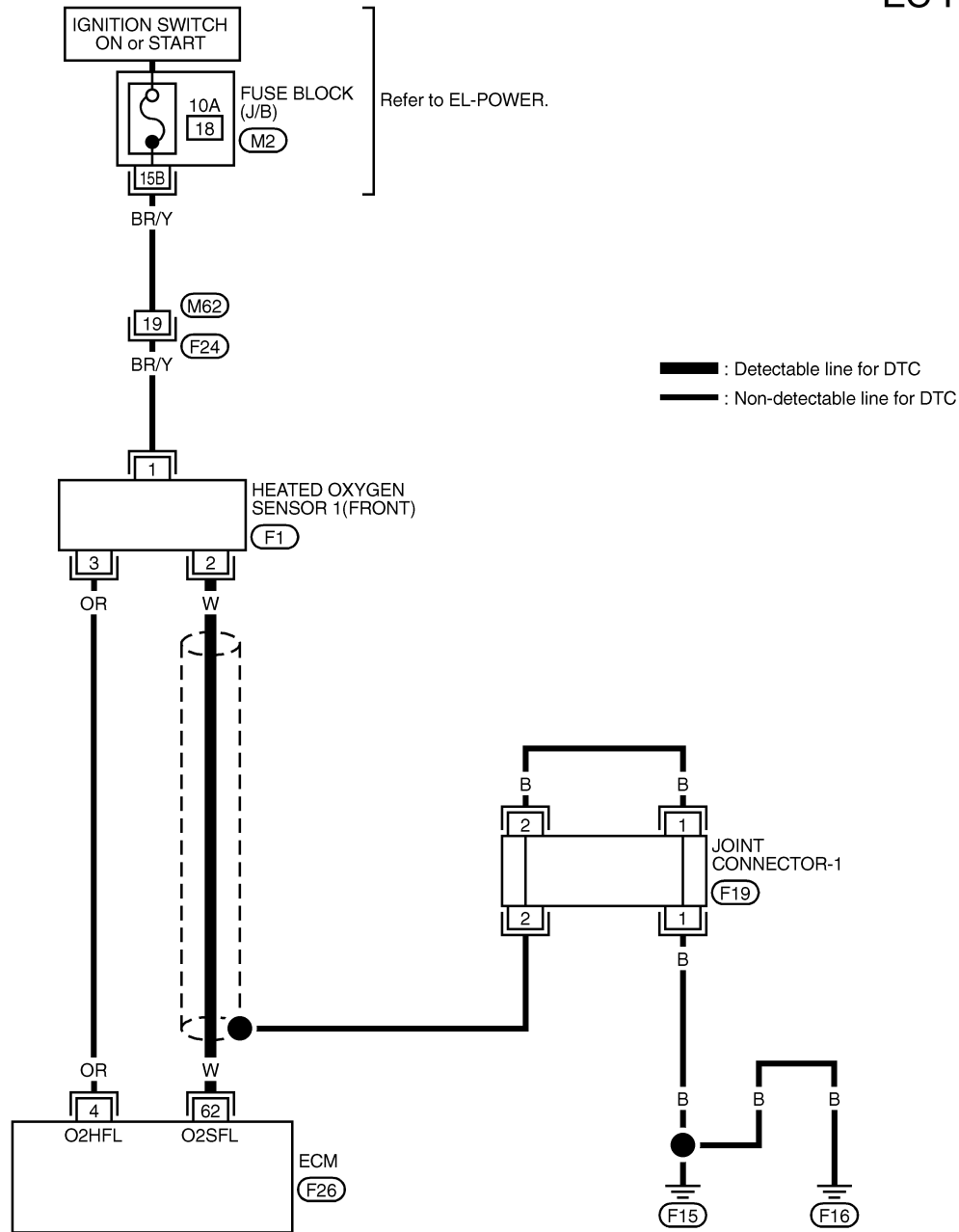
# DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

Wiring Diagram

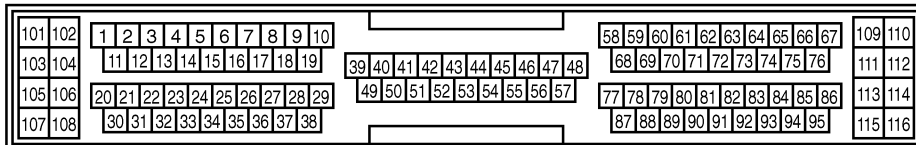
## Wiring Diagram

NCEC0125

EC-HO2S1-01



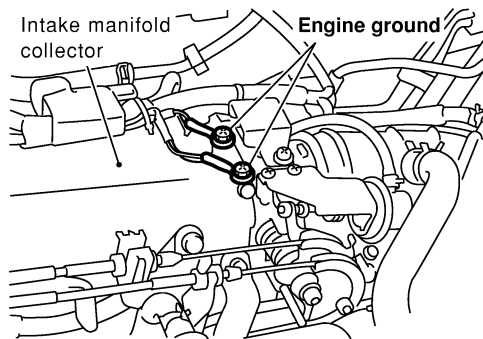
REFER TO THE FOLLOWING.  
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)



TEC778

## Diagnostic Procedure

NCEC0126

|                                                                                         |                                |
|-----------------------------------------------------------------------------------------|--------------------------------|
| <b>1</b>                                                                                | <b>RETIGHTEN GROUND SCREWS</b> |
| <p>1. Turn ignition switch "OFF".<br/>2. Loosen and retighten engine ground screws.</p> |                                |
|       |                                |
| SEF839X                                                                                 |                                |
| ▶ GO TO 2.                                                                              |                                |

GI

MA

EM

LC

**EC**

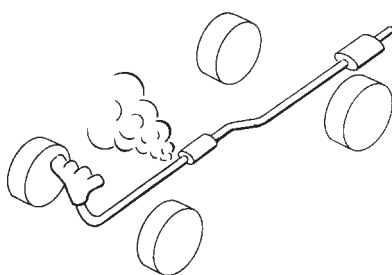
FE

CL

|                                                                                                                                              |                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>2</b>                                                                                                                                     | <b>RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)</b> |
| <p>Loosen and retighten front heated oxygen sensor.<br/><b>Tightening torque:</b><br/><b>40 - 60 N·m (4.1 - 6.1 kg·m, 30 - 44 ft·lb)</b></p> |                                                 |
| ▶ GO TO 3.                                                                                                                                   |                                                 |

MT

AT

|                                                                                                             |                               |
|-------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>3</b>                                                                                                    | <b>CHECK EXHAUST AIR LEAK</b> |
| <p>1. Start engine and run it at idle.<br/>2. Listen for an exhaust air leak before three way catalyst.</p> |                               |
|                          |                               |
| OK or NG                                                                                                    |                               |
| OK                                                                                                          | ▶ GO TO 4.                    |
| NG                                                                                                          | ▶ Repair or replace.          |

AX

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RS

BT

HA

|                                                                      |                                  |
|----------------------------------------------------------------------|----------------------------------|
| <b>4</b>                                                             | <b>CHECK FOR INTAKE AIR LEAK</b> |
| <p>Listen for an intake air leak after the mass air flow sensor.</p> |                                  |
| OK or NG                                                             |                                  |
| OK                                                                   | ▶ GO TO 5.                       |
| NG                                                                   | ▶ Repair or replace.             |


SC


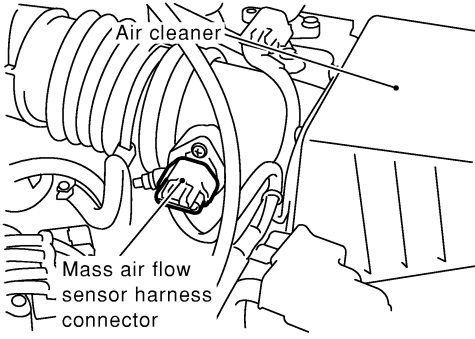
EL

IDX

# DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

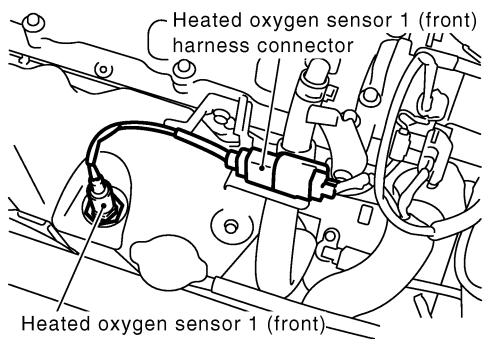
Diagnostic Procedure (Cont'd)

| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>CLEAR THE SELF-LEARNING DATA</b> |              |  |                    |            |  |  |       |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------|--|--------------------|------------|--|--|-------|--|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Start engine and warm it up to normal operating temperature.</li> <li>2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.</li> <li>3. Clear the self-learning control coefficient by touching "CLEAR".</li> </ol> <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse;"> <tr> <th colspan="2" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px;">B1<br/>100%</td> </tr> <tr> <td colspan="2" style="height: 150px;"></td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 2px;">CLEAR</td> </tr> </table> </div> <p style="text-align: right; margin-right: 20px;">SEF215Z</p> <ol style="list-style-type: none"> <li>4. Run engine for at least 10 minutes at idle speed.</li> </ol> <p style="text-align: center;"><b>Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?</b></p> |                                     | WORK SUPPORT |  | SELF-LEARNING CONT | B1<br>100% |  |  | CLEAR |  |
| WORK SUPPORT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                     |              |  |                    |            |  |  |       |  |
| SELF-LEARNING CONT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | B1<br>100%                          |              |  |                    |            |  |  |       |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                     |              |  |                    |            |  |  |       |  |
| CLEAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                     |              |  |                    |            |  |  |       |  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |                                                                       |   |                                                                       |    |   |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------------|---|-----------------------------------------------------------------------|----|---|----------|
| <p> <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Start engine and warm it up to normal operating temperature.</li> <li>2. Turn ignition switch "OFF".</li> <li>3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.</li> </ol> <div style="text-align: center; margin: 10px 0;">  </div> <p style="text-align: right; margin-right: 20px;">SEF840X</p> <ol style="list-style-type: none"> <li>4. Stop engine and reconnect mass air flow sensor harness connector.</li> <li>5. Make sure 1st trip DTC P0100 is displayed.</li> <li>6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.</li> <li>7. Make sure DTC P0000 is displayed.</li> <li>8. Run engine for at least 10 minutes at idle speed.</li> </ol> <p style="text-align: center;"><b>Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?</b></p> <p style="text-align: center;"><b>Yes or No</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; padding: 5px;">Yes</td> <td style="width: 5%; text-align: center; padding: 5px;">▶</td> <td style="padding: 5px;">Perform trouble diagnosis for DTC P0171, P0172. Refer to EC-272, 279.</td> </tr> <tr> <td style="padding: 5px;">No</td> <td style="text-align: center; padding: 5px;">▶</td> <td style="padding: 5px;">GO TO 6.</td> </tr> </table> |   | Yes                                                                   | ▶ | Perform trouble diagnosis for DTC P0171, P0172. Refer to EC-272, 279. | No | ▶ | GO TO 6. |
| Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ | Perform trouble diagnosis for DTC P0171, P0172. Refer to EC-272, 279. |   |                                                                       |    |   |          |
| No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ | GO TO 6.                                                              |   |                                                                       |    |   |          |

# DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

Diagnostic Procedure (Cont'd)

|          |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                        |   |          |    |   |                                                                                    |  |
|----------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---|----------|----|---|------------------------------------------------------------------------------------|--|
| <b>6</b> | <b>CHECK INPUT SIGNAL CIRCUIT</b> |                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                        |   |          |    |   |                                                                                    |  |
|          |                                   | <p>1. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.</p>  <p style="text-align: right;">SEF917Z</p>                                                                                                                                                                                           | <p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p><b>EC</b></p> <p>FE</p> <p>CL</p> <p>MT</p> |   |          |    |   |                                                                                    |  |
|          |                                   | <p>2. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>3. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should not exist.</b></p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                        |   |          |    |   |                                                                                    |  |
|          |                                   | <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 7.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>                                                                                                                           | OK                                                                                     | ▶ | GO TO 7. | NG | ▶ | Repair open circuit or short to ground or short to power in harness or connectors. |  |
| OK       | ▶                                 | GO TO 7.                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                        |   |          |    |   |                                                                                    |  |
| NG       | ▶                                 | Repair open circuit or short to ground or short to power in harness or connectors.                                                                                                                                                                                                                                                                                                                                      |                                                                                        |   |          |    |   |                                                                                    |  |

|          |                                                    |                                                                                                                                                                                                                                                    |           |   |          |    |   |                                         |           |
|----------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---|----------|----|---|-----------------------------------------|-----------|
| <b>7</b> | <b>CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)</b> |                                                                                                                                                                                                                                                    |           |   |          |    |   |                                         |           |
|          |                                                    | Refer to "Component Inspection", EC-236. <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                        | <p>AX</p> |   |          |    |   |                                         |           |
|          |                                                    | <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 8.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Replace heated oxygen sensor 1 (front).</td> </tr> </table> | OK        | ▶ | GO TO 8. | NG | ▶ | Replace heated oxygen sensor 1 (front). | <p>SU</p> |
| OK       | ▶                                                  | GO TO 8.                                                                                                                                                                                                                                           |           |   |          |    |   |                                         |           |
| NG       | ▶                                                  | Replace heated oxygen sensor 1 (front).                                                                                                                                                                                                            |           |   |          |    |   |                                         |           |

|          |                                             |                                                                                                                                                                                                                                                    |                     |   |          |    |   |                                         |           |
|----------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---|----------|----|---|-----------------------------------------|-----------|
| <b>8</b> | <b>CHECK HEATED OXYGEN SENSOR 1 (FRONT)</b> |                                                                                                                                                                                                                                                    |                     |   |          |    |   |                                         |           |
|          |                                             | Refer to "Component Inspection", EC-224. <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                        | <p>BR</p> <p>ST</p> |   |          |    |   |                                         |           |
|          |                                             | <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 9.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Replace heated oxygen sensor 1 (front).</td> </tr> </table> | OK                  | ▶ | GO TO 9. | NG | ▶ | Replace heated oxygen sensor 1 (front). | <p>RS</p> |
| OK       | ▶                                           | GO TO 9.                                                                                                                                                                                                                                           |                     |   |          |    |   |                                         |           |
| NG       | ▶                                           | Replace heated oxygen sensor 1 (front).                                                                                                                                                                                                            |                     |   |          |    |   |                                         |           |

|          |                                   |                                                                                                                                                                                                                                           |                     |   |           |    |   |                               |           |
|----------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---|-----------|----|---|-------------------------------|-----------|
| <b>9</b> | <b>CHECK MASS AIR FLOW SENSOR</b> |                                                                                                                                                                                                                                           |                     |   |           |    |   |                               |           |
|          |                                   | Refer to "Component Inspection", EC-162. <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                               | <p>BT</p> <p>HA</p> |   |           |    |   |                               |           |
|          |                                   | <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 10.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Replace mass air flow sensor.</td> </tr> </table> | OK                  | ▶ | GO TO 10. | NG | ▶ | Replace mass air flow sensor. | <p>SC</p> |
| OK       | ▶                                 | GO TO 10.                                                                                                                                                                                                                                 |                     |   |           |    |   |                               |           |
| NG       | ▶                                 | Replace mass air flow sensor.                                                                                                                                                                                                             |                     |   |           |    |   |                               |           |

|           |                        |                                                                                                                                                                                                                                          |                      |   |           |    |   |                              |  |
|-----------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---|-----------|----|---|------------------------------|--|
| <b>10</b> | <b>CHECK PCV VALVE</b> |                                                                                                                                                                                                                                          |                      |   |           |    |   |                              |  |
|           |                        | Refer to "Positive Crankcase Ventilation", EC-49. <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                     | <p>EL</p> <p>IDX</p> |   |           |    |   |                              |  |
|           |                        | <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 11.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair or replace PCV valve.</td> </tr> </table> | OK                   | ▶ | GO TO 11. | NG | ▶ | Repair or replace PCV valve. |  |
| OK        | ▶                      | GO TO 11.                                                                                                                                                                                                                                |                      |   |           |    |   |                              |  |
| NG        | ▶                      | Repair or replace PCV valve.                                                                                                                                                                                                             |                      |   |           |    |   |                              |  |

# DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|
| <b>11</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>CHECK SHIELD CIRCUIT</b> |                                                                 |
| <p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect joint connector-1.</p> <p>3. Check the following.</p> <ul style="list-style-type: none"> <li>● Continuity between joint connector-1 terminal 2 and ground<br/>Refer to Wiring Diagram.</li> <li>● Joint connector-1<br/>(Refer to EL-314, "HARNESS LAYOUT".)<br/><b>Continuity should exist.</b></li> </ul> <p>4. Also check harness for short to power.</p> <p>5. Then reconnect joint connector.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                             |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                           | GO TO 12.                                                       |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                           | Repair open circuit or short to power in harness or connectors. |

|                                                                |                                    |                       |
|----------------------------------------------------------------|------------------------------------|-----------------------|
| <b>12</b>                                                      | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                       |
|                                                                | ▶                                  | <b>INSPECTION END</b> |

| DATA MONITOR    |         |
|-----------------|---------|
| MONITOR         | NO DTC  |
| ENG SPEED       | XXX rpm |
| MAS A/F SE-B1   | XXX V   |
| COOLAN TEMP/S   | XXX °C  |
| HO2S1 (B1)      | XXX V   |
| HO2S1 MNTR (B1) | LEAN    |

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|                                                                                  |
|----------------------------------------------------------------------------------|
| cycle      1   2   3   4   5  <br>HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R          |
| R means HO2S1 MNTR (B1) indicates RICH<br>L means HO2S1 MNTR (B1) indicates LEAN |

SEF217YA

## Component Inspection

### HEATED OXYGEN SENSOR 1 (FRONT)

NCEC0127

NCEC0127S02

#### Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" five times in 10 seconds.  
5 times (cycles) are counted as shown below:  
R = "HO2S1 MNTR (B1)", "RICH"  
L = "HO2S1 MNTR (B1)", "LEAN"
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.

#### CAUTION:

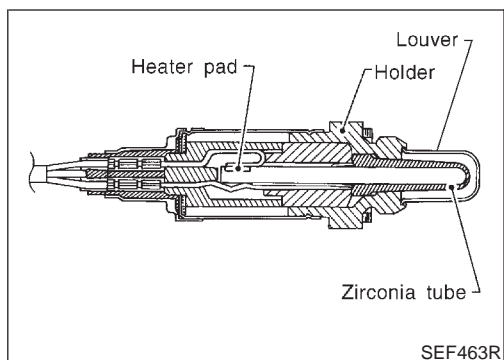
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.





# DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

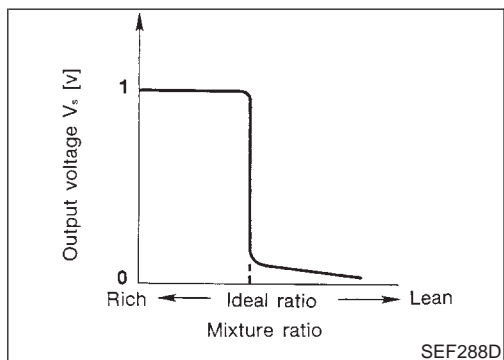
## Component Description



## Component Description

NCEC0128

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



## CONSULT-II Reference Value in Data Monitor Mode

NCEC0129

Specification data are reference values.

| MONITOR ITEM    | CONDITION                                                                  |                                       | SPECIFICATION                                               |
|-----------------|----------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------|
| HO2S1 (B1)      |                                                                            |                                       | 0 - 0.3V ↔ Approx. 0.6 - 1.0V                               |
| HO2S1 MNTR (B1) | <ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> | Maintaining engine speed at 2,000 rpm | LEAN ↔ RICH<br>Changes more than 5 times during 10 seconds. |

## ECM Terminals and Reference Value

NCEC0130

Specification data are reference values and are measured between each terminal and ground.

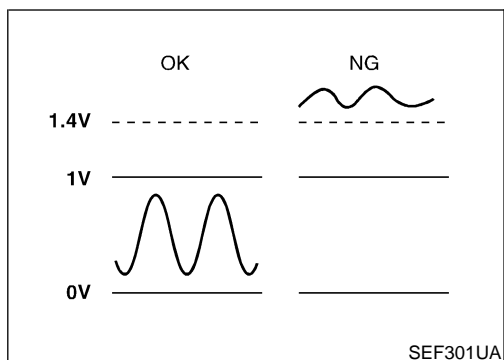
### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-NAL NO. | WIRE COLOR | ITEM                           | CONDITION                                                                                                                                                          | DATA (DC Voltage)                            |
|---------------|------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 62            | W          | Heated oxygen sensor 1 (front) | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>After warming up to normal operating temperature and engine speed is 2,000 rpm</li> </ul> | <p>0 - Approximately 1.0V</p> <p>SEF059V</p> |

# DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

On Board Diagnosis Logic

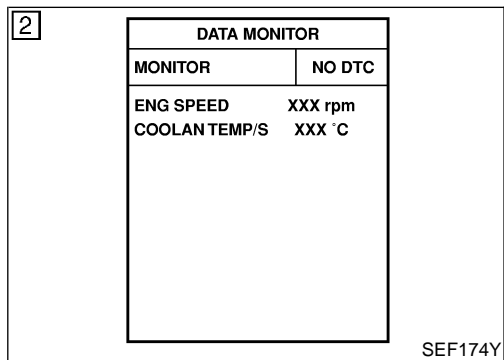


## On Board Diagnosis Logic

NCEC0131

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 (front) output is not inordinately high.

| DTC No. | Malfunction is detected when ...                                                                              | Check Items (Possible Cause)                                                                                                                             |
|---------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0134   | <ul style="list-style-type: none"> <li>An excessively high voltage from the sensor is sent to ECM.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Heated oxygen sensor 1 (front)</li> </ul> |



## DTC Confirmation Procedure

NCEC0132

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Restart engine and let it idle for 2 minutes.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-229.

### Ⓜ With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Restart engine and let it idle for 2 minutes.
- 4) Turn ignition switch "OFF" and wait at least 10 seconds.
- 5) Restart engine and let it idle for 2 minutes.
- 6) Select "MODE 3" with GST.
- 7) If DTC is detected, go to "Diagnostic Procedure", EC-229.

- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

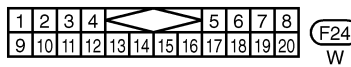
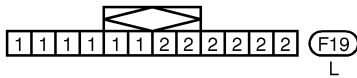
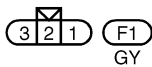
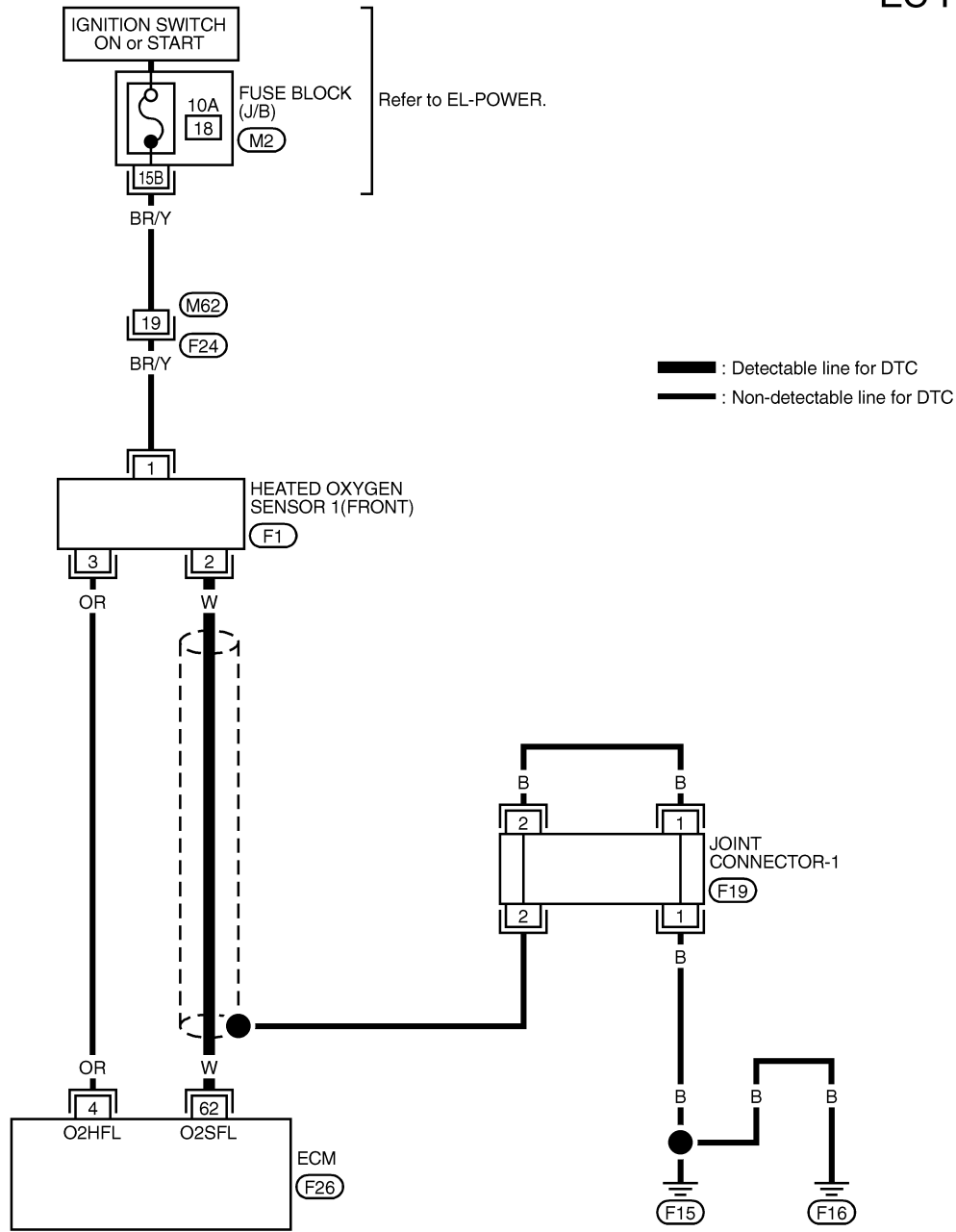
# DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

Wiring Diagram

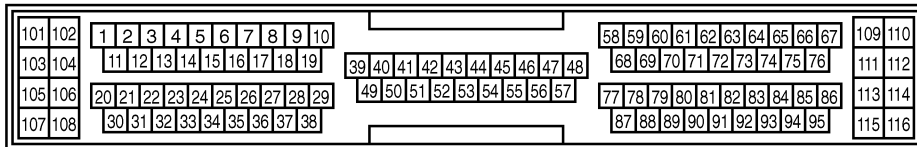
## Wiring Diagram

NCEC0133

EC-HO2S1-01



REFER TO THE FOLLOWING.  
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)



TEC778

# DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

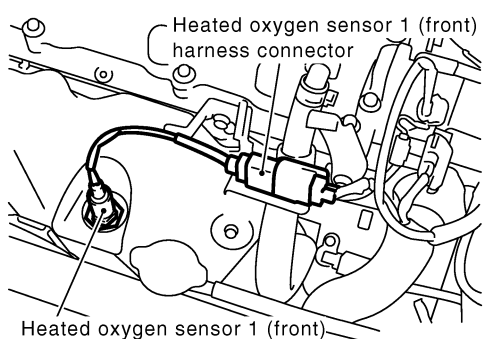
Diagnostic Procedure

## Diagnostic Procedure

NCEC0134

|                                                                                                                                         |                                                 |          |  |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------|--|
| <b>1</b>                                                                                                                                | <b>RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)</b> |          |  |
| Loosen and retighten heated oxygen sensor 1 (front).<br><b>Tightening torque:</b><br><b>40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)</b> |                                                 |          |  |
| ▶                                                                                                                                       |                                                 | GO TO 2. |  |

GI  
MA  
EM

|                                                                                                                                                          |                                   |                                                                                    |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------|--|
| <b>2</b>                                                                                                                                                 | <b>CHECK INPUT SIGNAL CIRCUIT</b> |                                                                                    |  |
| 1. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.                                                                |                                   |                                                                                    |  |
|                                                                        |                                   |                                                                                    |  |
| SEF917Z                                                                                                                                                  |                                   |                                                                                    |  |
| 2. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2.<br>Refer to Wiring Diagram.<br><b>Continuity should exist.</b>                 |                                   |                                                                                    |  |
| 3. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground.<br>Refer to Wiring Diagram.<br><b>Continuity should not exist.</b> |                                   |                                                                                    |  |
| 4. Also check harness for short to power.                                                                                                                |                                   |                                                                                    |  |
| <b>OK or NG</b>                                                                                                                                          |                                   |                                                                                    |  |
| OK ▶                                                                                                                                                     |                                   | GO TO 3.                                                                           |  |
| NG ▶                                                                                                                                                     |                                   | Repair open circuit or short to ground or short to power in harness or connectors. |  |

EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR

|                                                                                                     |                                |                                      |  |
|-----------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------|--|
| <b>3</b>                                                                                            | <b>CHECK HARNESS CONNECTOR</b> |                                      |  |
| Check heated oxygen sensor 1 (front) harness connector for water.<br><b>Water should not exist.</b> |                                |                                      |  |
| <b>OK or NG</b>                                                                                     |                                |                                      |  |
| OK ▶                                                                                                |                                | GO TO 4.                             |  |
| NG ▶                                                                                                |                                | Repair or replace harness connector. |  |

ST  
RS  
BT

|                                          |                                             |                                         |  |
|------------------------------------------|---------------------------------------------|-----------------------------------------|--|
| <b>4</b>                                 | <b>CHECK HEATED OXYGEN SENSOR 1 (FRONT)</b> |                                         |  |
| Refer to "Component Inspection", EC-230. |                                             |                                         |  |
| <b>OK or NG</b>                          |                                             |                                         |  |
| OK ▶                                     |                                             | GO TO 5.                                |  |
| NG ▶                                     |                                             | Replace heated oxygen sensor 1 (front). |  |

HA  
SC  
EL

IDX

# DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>CHECK SHIELD CIRCUIT</b> |                                                                 |
| 1. Turn ignition switch "OFF".<br>2. Disconnect joint connector-1.<br>3. Check the following. <ul style="list-style-type: none"> <li>● Continuity between joint connector-1 terminal 2 and ground<br/>Refer to Wiring Diagram.</li> <li>● Joint connector-1<br/>(Refer to EL-314, "HARNES LAYOUT".)<br/><b>Continuity should exist.</b></li> </ul> 4. Also check harness for short to power. Then reconnect joint connector. |                             |                                                                 |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                              |                             |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                           | ▶                           | GO TO 6.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                           | ▶                           | Repair open circuit or short to power in harness or connectors. |

|                                                                |                                    |                       |
|----------------------------------------------------------------|------------------------------------|-----------------------|
| <b>6</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                       |
| ▶                                                              |                                    | <b>INSPECTION END</b> |

| DATA MONITOR    |         |
|-----------------|---------|
| MONITOR         | NO DTC  |
| ENG SPEED       | XXX rpm |
| MAS A/F SE-B1   | XXX V   |
| COOLAN TEMP/S   | XXX °C  |
| HO2S1 (B1)      | XXX V   |
| HO2S1 MNTR (B1) | LEAN    |

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|                                                                                  |
|----------------------------------------------------------------------------------|
| cycle      1   2   3   4   5  <br>HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R          |
| R means HO2S1 MNTR (B1) indicates RICH<br>L means HO2S1 MNTR (B1) indicates LEAN |

SEF217YA

## Component Inspection

### HEATED OXYGEN SENSOR 1 (FRONT)

NCEC0135

NCEC0135S01

#### Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" five times in 10 seconds.  
5 times (cycles) are counted as shown below:  
R = "HO2S1 MNTR (B1)", "RICH"  
L = "HO2S1 MNTR (B1)", "LEAN"
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.

#### CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



# DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT)

Description

## Description

NCEC0136

### SYSTEM DESCRIPTION

NCEC0136S01

| Sensor                   | Input Signal to ECM | ECM function                                  | Actuator                              |
|--------------------------|---------------------|-----------------------------------------------|---------------------------------------|
| Camshaft position sensor | Engine speed        | Heated oxygen sensor 1 heater (front) control | Heated oxygen sensor 1 heater (front) |

The ECM performs ON/OFF control of the heated oxygen sensor 1 heater (front) corresponding to the engine operating condition.

### OPERATION

NCEC0136S02

| Engine speed    | Front heated oxygen sensor heater |
|-----------------|-----------------------------------|
| Above 3,200 rpm | OFF                               |
| Below 3,200 rpm | ON                                |

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0137

Specification data are reference values.

| MONITOR ITEM   | CONDITION                       | SPECIFICATION |
|----------------|---------------------------------|---------------|
| HO2S1 HTR (B1) | ● Engine speed: Below 3,200 rpm | ON            |
|                | ● Engine speed: Above 3,200 rpm | OFF           |

## ECM Terminals and Reference Value

NCEC0138

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TER-MINAL NO. | WIRE COLOR | ITEM                                  | CONDITION                                                 | DATA (DC Voltage)          |
|---------------|------------|---------------------------------------|-----------------------------------------------------------|----------------------------|
| 4             | OR         | Heated oxygen sensor 1 heater (front) | [Engine is running]<br>● Engine speed is below 3,200 rpm. | Approximately 0V           |
|               |            |                                       | [Engine is running]<br>● Engine speed is above 3,200 rpm. | BATTERY VOLTAGE (11 - 14V) |

## On Board Diagnosis Logic

NCEC0139

| DTC No. | Malfunction is detected when ...                                                                                                                                                                                                                            | Check Items (Possible Cause)                                                                                                                                                                   |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0135   | <ul style="list-style-type: none"> <li>The current amperage in the heated oxygen sensor 1 heater (front) circuit is out of the normal range. [An improper voltage drop signal is sent to ECM through the heated oxygen sensor 1 heater (front).]</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors [The heated oxygen sensor 1 heater (front) circuit is open or shorted.]</li> <li>Heated oxygen sensor 1 heater (front)</li> </ul> |



## DTC Confirmation Procedure

NCEC0140

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.

2

| DATA MONITOR |         |
|--------------|---------|
| MONITOR      | NO DTC  |
| ENG SPEED    | XXX rpm |

SEF058Y

### With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 6 seconds at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-235.

### With GST

- 1) Start engine and run it for at least 6 seconds at idle speed.
  - 2) Turn ignition switch "OFF" and wait at least 10 seconds.
  - 3) Start engine and run it for at least 6 seconds at idle speed.
  - 4) Select "MODE 3" with GST.
  - 5) If DTC is detected, go to "Diagnostic Procedure", EC-235.
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

GI

MA

EM

LC

EC

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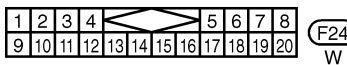
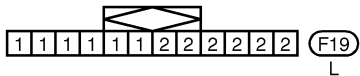
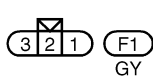
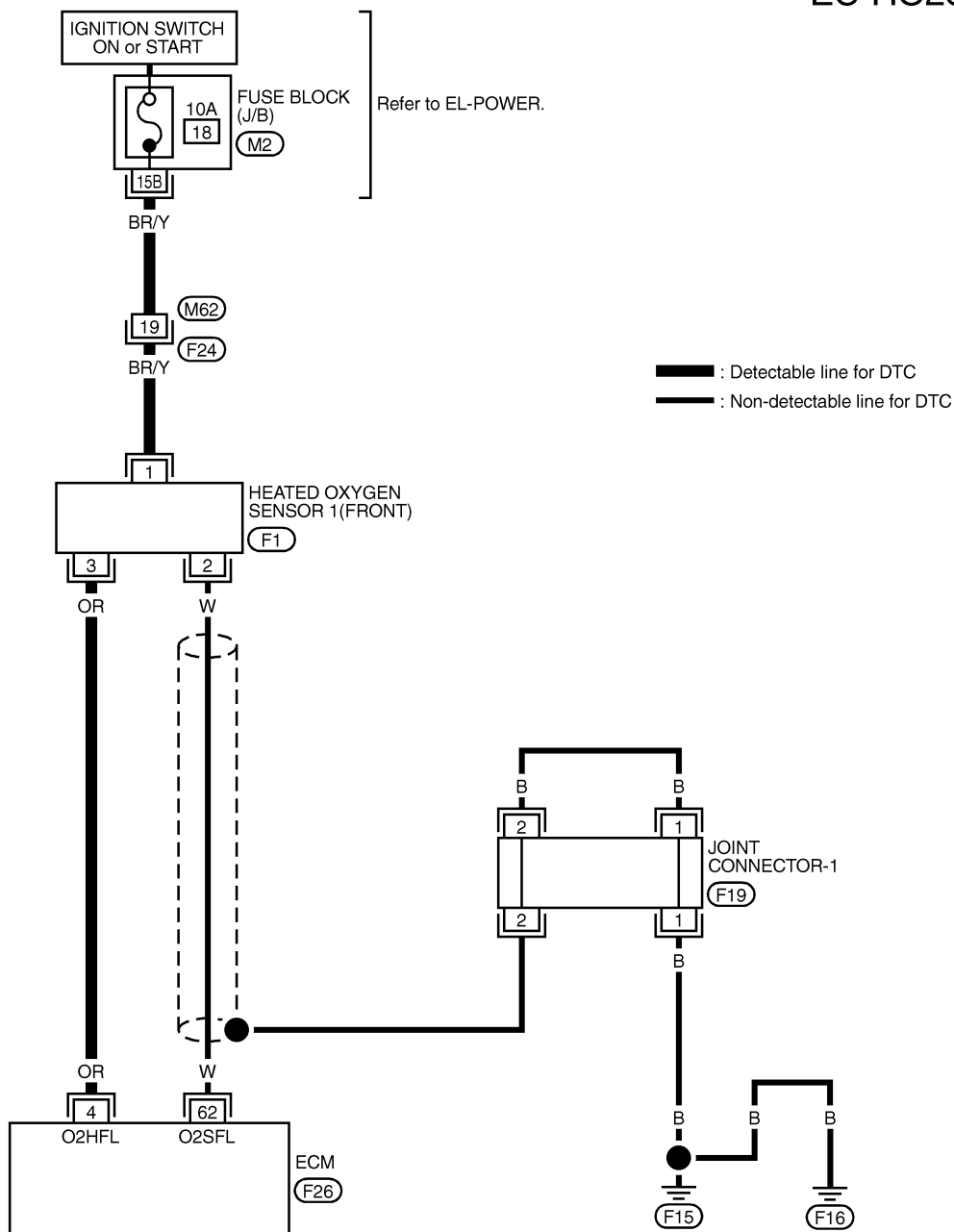
# DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT)

Wiring Diagram

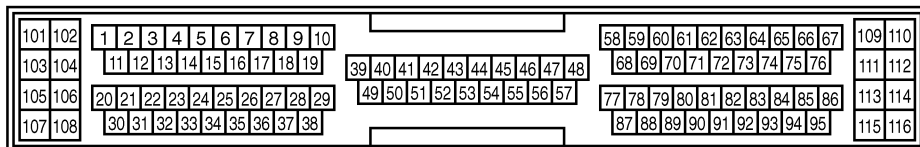
## Wiring Diagram

NCEC0141

EC-HO2S1H-01



REFER TO THE FOLLOWING.  
(M2) - FUSE BLOCK-JUNCTION BOX (J/B)



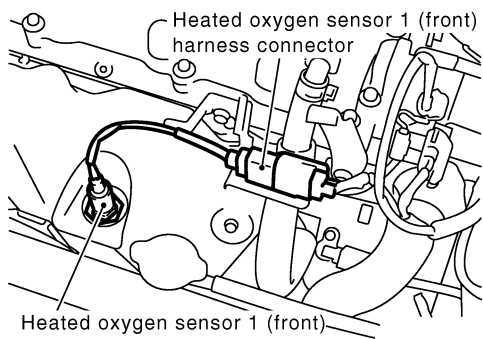
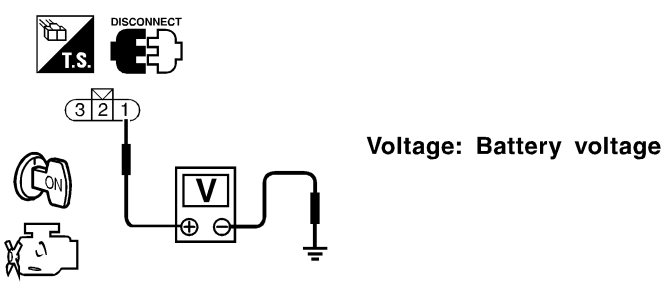
TEC779

# DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0142

|          |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                      |
|----------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | <b>CHECK POWER SUPPLY</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                      |
|          |                           | <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Disconnect heated oxygen sensor 1 (front) harness connector.</li> </ol>  <ol style="list-style-type: none"> <li>3. Turn ignition switch "ON".</li> <li>4. Check voltage between HO2S1 terminal 1 and ground with CONSULT-II or tester.</li> </ol>  <p style="text-align: center;"><b>OK or NG</b></p> | <p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p><b>EC</b></p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> |
|          | OK                        | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | GO TO 3.                                                                                                             |
|          | NG                        | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | GO TO 2.                                                                                                             |

SEF917Z

SEF934X

|          |                                   |                                                                                                                                                                                                                                                                                                                                  |                               |
|----------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>2</b> | <b>DETECT MALFUNCTIONING PART</b> |                                                                                                                                                                                                                                                                                                                                  |                               |
|          |                                   | <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M62, F24</li> <li>● Fuse block (J/B) connector M2</li> <li>● 10A fuse</li> <li>● Harness for open or short between heated oxygen sensor 1 (front) and fuse</li> </ul> <p style="text-align: center;">▶ Repair harness or connectors.</p> | <p>ST</p> <p>RS</p> <p>BT</p> |

|          |                                    |                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                    |
|----------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>3</b> | <b>CHECK OUTPUT SIGNAL CIRCUIT</b> |                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                    |
|          |                                    | <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Disconnect ECM harness connector.</li> <li>3. Check harness continuity between HO2S1 terminal 3 and ECM terminal 4.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>4. Also check harness for short to ground and short to power.</li> </ol> <p style="text-align: center;"><b>OK or NG</b></p> | <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>                                           |
|          | OK                                 | ▶                                                                                                                                                                                                                                                                                                                                                                                                           | GO TO 4.                                                                           |
|          | NG                                 | ▶                                                                                                                                                                                                                                                                                                                                                                                                           | Repair open circuit or short to ground or short to power in harness or connectors. |

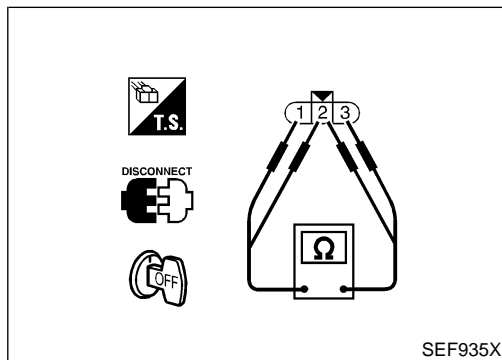
# DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT)

Diagnostic Procedure (Cont'd)

|                                          |                                                    |
|------------------------------------------|----------------------------------------------------|
| <b>4</b>                                 | <b>CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)</b> |
| Refer to "Component Inspection", EC-236. |                                                    |
| OK or NG                                 |                                                    |
| OK                                       | ▶ GO TO 5.                                         |
| NG                                       | ▶ Replace heated oxygen sensor 1 (front).          |

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>5</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
|                                                                | ▶ <b>INSPECTION END</b>            |



## Component Inspection

### HEATED OXYGEN SENSOR 1 HEATER (FRONT)

NCEC0143

NCEC0143S01

Check resistance between terminals 3 and 1.

**Resistance: 2.3 - 4.3Ω at 25°C (77°F)**

Check continuity between terminals 2 and 1, 3 and 2.

**Continuity should not exist.**

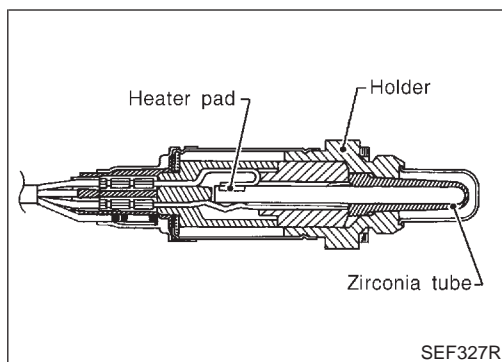
If NG, replace the heated oxygen sensor 1 (front).

#### **CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

# DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

Component Description



## Component Description

NCEC0144

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0145

Specification data are reference values.

| MONITOR ITEM    | CONDITION                                                                  |                                       | SPECIFICATION                 |
|-----------------|----------------------------------------------------------------------------|---------------------------------------|-------------------------------|
| HO2S2 (B1)      | <ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> | Revving engine from idle to 3,000 rpm | 0 - 0.3V ↔ Approx. 0.6 - 1.0V |
| HO2S2 MNTR (B1) |                                                                            |                                       | LEAN ↔ RICH                   |

## ECM Terminals and Reference Value

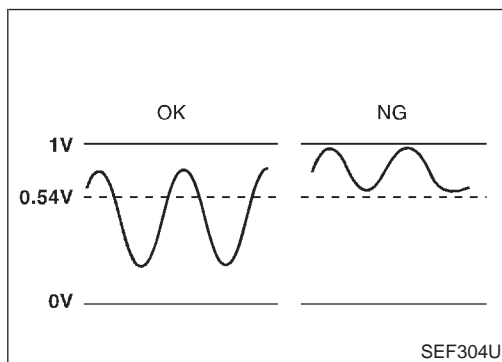
NCEC0146

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-NAL NO. | WIRE COLOR | ITEM                          | CONDITION                                                                                                                                                   | DATA (DC Voltage)      |
|---------------|------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 63            | W          | Heated oxygen sensor 2 (rear) | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>After warming up to normal operating temperature and engine speed is 2,000 rpm</li> </ul> | 0 - Approximately 1.0V |



## On Board Diagnosis Logic

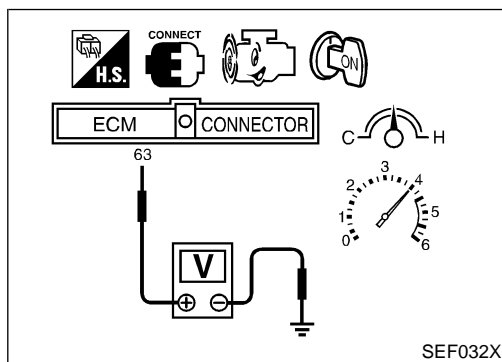
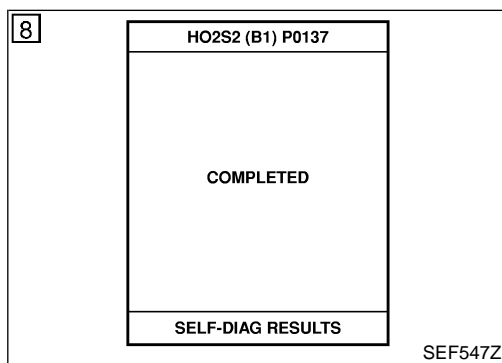
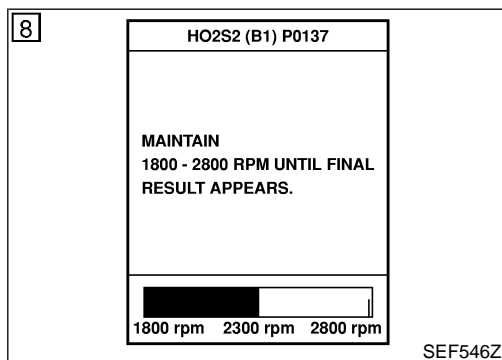
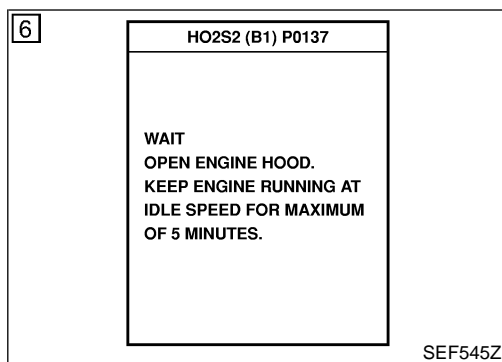
NCEC0147

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the minimum voltage of the sensor is sufficiently low during various driving conditions such as fuel-cut.

| DTC No. | Malfunction is detected when ...                                                                                            | Check Items (Possible Cause)                                                                                                                                                                      |
|---------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0137   | <ul style="list-style-type: none"> <li>The minimum voltage from the sensor does not reach the specified voltage.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Heated oxygen sensor 2 (rear)</li> <li>Fuel pressure</li> <li>Injectors</li> </ul> |

# DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

## DTC Confirmation Procedure



## DTC Confirmation Procedure

NCEC0148

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Open engine hood before conducting following procedure.

#### With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0137" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".  
If NG is displayed, refer to "Diagnostic Procedure", EC-240.  
If "CANNOT BE DIAGNOSED" is displayed, perform the following.
  - a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
  - b) Turn ignition switch "ON".
  - c) Select "DATA MONITOR" mode with CONSULT-II.
  - d) Start engine.
  - e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

## Overall Function Check

NCEC0149

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

#### With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving engine up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be below 0.54V at least once during this procedure.**  
**If the voltage can be confirmed in step 4, step 5 is not necessary.**
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).  
**The voltage should be below 0.54V at least once during this procedure.**
- 6) If NG, go to "Diagnostic Procedure", EC-240.

# DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

Wiring Diagram

## Wiring Diagram

NCEC0150

EC-HO2S2-01

GI

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

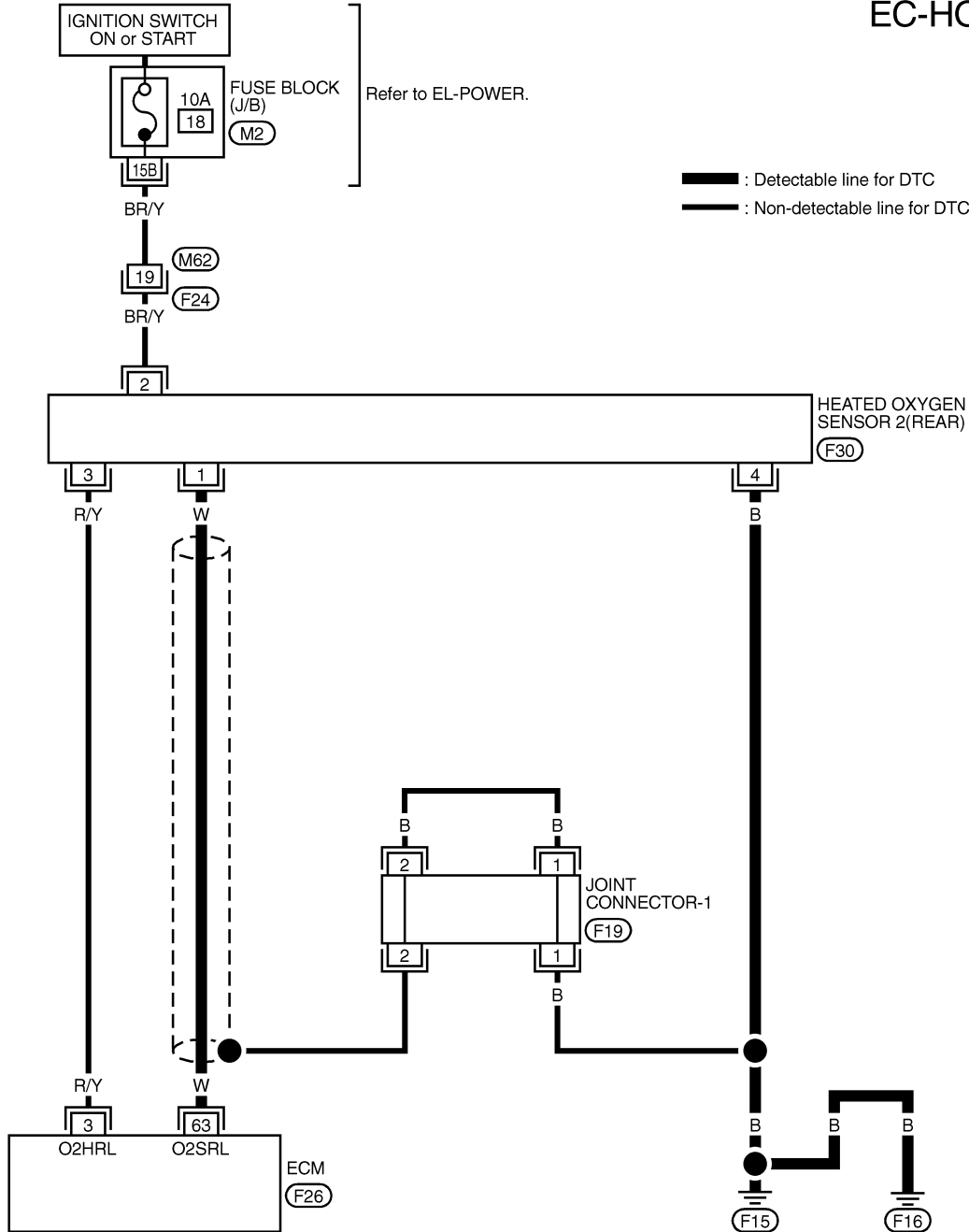
BT

HA

SC

EL

IDX



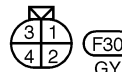
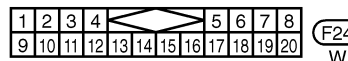
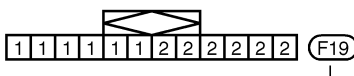
— : Detectable line for DTC  
 — : Non-detectable line for DTC

Refer to EL-POWER.

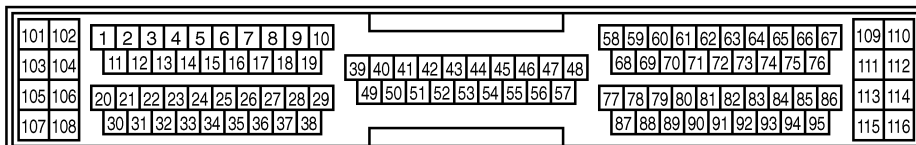
HEATED OXYGEN SENSOR 2(REAR)  
 (F30)

JOINT CONNECTOR-1  
 (F19)

ECM  
 (F26)



REFER TO THE FOLLOWING.  
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)



# DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

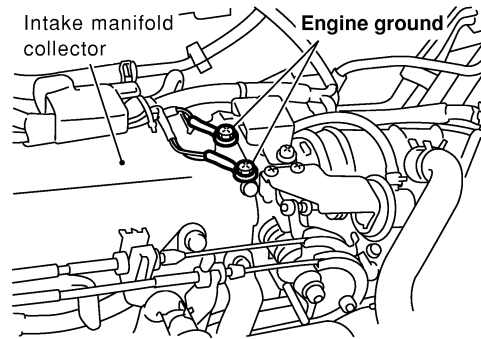
Diagnostic Procedure

## Diagnostic Procedure

NCEC0151

### 1 RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.



SEF839X



GO TO 2.



# DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

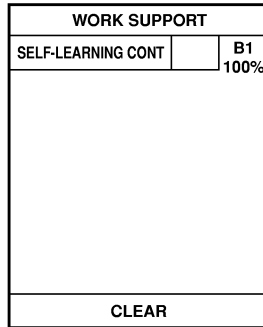
Diagnostic Procedure (Cont'd)

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

## 2 CLEAR THE SELF-LEARNING DATA

### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

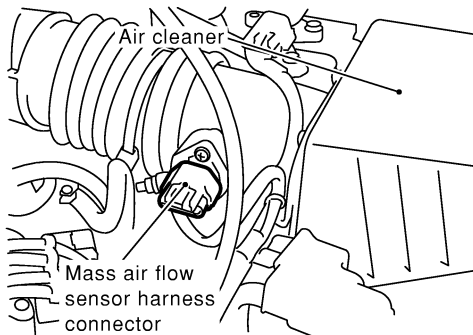


SEF215Z

4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected? Is it difficult to start engine?**

### Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



SEF840X

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

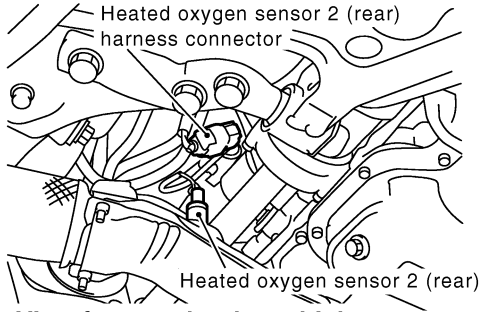
**Is the 1st trip DTC P0172 detected? Is it difficult to start engine?**

**Yes or No**

|     |   |                                                           |
|-----|---|-----------------------------------------------------------|
| Yes | ▶ | Perform trouble diagnosis for DTC P0172. Refer to EC-279. |
| No  | ▶ | GO TO 3.                                                  |

# DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

Diagnostic Procedure (Cont'd)

| 3                                                                                                                                                                                                                                                                                                                                                                                        |   | CHECK INPUT SIGNAL CIRCUIT                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------|
| <p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p>                                                                                                                                                                                                                                                    |   |                                                                                    |
|  <p>Heated oxygen sensor 2 (rear)<br/>harness connector</p> <p>Heated oxygen sensor 2 (rear)</p> <p><b>View from under the vehicle</b></p>                                                                                                                                                             |   |                                                                                    |
| SEF918Z                                                                                                                                                                                                                                                                                                                                                                                  |   |                                                                                    |
| <p>3. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>4. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should not exist.</b></p> <p>5. Also check harness for short to ground and short to power.</p> |   |                                                                                    |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                          |   |                                                                                    |
| OK                                                                                                                                                                                                                                                                                                                                                                                       | ▶ | GO TO 4.                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                       | ▶ | Repair open circuit or short to ground or short to power in harness or connectors. |

| 4                                                                                                                                                                                              |   | CHECK GROUND CIRCUIT                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------|
| <p>1. Check harness continuity between HO2S2 terminal 4 and body ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>2. Also check harness for short to power.</p> |   |                                                                 |
| <b>OK or NG</b>                                                                                                                                                                                |   |                                                                 |
| OK                                                                                                                                                                                             | ▶ | GO TO 5.                                                        |
| NG                                                                                                                                                                                             | ▶ | Repair open circuit or short to power in harness or connectors. |

| 5                                        |   | CHECK HEATED OXYGEN SENSOR 2 (REAR)    |
|------------------------------------------|---|----------------------------------------|
| Refer to "Component Inspection", EC-243. |   |                                        |
| <b>OK or NG</b>                          |   |                                        |
| OK                                       | ▶ | GO TO 6.                               |
| NG                                       | ▶ | Replace heated oxygen sensor 2 (rear). |

# DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

Diagnostic Procedure (Cont'd)

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                 |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>6</b> | <b>CHECK SHIELD CIRCUIT</b>                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                 |
|          | 1. Turn ignition switch "OFF".<br>2. Disconnect joint connector-1.<br>3. Check the following. <ul style="list-style-type: none"> <li>● Continuity between joint connector-1 terminal 2 and ground<br/>Refer to Wiring Diagram.</li> <li>● Joint connector-1<br/>(Refer to EL-314, "HARNESS LAYOUT".)<br/><b>Continuity should exist.</b></li> </ul> 4. Also check harness for short to power.<br>5. Then reconnect joint connector-1. |                                                                 |
|          | <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                 |
| OK       | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                     | GO TO 7.                                                        |
| NG       | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                     | Repair open circuit or short to power in harness or connectors. |

GI  
MA  
EM  
LC

EC

|          |                                                                |                       |
|----------|----------------------------------------------------------------|-----------------------|
| <b>7</b> | <b>CHECK INTERMITTENT INCIDENT</b>                             |                       |
|          | Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                       |
|          | ▶                                                              | <b>INSPECTION END</b> |

FE  
CL

MT

| ACTIVE TEST     |         |
|-----------------|---------|
| FUEL INJECTION  | 25 %    |
| MONITOR         |         |
| ENG SPEED       | XXX rpm |
| HO2S1 (B1)      | XXX V   |
| HO2S2 (B1)      | XXX V   |
| HO2S1 MNTR (B1) | RICH    |
| HO2S2 MNTR (B1) | RICH    |
|                 |         |
|                 |         |

SEF662Y

## Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NCEC0152

AT

NCEC0152S01

### Ⓟ With CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .

AX

SU

BR

**"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)" should be below 0.54V at least once when the "FUEL INJECTION" is -25%.**

ST

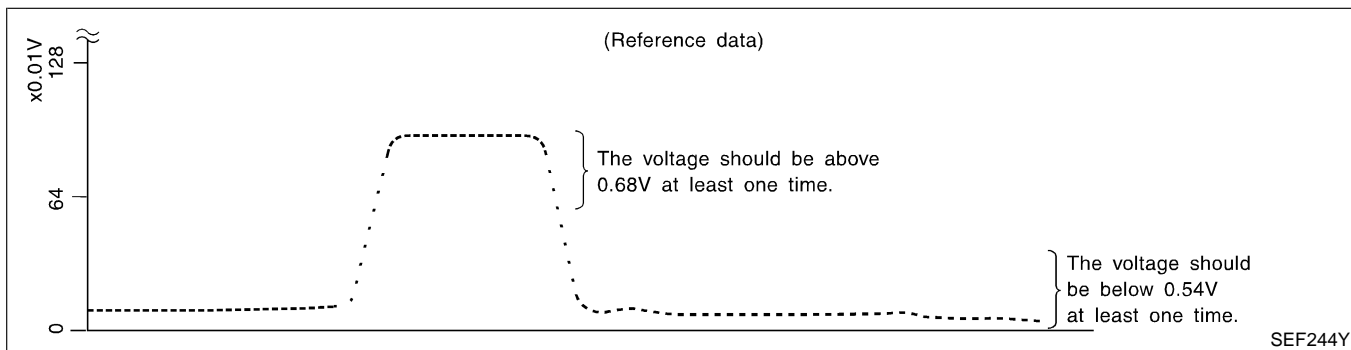
### CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

RS

BT

HA



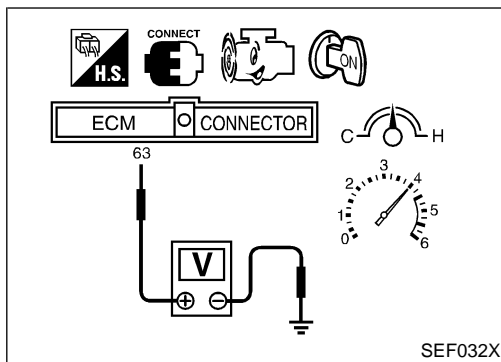
SC

EL

IDX

# DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

Component Inspection (Cont'd)



## ⊗ Without CONSULT-II

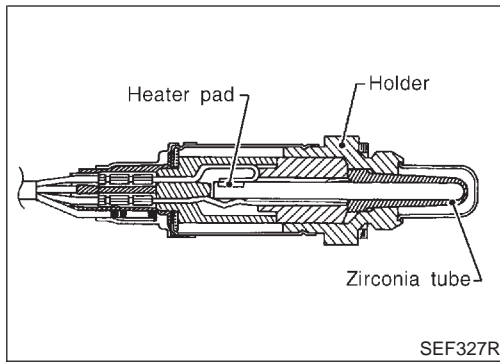
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.68V at least once.**  
**If the voltage is above 0.68V at step 4, step 5 is not necessary.**
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).  
**The voltage should be below 0.54V at least once.**

## CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

# DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

Component Description



## Component Description

NCEC0153

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0154

Specification data are reference values.

| MONITOR ITEM    | CONDITION                                                                                                        | SPECIFICATION                 |
|-----------------|------------------------------------------------------------------------------------------------------------------|-------------------------------|
| HO2S2 (B1)      | <ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> Revving engine from idle to 3,000 rpm | 0 - 0.3V ↔ Approx. 0.6 - 1.0V |
| HO2S2 MNTR (B1) |                                                                                                                  | LEAN ↔ RICH                   |

## ECM Terminals and Reference Value

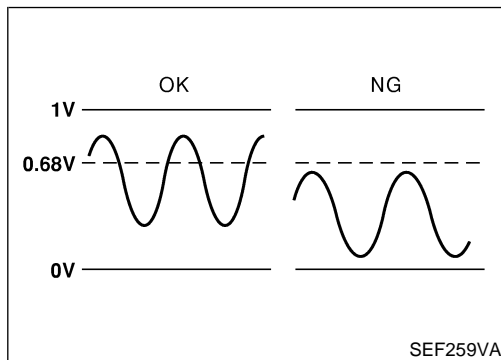
NCEC0155

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-NAL NO. | WIRE COLOR | ITEM                          | CONDITION                                                                                                                                                   | DATA (DC Voltage)      |
|---------------|------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 63            | W          | Heated oxygen sensor 2 (rear) | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>After warming up to normal operating temperature and engine speed is 2,000 rpm</li> </ul> | 0 - Approximately 1.0V |



## On Board Diagnosis Logic

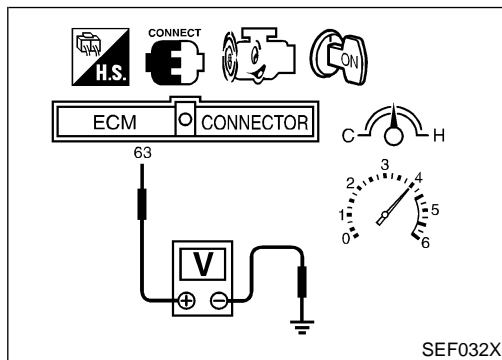
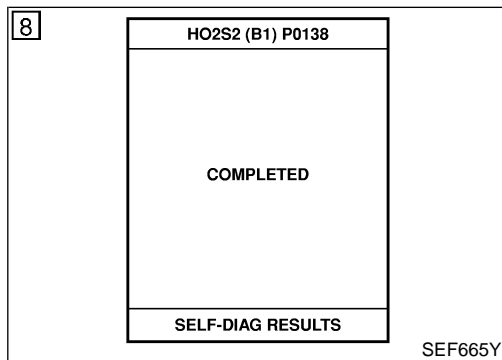
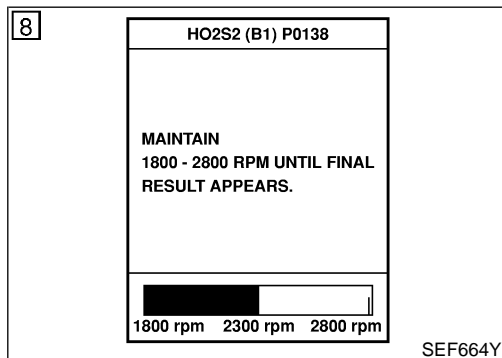
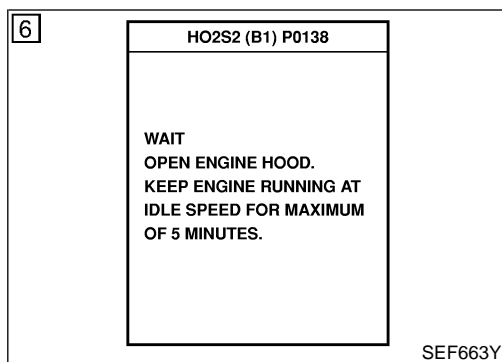
NCEC0156

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the maximum voltage of the sensor is sufficiently high during various driving conditions such as fuel-cut.

| DTC No. | Malfunction is detected when ...                                                                                            | Check Items (Possible Cause)                                                                                                                                                                                                |
|---------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0138   | <ul style="list-style-type: none"> <li>The maximum voltage from the sensor does not reach the specified voltage.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Heated oxygen sensor 2 (rear)</li> <li>Fuel pressure</li> <li>Injectors</li> <li>Intake air leaks</li> </ul> |

# DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

## DTC Confirmation Procedure



## DTC Confirmation Procedure

NCEC0157

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Open engine hood before conducting following procedure.

#### With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0138" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-248.

If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

## Overall Function Check

NCEC0158

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

#### With GST

- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving engine up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.68V at least once during this procedure.**  
**If the voltage can be confirmed in step 4, step 5 is not necessary.**
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).  
**The voltage should be above 0.68V at least once during this procedure.**
- 6) If NG, go to "Diagnostic Procedure", EC-248.

# DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

Wiring Diagram

## Wiring Diagram

NCEC0159

EC-HO2S2-01

GI

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

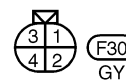
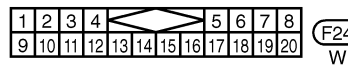
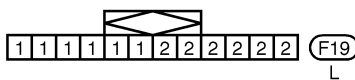
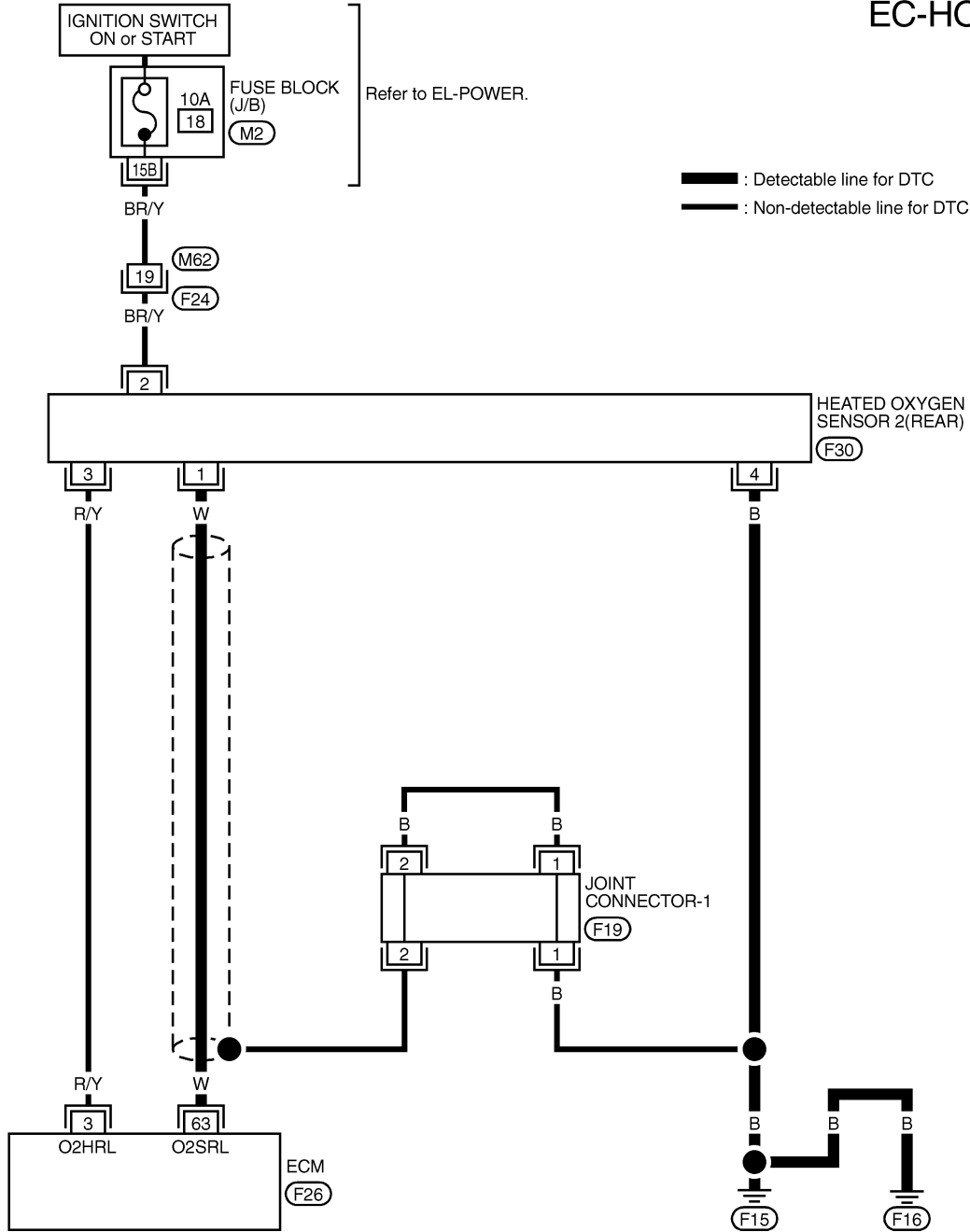
BT

HA

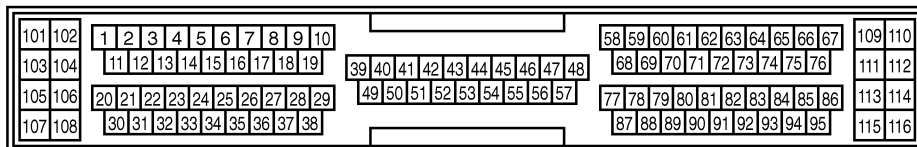
SC

EL

IDX



REFER TO THE FOLLOWING.  
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)



# DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

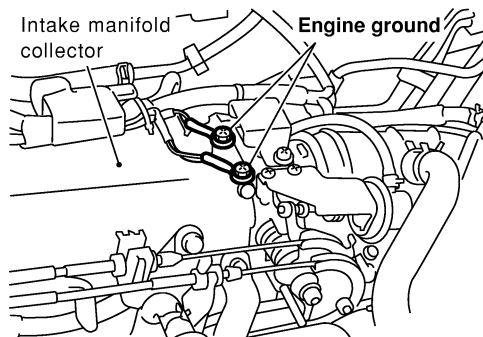
Diagnostic Procedure

## Diagnostic Procedure

NCEC0160

### 1 RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.



SEF839X



GO TO 2.



# DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

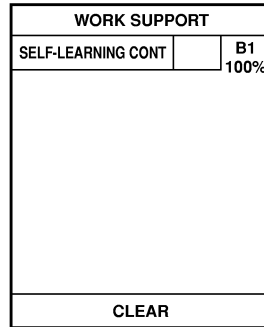
Diagnostic Procedure (Cont'd)

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

## 2 CLEAR THE SELF-LEARNING DATA

### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

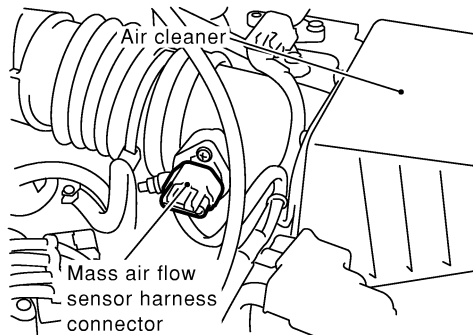


SEF215Z

4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 detected? Is it difficult to start engine?**

### Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



SEF840X

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

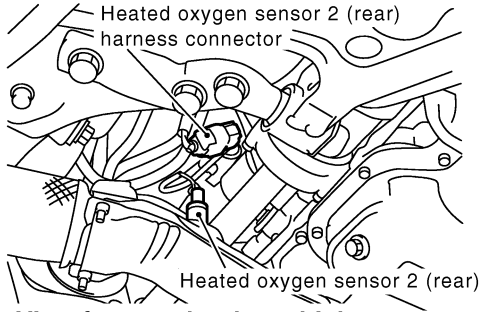
**Is the 1st trip DTC P0171 detected? Is it difficult to start engine?**

**Yes or No**

|     |   |                                                           |
|-----|---|-----------------------------------------------------------|
| Yes | ▶ | Perform trouble diagnosis for DTC P0171. Refer to EC-272. |
| No  | ▶ | GO TO 3.                                                  |

# DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                   |                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>CHECK INPUT SIGNAL CIRCUIT</b> |                                                                                    |
| <p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p> <div style="text-align: center;">  <p style="text-align: center;"><b>View from under the vehicle</b></p> </div> <p style="text-align: right;">SEF918Z</p>                                                           |                                   |                                                                                    |
| <p>3. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>4. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should not exist.</b></p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                   |                                                                                    |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                 | GO TO 4.                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                 | Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                                                                                                                                                                                                                     |                             |                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                            | <b>CHECK GROUND CIRCUIT</b> |                                                                 |
| <p>1. Check harness continuity between HO2S2 terminal 4 and engine ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                             |                                                                 |
| OK                                                                                                                                                                                                                                                  | ▶                           | GO TO 5.                                                        |
| NG                                                                                                                                                                                                                                                  | ▶                           | Repair open circuit or short to power in harness or connectors. |

|                                                                                                    |                                            |                                        |
|----------------------------------------------------------------------------------------------------|--------------------------------------------|----------------------------------------|
| <b>5</b>                                                                                           | <b>CHECK HEATED OXYGEN SENSOR 2 (REAR)</b> |                                        |
| <p>Refer to "Component Inspection", EC-251.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                            |                                        |
| OK                                                                                                 | ▶                                          | GO TO 6.                               |
| NG                                                                                                 | ▶                                          | Replace heated oxygen sensor 2 (rear). |

# DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

Diagnostic Procedure (Cont'd)

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                 |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>6</b> | <b>CHECK SHIELD CIRCUIT</b>                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                 |
|          | 1. Turn ignition switch "OFF".<br>2. Disconnect joint connector-1.<br>3. Check the following. <ul style="list-style-type: none"> <li>● Continuity between joint connector-1 terminal 2 and ground<br/>Refer to Wiring Diagram.</li> <li>● Joint connector-1<br/>(Refer to EL-314, "HARNESS LAYOUT".)<br/><b>Continuity should exist.</b></li> </ul> 4. Also check harness for short to power.<br>5. Then reconnect joint connector-1. |                                                                 |
|          | <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                 |
| OK       | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                     | GO TO 7.                                                        |
| NG       | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                     | Repair open circuit or short to power in harness or connectors. |

GI  
MA  
EM  
LC  
EC

|          |                                                                |                       |
|----------|----------------------------------------------------------------|-----------------------|
| <b>7</b> | <b>CHECK INTERMITTENT INCIDENT</b>                             |                       |
|          | Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                       |
|          | ▶                                                              | <b>INSPECTION END</b> |

FE  
CL  
MT

| ACTIVE TEST     |         |
|-----------------|---------|
| FUEL INJECTION  | 25 %    |
| MONITOR         |         |
| ENG SPEED       | XXX rpm |
| HO2S1 (B1)      | XXX V   |
| HO2S2 (B1)      | XXX V   |
| HO2S1 MNTR (B1) | RICH    |
| HO2S2 MNTR (B1) | RICH    |
|                 |         |
|                 |         |

SEF662Y

## Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NCEC0161  
NCEC0161S01

### Ⓜ With CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes..
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .

AT  
AX  
SU  
BR

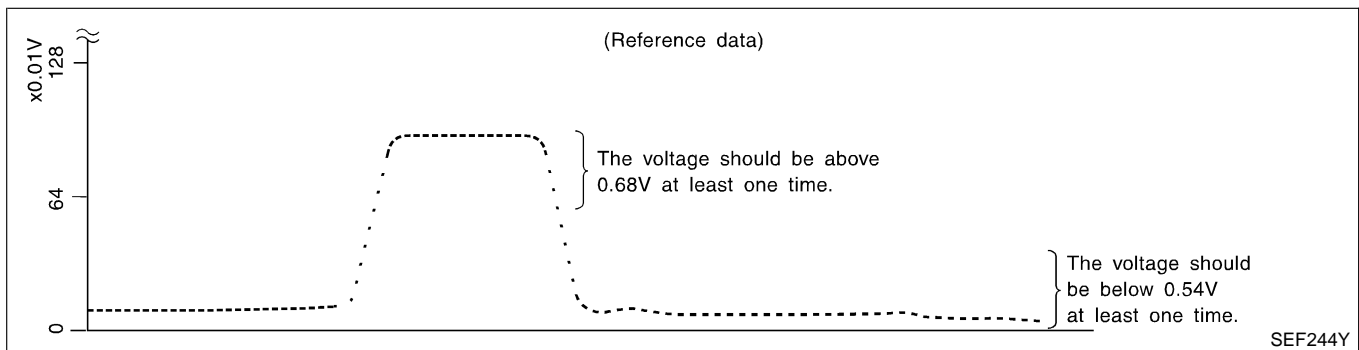
**"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.**  
**"HO2S2 (B1)" should be below 0.54V at least once when the "FUEL INJECTION" is -25%.**

ST  
RS

### CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

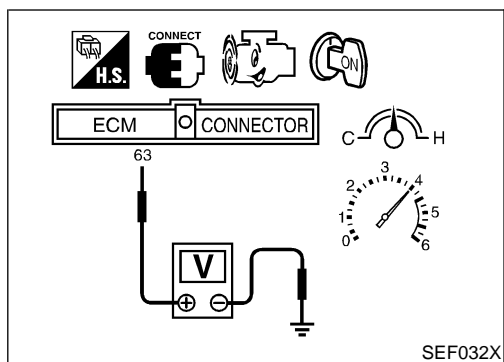
BT  
HA



SC  
EL  
IDX

# DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

Component Inspection (Cont'd)



## ⊗ Without CONSULT-II

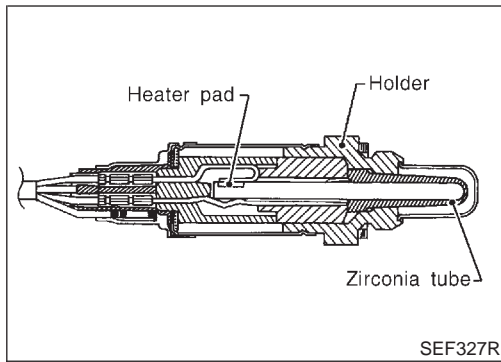
- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.68V at least once.**  
**If the voltage is above 0.68V at step 4, step 5 is not necessary.**
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).  
**The voltage should be below 0.54V at least once.**

## CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

# DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

Component Description



## Component Description

NCEC0162

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0163

Specification data are reference values.

| MONITOR ITEM    | CONDITION                                                                                                        | SPECIFICATION                 |
|-----------------|------------------------------------------------------------------------------------------------------------------|-------------------------------|
| HO2S2 (B1)      | <ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> Revving engine from idle to 3,000 rpm | 0 - 0.3V ↔ Approx. 0.6 - 1.0V |
| HO2S2 MNTR (B1) |                                                                                                                  | LEAN ↔ RICH                   |

## ECM Terminals and Reference Value

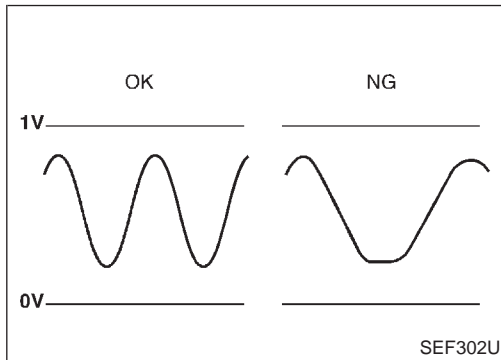
NCEC0164

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMINAL NO. | WIRE COLOR | ITEM                          | CONDITION                                                                                                                                                               | DATA (DC Voltage)      |
|--------------|------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 63           | W          | Heated oxygen sensor 2 (rear) | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>After warming up to normal operating temperature and revving engine from idle to 2,000 rpm</li> </ul> | 0 - Approximately 1.0V |



## On Board Diagnosis Logic

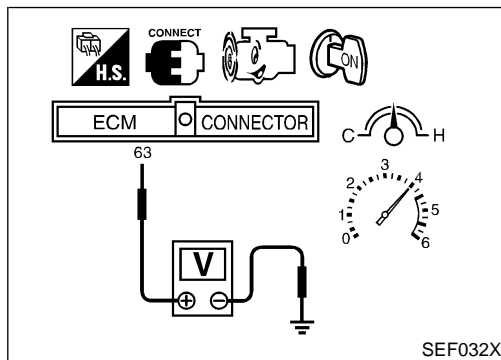
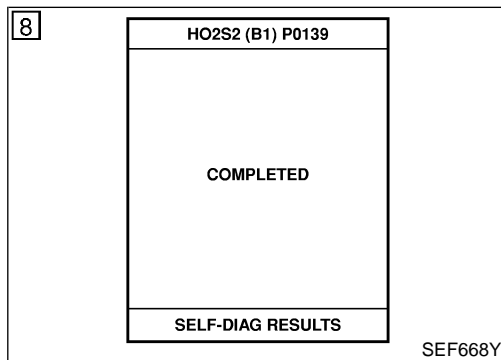
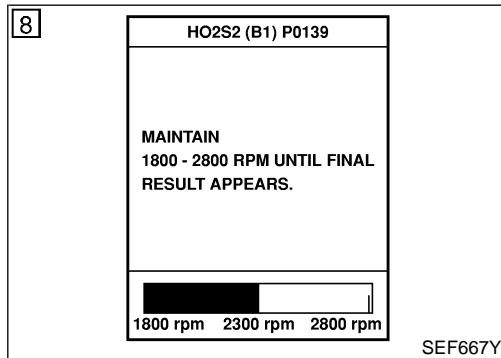
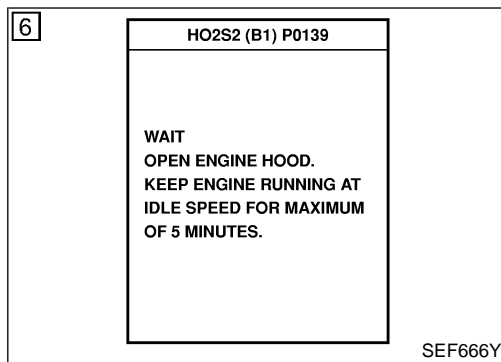
NCEC0165

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel-cut.

| DTC No. | Malfunction is detected when ...                                                                                                         | Check Items (Possible Cause)                                                                                                                                                                                                |
|---------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0139   | <ul style="list-style-type: none"> <li>It takes more than the specified time for the sensor to respond between rich and lean.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Heated oxygen sensor 2 (rear)</li> <li>Fuel pressure</li> <li>Injectors</li> <li>Intake air leaks</li> </ul> |

# DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

DTC Confirmation Procedure



## DTC Confirmation Procedure

NCEC0166

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Open engine hood before conducting following procedure.

#### With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0139" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-256. If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

## Overall Function Check

NCEC0167

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

#### With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should change at more than 0.06V for 1 second during this procedure.**  
**If the voltage can be confirmed in step 4, step 5 is not necessary.**
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).  
**The voltage should change at more than 0.06V for 1 second during this procedure.**
- 6) If NG, go to "Diagnostic Procedure", EC-256.

# DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

Wiring Diagram

## Wiring Diagram

NCEC0168

EC-HO2S2-01

GI

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

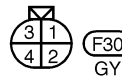
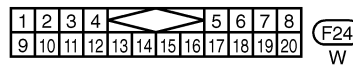
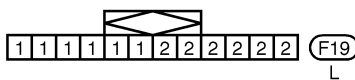
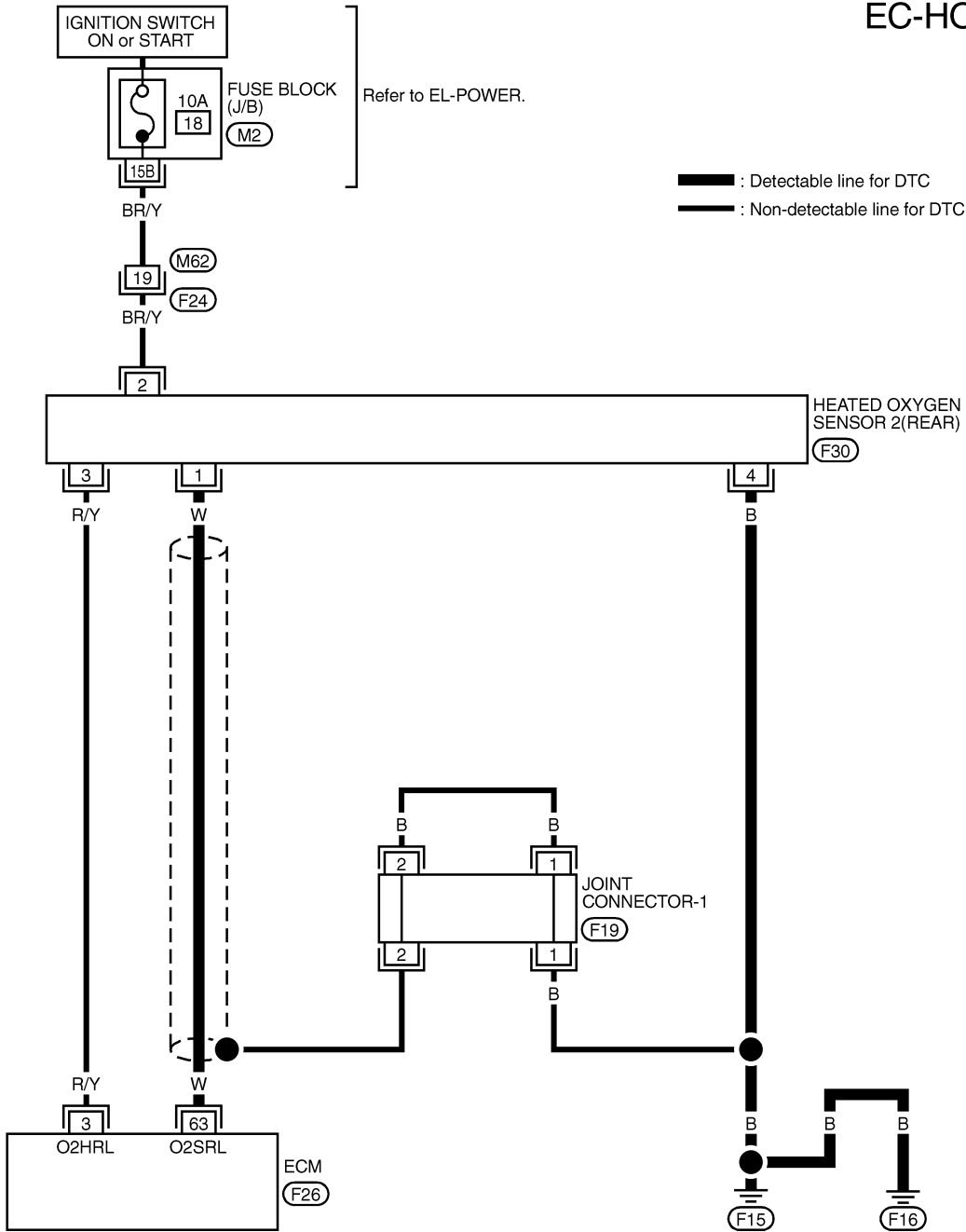
BT

HA

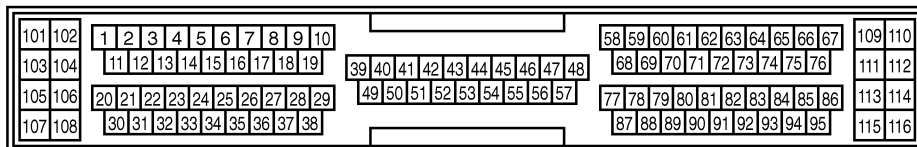
SC

EL

IDX



REFER TO THE FOLLOWING.  
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)



# DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

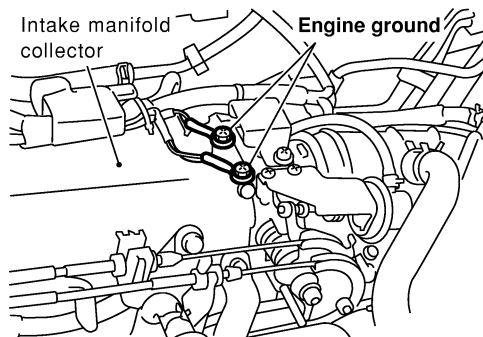
Diagnostic Procedure

## Diagnostic Procedure

NCEC0169

### 1 RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.



SEF839X



GO TO 2.



# DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

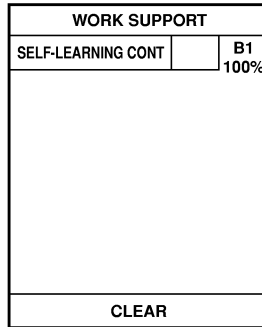
Diagnostic Procedure (Cont'd)

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

## 2 CLEAR THE SELF-LEARNING DATA

### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

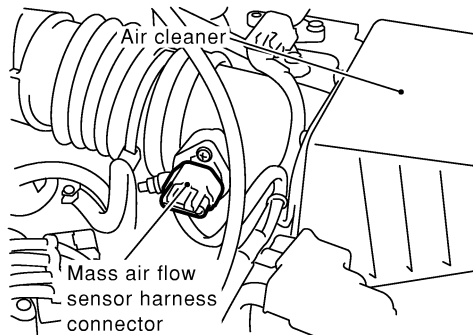


SEF215Z

4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected? Is it difficult to start engine?**

### Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



SEF840X

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

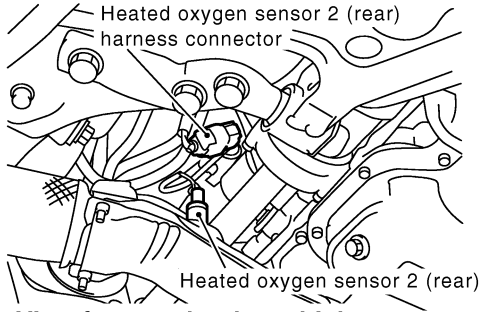
**Is the 1st trip DTC P0172 detected? Is it difficult to start engine?**

**Yes or No**

|     |   |                                                           |
|-----|---|-----------------------------------------------------------|
| Yes | ▶ | Perform trouble diagnosis for DTC P0172. Refer to EC-279. |
| No  | ▶ | GO TO 3.                                                  |

# DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

Diagnostic Procedure (Cont'd)

| 3                                                                                                                                                                                                                                                                                                                                                                                        |   | CHECK INPUT SIGNAL CIRCUIT                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------|
| <p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p>                                                                                                                                                                                                                                                    |   |                                                                                    |
|  <p>Heated oxygen sensor 2 (rear)<br/>harness connector</p> <p>Heated oxygen sensor 2 (rear)</p> <p><b>View from under the vehicle</b></p>                                                                                                                                                             |   |                                                                                    |
| SEF918Z                                                                                                                                                                                                                                                                                                                                                                                  |   |                                                                                    |
| <p>3. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>4. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should not exist.</b></p> <p>5. Also check harness for short to ground and short to power.</p> |   |                                                                                    |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                          |   |                                                                                    |
| OK                                                                                                                                                                                                                                                                                                                                                                                       | ▶ | GO TO 4.                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                       | ▶ | Repair open circuit or short to ground or short to power in harness or connectors. |

| 4                                                                                                                                                                                                |   | CHECK GROUND CIRCUIT                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------|
| <p>1. Check harness continuity between HO2S2 terminal 4 and engine ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>2. Also check harness for short to power.</p> |   |                                                                 |
| <b>OK or NG</b>                                                                                                                                                                                  |   |                                                                 |
| OK                                                                                                                                                                                               | ▶ | GO TO 5.                                                        |
| NG                                                                                                                                                                                               | ▶ | Repair open circuit or short to power in harness or connectors. |

| 5                                        |   | CHECK HEATED OXYGEN SENSOR 2 (REAR)    |
|------------------------------------------|---|----------------------------------------|
| Refer to "Component Inspection", EC-259. |   |                                        |
| <b>OK or NG</b>                          |   |                                        |
| OK                                       | ▶ | GO TO 6.                               |
| NG                                       | ▶ | Replace heated oxygen sensor 2 (rear). |

# DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

Diagnostic Procedure (Cont'd)

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                 |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>6</b> | <b>CHECK SHIELD CIRCUIT</b>                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                 |
|          | 1. Turn ignition switch "OFF".<br>2. Disconnect joint connector-1.<br>3. Check the following. <ul style="list-style-type: none"> <li>● Continuity between joint connector-1 terminal 2 and ground<br/>Refer to Wiring Diagram.</li> <li>● Joint connector-1<br/>(Refer to EL-314, "HARNESS LAYOUT".)<br/><b>Continuity should exist.</b></li> </ul> 4. Also check harness for short to power.<br>5. Then reconnect joint connector-1. |                                                                 |
|          | <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                 |
| OK       | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                     | GO TO 7.                                                        |
| NG       | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                     | Repair open circuit or short to power in harness or connectors. |

GI  
MA  
EM  
LC  
EC

|          |                                                                |                       |
|----------|----------------------------------------------------------------|-----------------------|
| <b>7</b> | <b>CHECK INTERMITTENT INCIDENT</b>                             |                       |
|          | Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                       |
|          | ▶                                                              | <b>INSPECTION END</b> |

FE  
CL  
MT

| ACTIVE TEST     |         |
|-----------------|---------|
| FUEL INJECTION  | 25 %    |
| MONITOR         |         |
| ENG SPEED       | XXX rpm |
| HO2S1 (B1)      | XXX V   |
| HO2S2 (B1)      | XXX V   |
| HO2S1 MNTR (B1) | RICH    |
| HO2S2 MNTR (B1) | RICH    |
|                 |         |
|                 |         |

SEF662Y

## Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NCEC0170  
NCEC0170S01

### Ⓜ With CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .

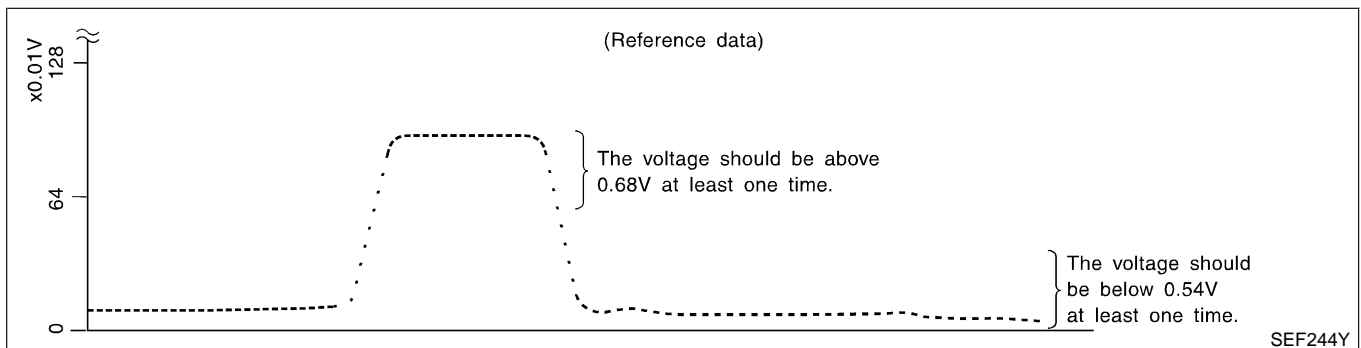
**"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.**

**"HO2S2 (B1)" should be below 0.54V at least once when the "FUEL INJECTION" is -25%.**

### CAUTION:

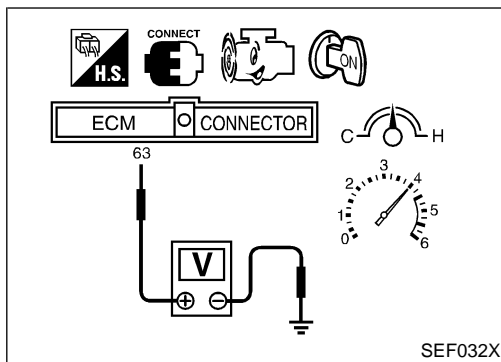
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX



# DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

Component Inspection (Cont'd)



## ⊗ Without CONSULT-II

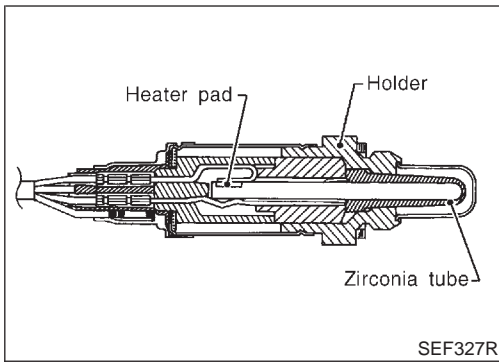
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.68V at least once.**  
**If the voltage is above 0.68V at step 4, step 5 is not necessary.**
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).  
**The voltage should be below 0.54V at least once.**

## CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

# DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

Component Description



## Component Description

NCEC0171

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0172

Specification data are reference values.

| MONITOR ITEM    | CONDITION                                                                                                        | SPECIFICATION                 |
|-----------------|------------------------------------------------------------------------------------------------------------------|-------------------------------|
| HO2S2 (B1)      | <ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> Revving engine from idle to 3,000 rpm | 0 - 0.3V ↔ Approx. 0.6 - 1.0V |
| HO2S2 MNTR (B1) |                                                                                                                  | LEAN ↔ RICH                   |

## ECM Terminals and Reference Value

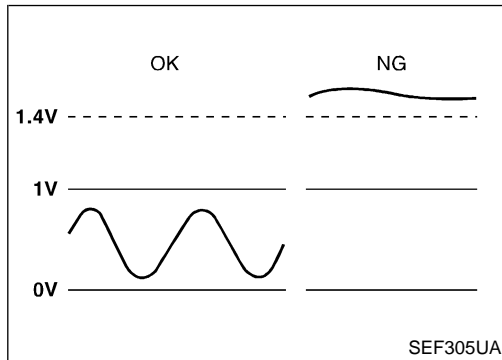
NCEC0173

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMINAL NO. | WIRE COLOR | ITEM                          | CONDITION                                                                                                                                                        | DATA (DC Voltage)      |
|--------------|------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 63           | W          | Heated oxygen sensor 2 (rear) | [Engine is running] <ul style="list-style-type: none"> <li>After warming up to normal operating temperature and revving engine from idle to 2,000 rpm</li> </ul> | 0 - Approximately 1.0V |



## On Board Diagnosis Logic

NCEC0174

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether or not the voltage is too high during various driving conditions such as fuel-cut.

| DTC No. | Malfunction is detected when ...                                                                              | Check Items (Possible Cause)                                                                                                                            |
|---------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0140   | <ul style="list-style-type: none"> <li>An excessively high voltage from the sensor is sent to ECM.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Heated oxygen sensor 2 (rear)</li> </ul> |

# DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

DTC Confirmation Procedure

|              |               |          |
|--------------|---------------|----------|
| 5            | DATA MONITOR  |          |
|              | MONITOR       | NO DTC   |
|              | ENG SPEED     | XXX rpm  |
|              | COOLAN TEMP/S | XXX °C   |
|              | VHCL SPEED SE | XXX km/h |
| B/FUEL SCHDL | XXX msec      |          |

SEF189Y

## DTC Confirmation Procedure

NCEC0175

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

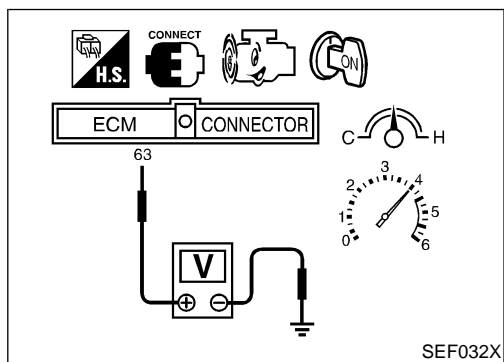
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 3) Stop vehicle with engine running.
- 4) Let engine idle for 1 minute.
- 5) Maintain the following conditions for at least 5 consecutive seconds.

|                |                             |
|----------------|-----------------------------|
| ENG SPEED      | 1,400 - 3,400 rpm           |
| VHCL SPEED SE  | 64 - 120 km/h (40 - 75 MPH) |
| B/FUEL SCHDL   | 0.5 - 3.9 msec              |
| COOLAN TEMP/S  | More than 70°C (158°F)      |
| Selector lever | Suitable position           |

- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-264.



## Overall Function Check

NCEC0176

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

#### Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage after revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be below 1.4V during this procedure.**
- 5) If NG, go to "Diagnostic Procedure", EC-264.

# DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

Wiring Diagram

## Wiring Diagram

NCEC0177

EC-HO2S2-01

GI

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

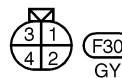
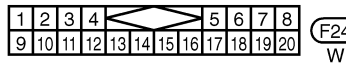
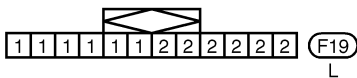
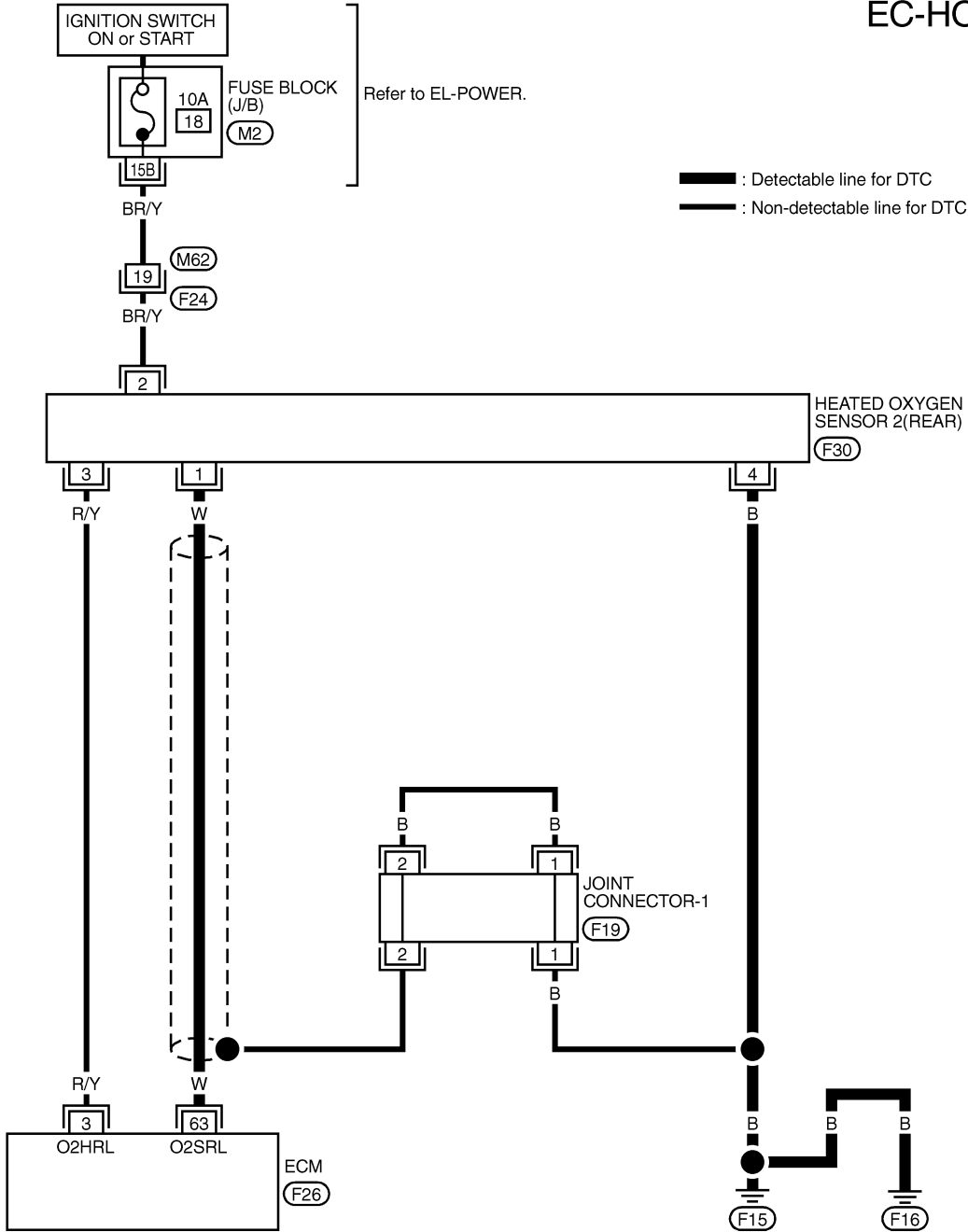
BT

HA

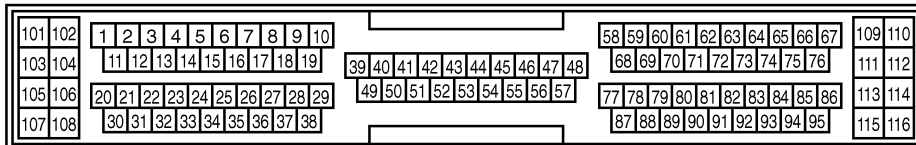
SC

EL

IDX



REFER TO THE FOLLOWING.  
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)

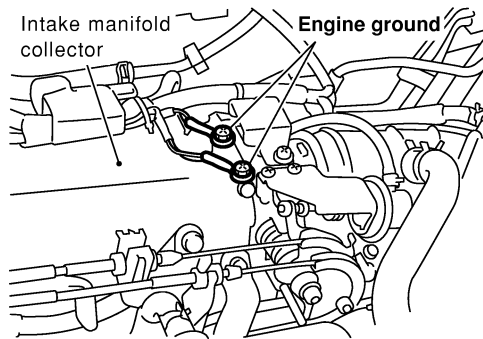


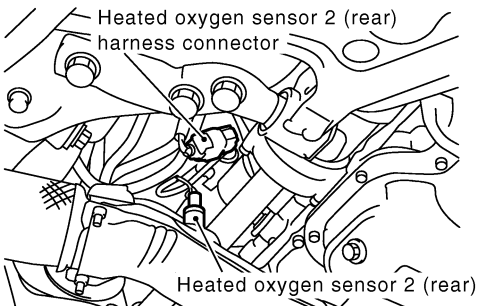
# DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0178

|                                                                                                                                         |                                |
|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>1</b>                                                                                                                                | <b>RETIGHTEN GROUND SCREWS</b> |
| <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Loosen and retighten engine ground screws.</li> </ol> |                                |
|                                                       |                                |
| SEF839X                                                                                                                                 |                                |
| ▶ GO TO 2.                                                                                                                              |                                |

|                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK INPUT SIGNAL CIRCUIT</b>                                                    |
| <ol style="list-style-type: none"> <li>1. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</li> </ol>                                                                                                                                                                                                                                                                                              |                                                                                      |
|                                                                                                                                                                                                                                                                                                                                                      |                                                                                      |
| SEF918Z                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                      |
| <ol style="list-style-type: none"> <li>2. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>3. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should not exist.</b></li> <li>4. Also check harness for short to ground and short to power.</li> </ol> |                                                                                      |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                      |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶ GO TO 3.                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                                                                                                                                                                                                               |                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>3</b>                                                                                                                                                                                                                                      | <b>CHECK GROUND CIRCUIT</b>                                       |
| <ol style="list-style-type: none"> <li>1. Check harness continuity between HO2S2 terminal 4 and engine ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>2. Also check harness for short to power.</li> </ol> |                                                                   |
| <b>OK or NG</b>                                                                                                                                                                                                                               |                                                                   |
| OK                                                                                                                                                                                                                                            | ▶ GO TO 4.                                                        |
| NG                                                                                                                                                                                                                                            | ▶ Repair open circuit or short to power in harness or connectors. |



# DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

Diagnostic Procedure (Cont'd)

|                                                                                                    |                                |                                      |
|----------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------|
| <b>4</b>                                                                                           | <b>CHECK HARNESS CONNECTOR</b> |                                      |
| Check heated oxygen sensor 2 (rear) harness connector for water.<br><b>Water should not exist.</b> |                                |                                      |
| <b>OK or NG</b>                                                                                    |                                |                                      |
| OK                                                                                                 | ▶                              | GO TO 5.                             |
| NG                                                                                                 | ▶                              | Repair or replace harness connector. |

|                                          |                                            |                                        |
|------------------------------------------|--------------------------------------------|----------------------------------------|
| <b>5</b>                                 | <b>CHECK HEATED OXYGEN SENSOR 2 (REAR)</b> |                                        |
| Refer to "Component Inspection", EC-265. |                                            |                                        |
| <b>OK or NG</b>                          |                                            |                                        |
| OK                                       | ▶                                          | GO TO 6.                               |
| NG                                       | ▶                                          | Replace heated oxygen sensor 2 (rear). |

|                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|
| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>CHECK SHIELD CIRCUIT</b> |                                                                 |
| 1. Turn ignition switch "OFF".<br>2. Disconnect joint connector-1.<br>3. Check the following. <ul style="list-style-type: none"> <li>● Continuity between joint connector-1 terminal 2 and ground<br/>Refer to Wiring Diagram.</li> <li>● Joint connector-1<br/>(Refer to EL-314, "HARNESS LAYOUT".)<br/><b>Continuity should exist.</b></li> </ul> 4. Also check harness for short to power.<br>5. Then reconnect joint connector-1. |                             |                                                                 |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶                           | GO TO 7.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶                           | Repair open circuit or short to power in harness or connectors. |

|                                                                |                                    |                       |
|----------------------------------------------------------------|------------------------------------|-----------------------|
| <b>7</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                       |
|                                                                |                                    | <b>INSPECTION END</b> |

| ACTIVE TEST     |         |
|-----------------|---------|
| FUEL INJECTION  | 25 %    |
| MONITOR         |         |
| ENG SPEED       | XXX rpm |
| HO2S1 (B1)      | XXX V   |
| HO2S2 (B1)      | XXX V   |
| HO2S1 MNTR (B1) | RICH    |
| HO2S2 MNTR (B1) | RICH    |
|                 |         |
|                 |         |

SEF662Y

## Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NCEC0179

NCEC0179S01

### Ⓜ With CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .

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# DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

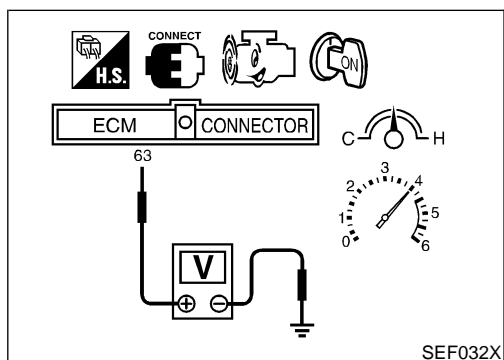
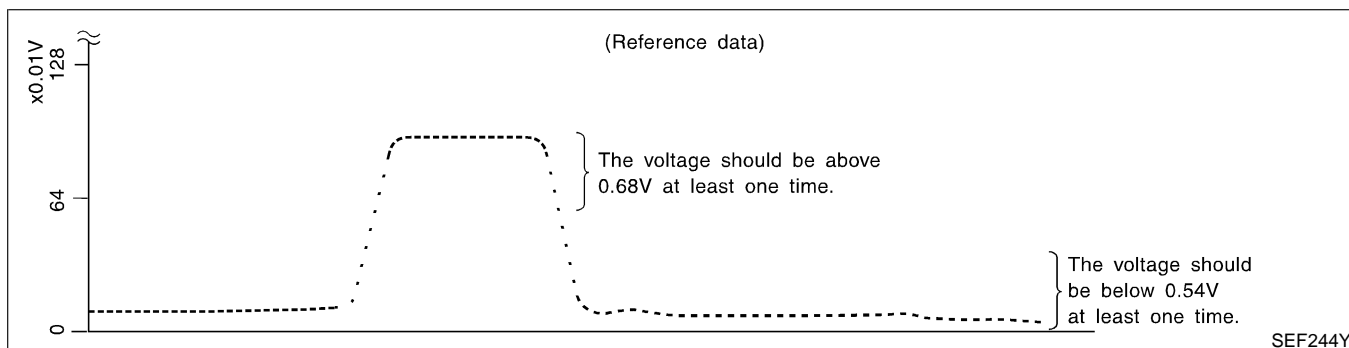
Component Inspection (Cont'd)

“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.

“HO2S2 (B1)” should be below 0.54V at least once when the “FUEL INJECTION” is -25%.

### CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



### ⊗ Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.68V at least once.**  
**If the voltage is above 0.68V at step 4, step 5 is not necessary.**
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with “OD” OFF (A/T).  
**The voltage should be below 0.54V at least once.**

### CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

# DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

Description

## Description

NCEC0180

### SYSTEM DESCRIPTION

NCEC0180S01

| Sensor                   | Input Signal to ECM | ECM function                                 | Actuator                             |
|--------------------------|---------------------|----------------------------------------------|--------------------------------------|
| Camshaft position sensor | Engine speed        | Heated oxygen sensor 2 heater (rear) control | Heated oxygen sensor 2 heater (rear) |

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater (rear) corresponding to the engine speed.

### OPERATION

NCEC0180S02

| Engine speed rpm | Heated oxygen sensor 2 heater (rear) |
|------------------|--------------------------------------|
| Above 3,600      | OFF                                  |
| Below 3,600      | ON                                   |

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0181

Specification data are reference values.

| MONITOR ITEM   | CONDITION                                                                                                                                            | SPECIFICATION |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| HO2S2 HTR (B1) | <ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Engine speed: Above 3,600 rpm</li> </ul>                        | OFF           |
|                | <ul style="list-style-type: none"> <li>Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more]</li> </ul> | ON            |

## ECM Terminals and Reference Value

NCEC0182

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-NAL NO. | WIRE COLOR | ITEM                                 | CONDITION                                                                                                                                                                                                   | DATA (DC Voltage)          |
|---------------|------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 3             | R/Y        | Heated oxygen sensor 2 heater (rear) | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Engine speed is below 3,600 rpm</li> <li>After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more</li> </ul>                    | 0 - 1.0V                   |
|               |            |                                      | <b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>Engine stopped</li> </ul> <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Engine speed is above 3,600 rpm</li> </ul> | BATTERY VOLTAGE (11 - 14V) |

## On Board Diagnosis Logic

NCEC0183

| DTC No. | Malfunction is detected when ...                                                                                                                                                                                                                          | Check Items (Possible Cause)                                                                                                                                                                 |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0141   | <ul style="list-style-type: none"> <li>The current amperage in the heated oxygen sensor 2 heater (rear) circuit is out of the normal range. [An improper voltage drop signal is sent to ECM through the heated oxygen sensor 2 heater (rear).]</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors [The heated oxygen sensor 2 heater (rear) circuit is open or shorted.]</li> <li>Heated oxygen sensor 2 heater (rear)</li> </ul> |

# DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

DTC Confirmation Procedure

## DTC Confirmation Procedure

NCEC0184

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is in between 10.5V and 16V at idle.

|   |               |          |
|---|---------------|----------|
| 2 | DATA MONITOR  |          |
|   | MONITOR       | NO DTC   |
|   | ENG SPEED     | XXX rpm  |
|   | VHCL SPEED SE | XXX km/h |
|   | THRTL POS SEN | XXX V    |

SEF175Y

### With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 3) Stop vehicle and let engine idle for at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-270.

### With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle and let engine idle for at least 6 seconds.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 5) Stop vehicle and let engine idle for at least 6 seconds.
- 6) Select "MODE 3" with GST.
- 7) If DTC is detected, go to "Diagnostic Procedure", EC-270.

**When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

# DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

Wiring Diagram

## Wiring Diagram

NCEC0185

EC-HO2S2H-01

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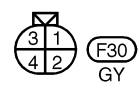
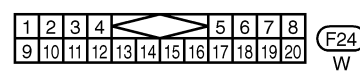
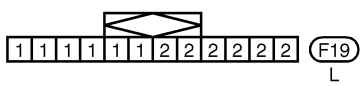
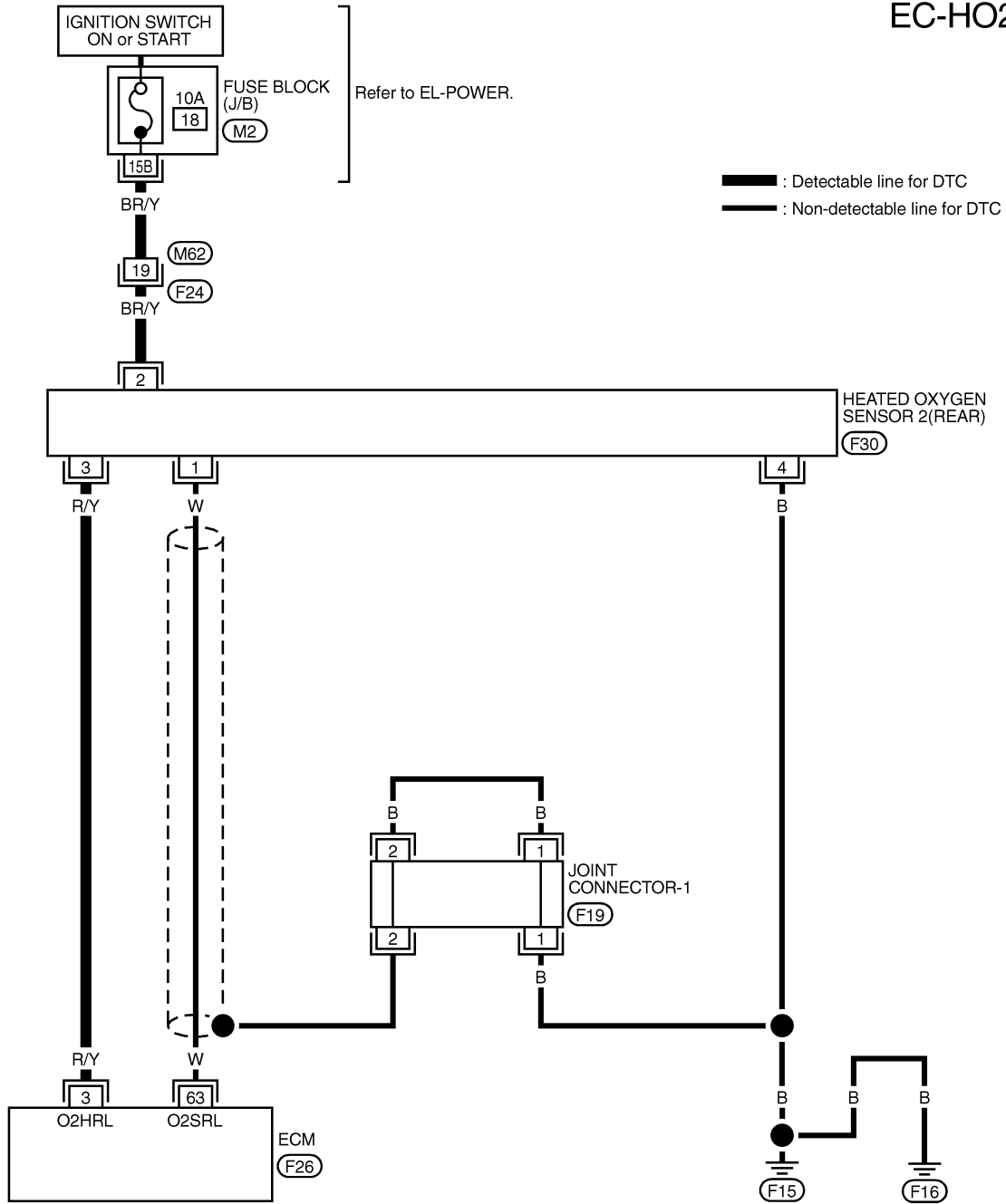
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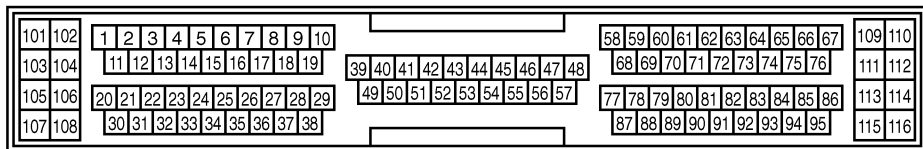
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REFER TO THE FOLLOWING.  
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)

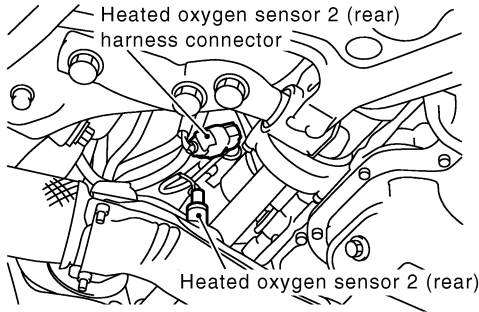
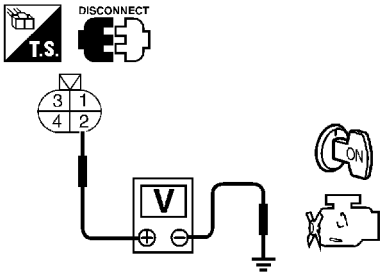


# DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0186

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>CHECK POWER SUPPLY</b> |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect heated oxygen sensor 2 (rear) harness connector.</p> <div style="text-align: center;">  <p>Heated oxygen sensor 2 (rear) harness connector</p> <p>Heated oxygen sensor 2 (rear)</p> <p><b>View from under the vehicle</b></p> </div> <p>3. Turn ignition switch "ON".<br/>                 4. Check voltage between HO2S2 terminal 2 and ground.</p> <div style="text-align: center;">  <p><b>Voltage: Battery voltage</b></p> <p><b>OK or NG</b></p> </div> |                           |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 3.                |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 2.                |

SEF918Z

SEF218W

|                                                                                                                                                                                                                                                              |                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                     | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M62, F24</li> <li>● Fuse block (J/B) connector M2</li> <li>● 10A fuse</li> <li>● Harness for open or short between heated oxygen sensor 2 (rear) and fuse</li> </ul> |                                   |
| ▶                                                                                                                                                                                                                                                            | Repair harness or connectors.     |

|                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                 | <b>CHECK OUTPUT SIGNAL CIRCUIT</b>                                                   |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect ECM harness connector.<br/>                 3. Check harness continuity between HO2S2 terminal 3 and ECM terminal 3.<br/>                 Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b></p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                      |
| OK                                                                                                                                                                                                                                                                                                                                                                                                       | ▶ GO TO 4.                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                       | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

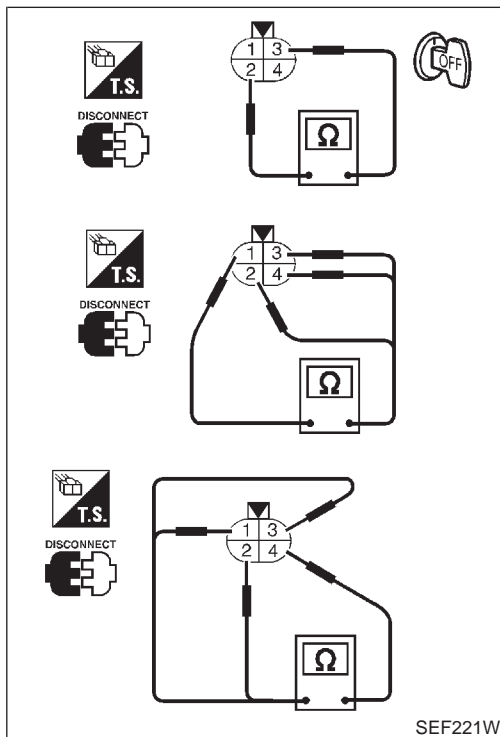
# DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

Diagnostic Procedure (Cont'd)

|                                          |                                                   |
|------------------------------------------|---------------------------------------------------|
| <b>4</b>                                 | <b>CHECK HEATED OXYGEN SENSOR 2 HEATER (REAR)</b> |
| Refer to "Component Inspection", EC-271. |                                                   |
| <b>OK or NG</b>                          |                                                   |
| OK                                       | ▶ GO TO 5.                                        |
| NG                                       | ▶ Replace heated oxygen sensor 2 (rear).          |

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>5</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
|                                                                | ▶ <b>INSPECTION END</b>            |

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## Component Inspection

### HEATED OXYGEN SENSOR 2 HEATER (REAR)

NCEC0187  
NCEC0187S01

Check the following.

- Check resistance between terminals 2 and 3.  
**Resistance: 2.3 - 4.3Ω at 25°C (77°F)**
- Check continuity.

| Terminal No.  | Continuity |
|---------------|------------|
| 1 and 2, 3, 4 | No         |
| 4 and 1, 2, 3 |            |

If NG, replace the heated oxygen sensor 2 (rear).

#### CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

# DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

On Board Diagnosis Logic

## On Board Diagnosis Logic

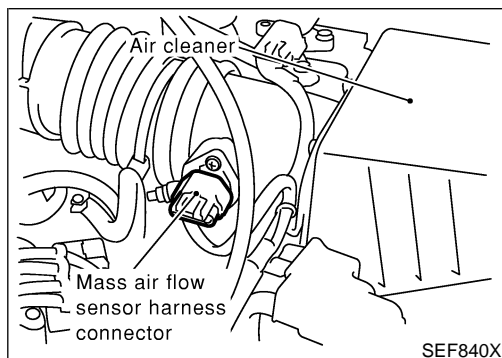
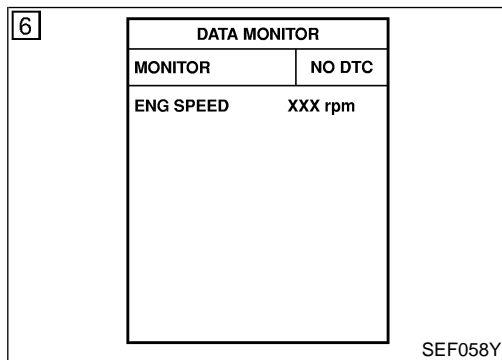
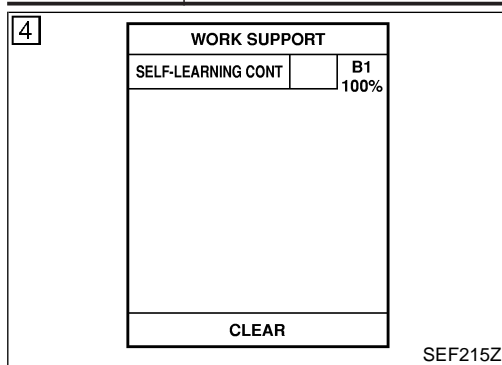
NCEC0188

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1 (front). The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

| Sensor                         | Input Signal to ECM                                              | ECM function                           | Actuator  |
|--------------------------------|------------------------------------------------------------------|----------------------------------------|-----------|
| Heated oxygen sensor 1 (front) | Density of oxygen in exhaust gas (Mixture ratio feedback signal) | Fuel injection & mixture ratio control | Injectors |

| DTC No. | Malfunction is detected when ...                                                                                                                                                                    | Check Items (Possible Cause)                                                                                                                                                                                                                  |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0171   | <ul style="list-style-type: none"> <li>Fuel injection system does not operate properly.</li> <li>The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)</li> </ul> | <ul style="list-style-type: none"> <li>Intake air leaks</li> <li>Heated oxygen sensor 1 (front)</li> <li>Injectors</li> <li>Exhaust gas leaks</li> <li>Incorrect fuel pressure</li> <li>Lack of fuel</li> <li>Mass air flow sensor</li> </ul> |



## DTC Confirmation Procedure

NCEC0189

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-275.
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction.
- Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-275. If engine does not start, visually check for exhaust and intake air leak.

### With GST

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 3 seconds at idle speed.
- Stop engine and reconnect mass air flow sensor harness connector.
- Select "MODE 7" with GST. Make sure 1st trip DTC P0100 is detected.
- Select "MODE 4" with GST and erase the 1st trip DTC P0100.



# DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

DTC Confirmation Procedure (Cont'd)

- 7) Start engine again and run it for at least 10 minutes at idle speed.
- 8) Select "MODE 7" with GST. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-275.
- 9) If it is difficult to start engine at step 8, the fuel injection system has a malfunction.
- 10) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-275. If engine does not start, visually check for exhaust and intake air leak.

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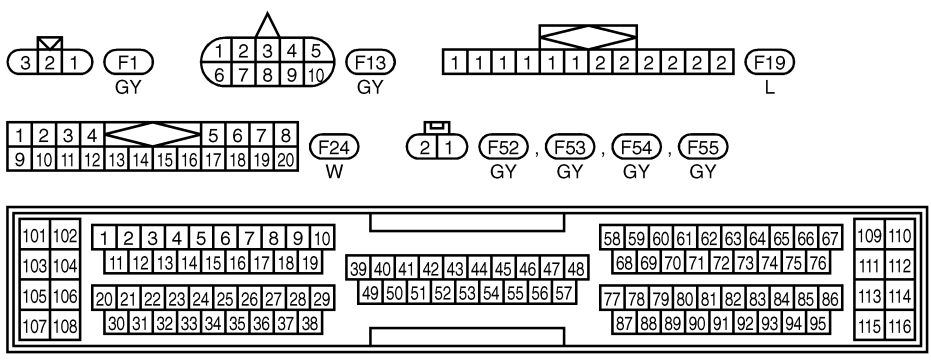
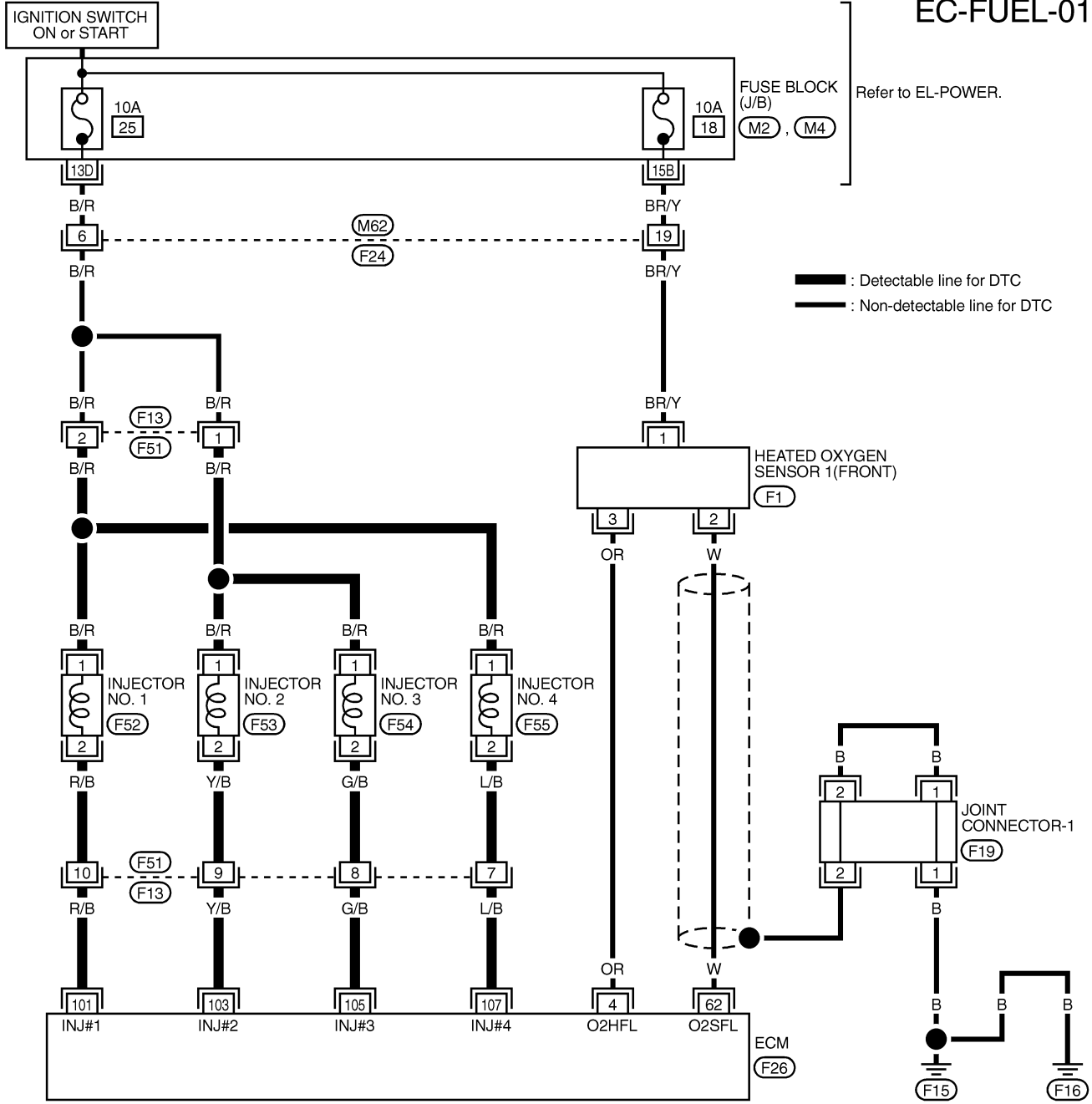
# DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

Wiring Diagram

## Wiring Diagram

NCEC0190

EC-FUEL-01



REFER TO THE FOLLOWING.  
 (M2), (M4) - FUSE BLOCK-JUNCTION BOX (J/B)



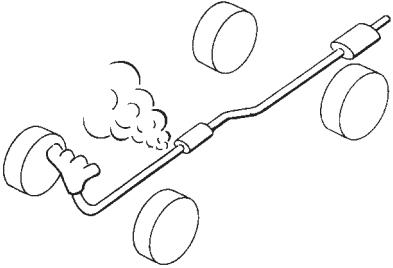
TEC795

# DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

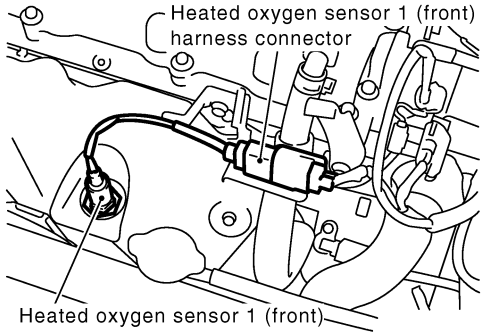
Diagnostic Procedure

## Diagnostic Procedure

NCEC0191

|                                                                                                             |                               |                    |
|-------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------|
| <b>1</b>                                                                                                    | <b>CHECK EXHAUST AIR LEAK</b> |                    |
| <p>1. Start engine and run it at idle.<br/>2. Listen for an exhaust air leak before three way catalyst.</p> |                               |                    |
|                           |                               |                    |
| SEF099P                                                                                                     |                               |                    |
| <b>OK or NG</b>                                                                                             |                               |                    |
| OK                                                                                                          | ▶                             | GO TO 2.           |
| NG                                                                                                          | ▶                             | Repair or replace. |

|                                                               |                                  |                    |
|---------------------------------------------------------------|----------------------------------|--------------------|
| <b>2</b>                                                      | <b>CHECK FOR INTAKE AIR LEAK</b> |                    |
| Listen for an intake air leak after the mass air flow sensor. |                                  |                    |
| <b>OK or NG</b>                                               |                                  |                    |
| OK                                                            | ▶                                | GO TO 3.           |
| NG                                                            | ▶                                | Repair or replace. |

|                                                                                                                                     |                                                     |                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------|
| <b>3</b>                                                                                                                            | <b>CHECK HEATED OXYGEN SENSOR 1 (FRONT) CIRCUIT</b> |                                                                                    |
| <p>1. Turn ignition switch "OFF".<br/>2. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.</p> |                                                     |                                                                                    |
|                                                 |                                                     |                                                                                    |
| SEF917Z                                                                                                                             |                                                     |                                                                                    |
| <b>OK or NG</b>                                                                                                                     |                                                     |                                                                                    |
| OK                                                                                                                                  | ▶                                                   | GO TO 4.                                                                           |
| NG                                                                                                                                  | ▶                                                   | Repair open circuit or short to ground or short to power in harness or connectors. |



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# DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

Diagnostic Procedure (Cont'd)

| 4                                                                                                                                                                                                                                                                                                                                 |   | CHECK FUEL PRESSURE |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------|
| 1. Release fuel pressure to zero.<br>Refer to EC-50.                                                                                                                                                                                                                                                                              |   |                     |
| 2. Install fuel pressure gauge and check fuel pressure.<br><b>At idling:</b><br><b>When fuel pressure regulator valve vacuum hose is connected.</b><br><b>235 kPa (2.4 kg/cm<sup>2</sup>, 34 psi)</b><br><b>When fuel pressure regulator valve vacuum hose is disconnected.</b><br><b>294 kPa (3.0 kg/cm<sup>2</sup>, 43 psi)</b> |   |                     |
| OK or NG                                                                                                                                                                                                                                                                                                                          |   |                     |
| OK                                                                                                                                                                                                                                                                                                                                | ▶ | GO TO 6.            |
| NG                                                                                                                                                                                                                                                                                                                                | ▶ | GO TO 5.            |

| 5                                                                                                                                                                                                                                              |   | DETECT MALFUNCTIONING PART |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----------------------------|
| Check the following.                                                                                                                                                                                                                           |   |                            |
| <ul style="list-style-type: none"><li>● Fuel pump and circuit (Refer to EC-583.)</li><li>● Fuel pressure regulator (Refer to EC-51.)</li><li>● Fuel lines. Refer to MA-16, "Checking Fuel Lines".</li><li>● Fuel filter for clogging</li></ul> |   |                            |
|                                                                                                                                                                                                                                                | ▶ | Repair or replace.         |

| 6                                                                                                                                                  |   | CHECK MASS AIR FLOW SENSOR                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------|
|  <b>With CONSULT-II</b>                                           |   |                                                                                                                                    |
| 1. Install all removed parts.                                                                                                                      |   |                                                                                                                                    |
| 2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.<br><b>at idling: 2.5 - 5.0 g-m/sec</b><br><b>at 2,500 rpm: 7.1 - 12.5 g-m/sec</b> |   |                                                                                                                                    |
|  <b>With GST</b>                                                |   |                                                                                                                                    |
| 1. Install all removed parts.                                                                                                                      |   |                                                                                                                                    |
| 2. Check mass air flow sensor signal in MODE 1 with GST.<br><b>at idling: 2.5 - 5.0 g-m/sec</b><br><b>at 2,500 rpm: 7.1 - 12.5 g-m/sec</b>         |   |                                                                                                                                    |
| OK or NG                                                                                                                                           |   |                                                                                                                                    |
| OK                                                                                                                                                 | ▶ | GO TO 7.                                                                                                                           |
| NG                                                                                                                                                 | ▶ | Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-154. |

# DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

Diagnostic Procedure (Cont'd)

## 7 CHECK FUNCTION OF INJECTORS

### With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

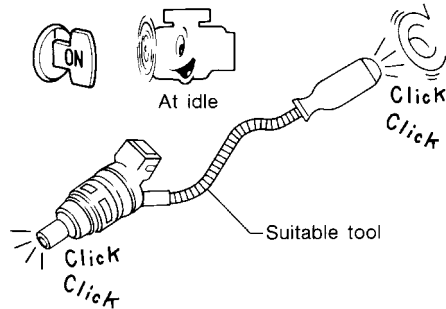
| ACTIVE TEST   |          |
|---------------|----------|
| POWER BALANCE |          |
| MONITOR       |          |
| ENG SPEED     | XXX rpm  |
| MAS A/F SE-B1 | XXX V    |
| IACV-AAC/V    | XXX step |
|               |          |
|               |          |

SEF190Y

3. Make sure that each circuit produces a momentary engine speed drop.

### Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

OK or NG

OK ► GO TO 8.

NG ► Perform trouble diagnosis for "INJECTORS", EC-574.

## 8 REMOVE INJECTOR

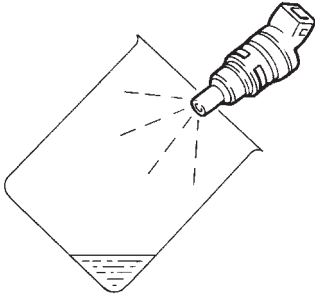
1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Remove injector with fuel tube assembly. Refer to EC-51.  
Keep fuel hose and all injectors connected to injector gallery. The injector harness connectors should remain connected.

► GO TO 9.

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

# DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                    |                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <b>9</b>                                                                                                                                                                           | <b>CHECK INJECTOR</b>                                                                       |
| <p>1. Disconnect all ignition wires.<br/>2. Place pans or saucers under each injector.<br/>3. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.</p> |                                                                                             |
|                                                                                                   |                                                                                             |
| <p>Fuel should be sprayed evenly for each cylinder.</p>                                                                                                                            |                                                                                             |
| <p>SEF595Q</p>                                                                                                                                                                     |                                                                                             |
| <p><b>OK or NG</b></p>                                                                                                                                                             |                                                                                             |
| OK                                                                                                                                                                                 | ▶ GO TO 10.                                                                                 |
| NG                                                                                                                                                                                 | ▶ Replace injectors from which fuel does not spray out. Always replace O-ring with new one. |

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>10</b>                                                      | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
|                                                                | ▶ <b>INSPECTION END</b>            |

# DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

On Board Diagnosis Logic

## On Board Diagnosis Logic

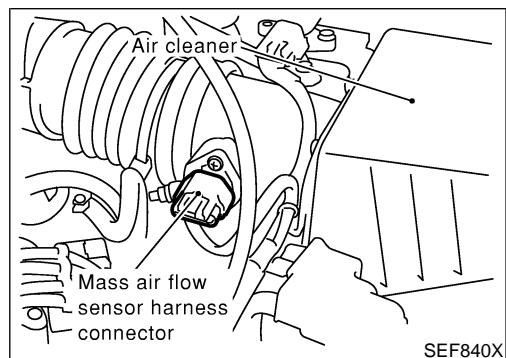
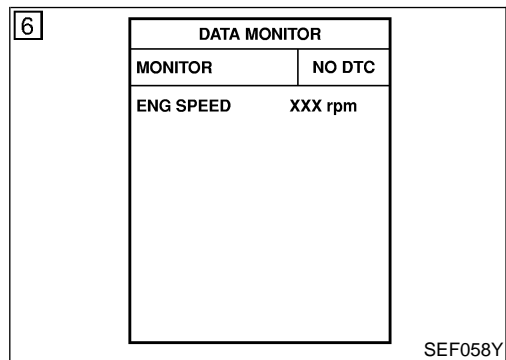
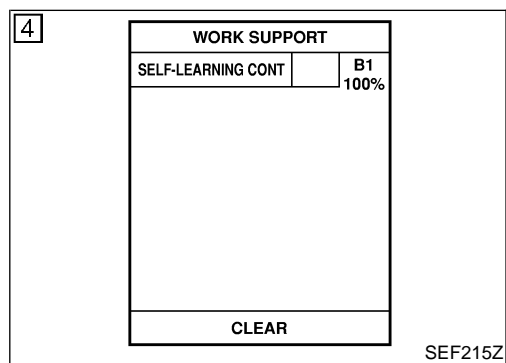
NCEC0192

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1 (front). The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

| Sensor                         | Input Signal to ECM                                              | ECM function                           | Actuator  |
|--------------------------------|------------------------------------------------------------------|----------------------------------------|-----------|
| Heated oxygen sensor 1 (front) | Density of oxygen in exhaust gas (Mixture ratio feedback signal) | Fuel injection & mixture ratio control | Injectors |

| DTC No. | Malfunction is detected when ...                                                                                                                                                                    | Check Items (Possible Cause)                                                                                                                                                                  |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0172   | <ul style="list-style-type: none"> <li>Fuel injection system does not operate properly.</li> <li>The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)</li> </ul> | <ul style="list-style-type: none"> <li>Heated oxygen sensor 1 (front)</li> <li>Injectors</li> <li>Exhaust gas leaks</li> <li>Incorrect fuel pressure</li> <li>Mass air flow sensor</li> </ul> |



## DTC Confirmation Procedure

NCEC0193

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### Ⓜ With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-282.
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction.
- Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-282. If engine does not start, remove ignition plugs and check for fouling, etc.

### Ⓜ With GST

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 3 seconds at idle speed.
- Stop engine and reconnect mass air flow sensor harness connector.
- Select "MODE 7" with GST. Make sure 1st trip DTC P0100 is detected.
- Select "MODE 4" with GST and erase the 1st trip DTC P0100.

## DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

*DTC Confirmation Procedure (Cont'd)*

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- 7) Start engine again and run it for at least 10 minutes at idle speed.
- 8) Select "MODE 7" with GST. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-282.
- 9) If it is difficult to start engine at step 8, the fuel injection system has a malfunction.
- 10) Crank engine while depressing accelerator pedal.  
If engine starts, go to "Diagnostic Procedure", EC-282. If engine does not start, remove ignition plugs and check for fouling, etc.

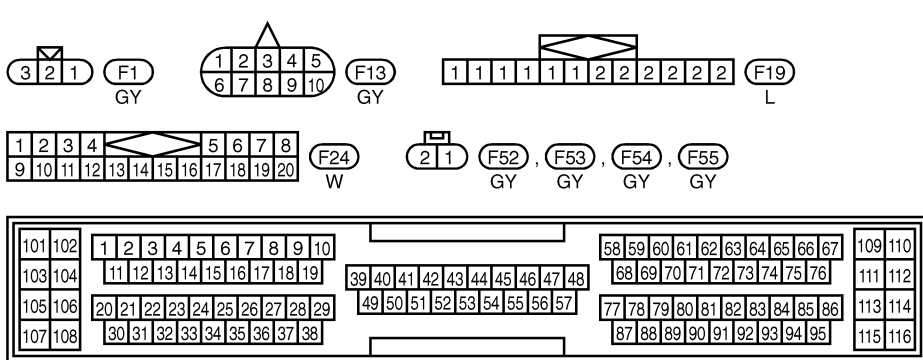
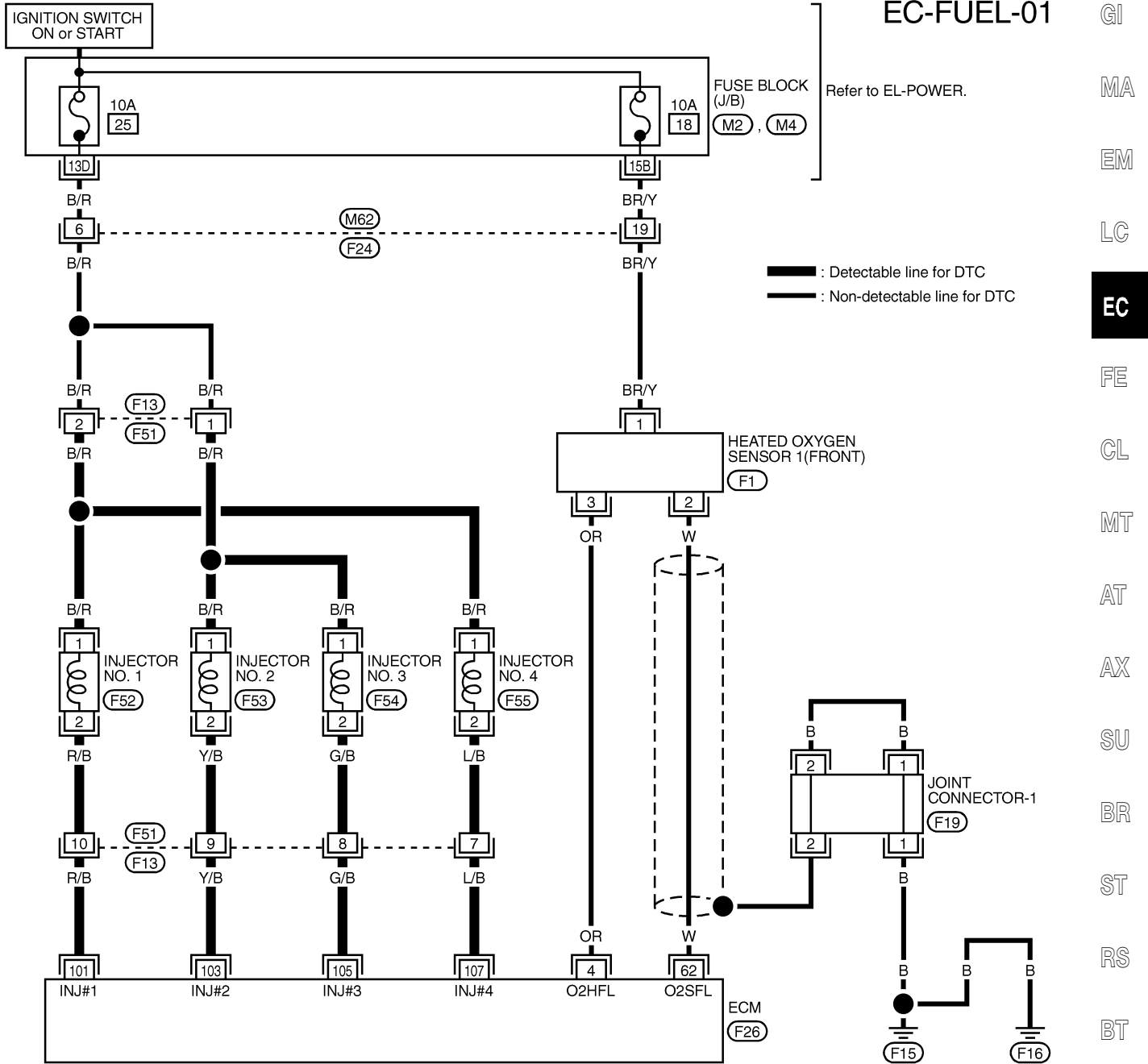


# DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

Wiring Diagram

## Wiring Diagram

NCEC0194



REFER TO THE FOLLOWING.

(M2), (M4) - FUSE BLOCK-JUNCTION BOX (J/B)



GI  
MA  
EM  
LC  
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IDX

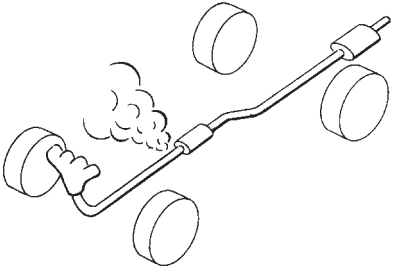
TEC795

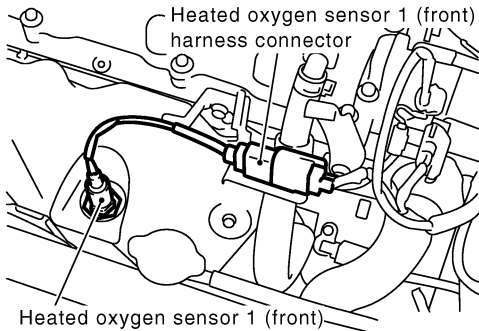
# DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0195

|                                                                                                                                                                                                                                              |                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>1</b>                                                                                                                                                                                                                                     | <b>CHECK FOR EXHAUST AIR LEAK</b> |
| <p>1. Start engine and run it at idle.<br/>2. Listen for an exhaust air leak before the three way catalyst.</p>  <p style="text-align: right;">SEF099P</p> |                                   |
| <b>OK or NG</b>                                                                                                                                                                                                                              |                                   |
| OK                                                                                                                                                                                                                                           | ▶ GO TO 2.                        |
| NG                                                                                                                                                                                                                                           | ▶ Repair or replace.              |

|                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>CHECK HEATED OXYGEN SENSOR 1 (FRONT) CIRCUIT</b>                                  |
| <p>1. Turn ignition switch "OFF".<br/>2. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.</p>  <p style="text-align: right;">SEF917Z</p>                                                                                                                                                                           |                                                                                      |
| <p>3. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>4. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should not exist.</b></p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                      |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶ GO TO 3.                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

# DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

Diagnostic Procedure (Cont'd)



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>CHECK FUEL PRESSURE</b> |
| <p>1. Release fuel pressure to zero.<br/>Refer to EC-50.</p> <p>2. Install fuel pressure gauge and check fuel pressure.</p> <p><b>At idling:</b></p> <p><b>When fuel pressure regulator valve vacuum hose is connected.</b><br/>Approximately 235 kPa (2.4 kg/cm<sup>2</sup>, 34 psi)</p> <p><b>When fuel pressure regulator valve vacuum hose is disconnected.</b><br/>Approximately 294 kPa (3.0 kg/cm<sup>2</sup>, 43 psi)</p> <p style="text-align: center;"><b>OK or NG</b></p> |                            |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ GO TO 5.                 |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ GO TO 4.                 |

GI  
MA  
EM  
LC

**EC**

|                                                                                                                                                                           |                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>4</b>                                                                                                                                                                  | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>Fuel pump and circuit (Refer to EC-583.)</li> <li>Fuel pressure regulator (Refer to EC-51.)</li> </ul> |                                   |
|                                                                                                                                                                           | ▶ Repair or replace.              |



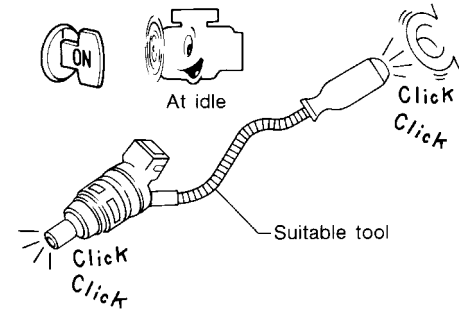
FE  
CL

|                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                             | <b>CHECK MASS AIR FLOW SENSOR</b>                                                                                                    |
| <p> <b>With CONSULT-II</b></p> <p>1. Install all removed parts.</p> <p>2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.</p> <p style="padding-left: 20px;"><b>at idling: 2.5 - 5.0 g-m/sec</b></p> <p style="padding-left: 20px;"><b>at 2,500 rpm: 7.1 - 12.5 g-m/sec</b></p>                                       |                                                                                                                                      |
| <p> <b>With GST</b></p> <p>1. Install all removed parts.</p> <p>2. Check mass air flow sensor signal in MODE 1 with GST.</p> <p style="padding-left: 20px;"><b>at idling: 2.5 - 5.0 g-m/sec</b></p> <p style="padding-left: 20px;"><b>at 2,500 rpm: 7.1 - 12.5 g-m/sec</b></p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                                                                      |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ GO TO 6.                                                                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-154. |

MT  
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SU  
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ST  
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IDX

# DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

Diagnostic Procedure (Cont'd)

| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                                  | <b>CHECK FUNCTION OF INJECTORS</b> |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------------------------------------------------|--|---------------|--|---------|--|-----------|---------|---------------|-------|------------|----------|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Start engine.</li> <li>Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.</li> </ol>                                                                                                                                                   |                                    |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS A/F SE-B1</td><td>XXX V</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table> |                                    | ACTIVE TEST                                        |  | POWER BALANCE |  | MONITOR |  | ENG SPEED | XXX rpm | MAS A/F SE-B1 | XXX V | IACV-AAC/V | XXX step |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                               |                                    |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
| POWER BALANCE                                                                                                                                                                                                                                                                                                                                                                                             |                                    |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                   |                                    |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                 | XXX rpm                            |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
| MAS A/F SE-B1                                                                                                                                                                                                                                                                                                                                                                                             | XXX V                              |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
| IACV-AAC/V                                                                                                                                                                                                                                                                                                                                                                                                | XXX step                           |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                           |                                    |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                           |                                    |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
| <p>3. Make sure that each circuit produces a momentary engine speed drop.</p>                                                                                                                                                                                                                                                                                                                             |                                    |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
| <p> <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Start engine.</li> <li>Listen to each injector operating sound.</li> </ol>                                                                                                                                                                      |                                    |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                        |                                    |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
| <p><b>Clicking noise should be heard.</b></p> <p><b>OK or NG</b></p>                                                                                                                                                                                                                                                                                                                                      |                                    |                                                    |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                        | ▶                                  | GO TO 7.                                           |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                        | ▶                                  | Perform trouble diagnosis for "INJECTORS", EC-575. |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |

SEF190Y

MEC703B

|                                                                                                                                                                                                                                                                                                      |                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <b>7</b>                                                                                                                                                                                                                                                                                             | <b>REMOVE INJECTOR</b> |
| <ol style="list-style-type: none"> <li>Confirm that the engine is cooled down and there are no fire hazards near the vehicle.</li> <li>Turn ignition switch "OFF".</li> <li>Remove injector assembly. Refer to EC-51.<br/>Keep fuel hose and all injectors connected to injector gallery.</li> </ol> |                        |
| <p>▶ GO TO 8.</p>                                                                                                                                                                                                                                                                                    |                        |

|                                                                                                                                                                                                                                                                                         |                       |                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------|
| <b>8</b>                                                                                                                                                                                                                                                                                | <b>CHECK INJECTOR</b> |                                                                                        |
| <ol style="list-style-type: none"> <li>Disconnect all injector harness connectors.</li> <li>Disconnect all ignition wires.</li> <li>Prepare pans or saucers under each injectors.</li> <li>Crank engine for about 3 seconds.<br/>Make sure fuel does not drip from injector.</li> </ol> |                       |                                                                                        |
| <p><b>OK or NG</b></p>                                                                                                                                                                                                                                                                  |                       |                                                                                        |
| OK (Does not drip)                                                                                                                                                                                                                                                                      | ▶                     | GO TO 9.                                                                               |
| NG (Drips)                                                                                                                                                                                                                                                                              | ▶                     | Replace the injectors from which fuel is dripping. Always replace O-ring with new one. |

# DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

Diagnostic Procedure (Cont'd)

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>9</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
| ▶                                                              | <b>INSPECTION END</b>              |

GI

MA

EM

LC

**EC**

FE

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SU

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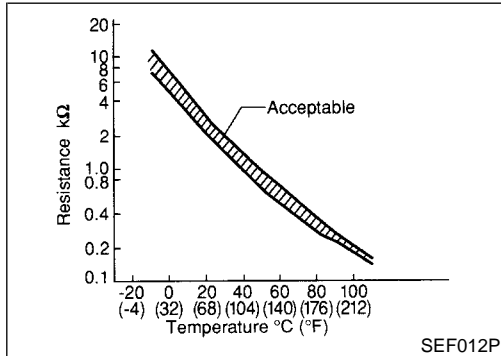
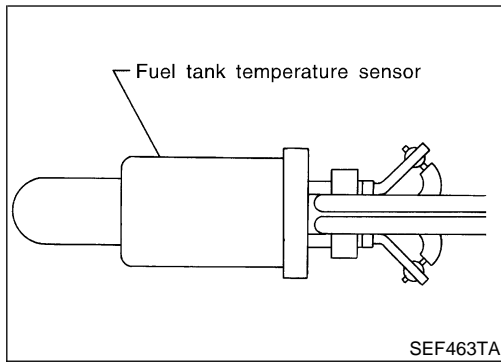
SC

EL

IDX

# DTC P0180 FUEL TANK TEMPERATURE SENSOR

## Component Description



## Component Description

NCEC0196

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

### <Reference data>

| Fluid temperature °C (°F) | Voltage* V | Resistance kΩ |
|---------------------------|------------|---------------|
| 20 (68)                   | 3.5        | 2.3 - 2.7     |
| 50 (122)                  | 2.2        | 0.79 - 0.90   |

\*: These data are reference values and are measured between ECM terminal 82 (Fuel tank temperature sensor) and ground.

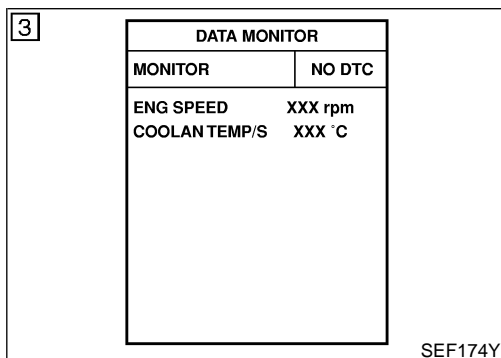
### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

## On Board Diagnosis Logic

NCEC0197

| DTC No. | Malfunction is detected when ...                                                                                                                                                                                                                                       | Check Items (Possible Cause)                                                                                                                           |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0180   | <ul style="list-style-type: none"> <li>An excessively high or low voltage is sent to ECM.</li> <li>Rationally incorrect voltage is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Fuel tank temperature sensor</li> </ul> |



## DTC Confirmation Procedure

NCEC0198

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### ④ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 10 seconds.

If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-289.

# DTC P0180 FUEL TANK TEMPERATURE SENSOR

DTC Confirmation Procedure (Cont'd)

If the result is OK, go to following step.

- 4) Check "COOLAN TEMP/S" signal.  
If the signal is less than 60°C (140°F), the result will be OK. GI  
If the signal is above 60°C (140°F), go to the following step.
- 5) Cool engine down until "COOLAN TEMP/S" signal is less than 60°C (140°F). MA
- 6) Wait at least 10 seconds.
- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-289. EM

LC



## With GST

Follow the procedure "With CONSULT-II" above.

EC

FE

GL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

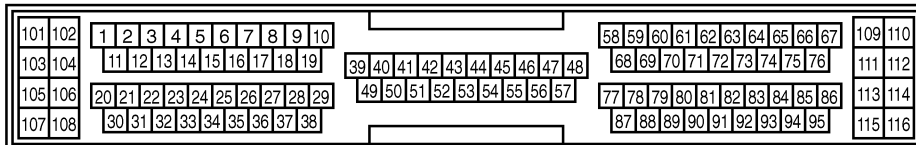
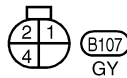
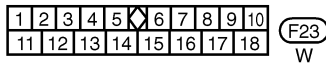
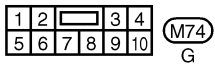
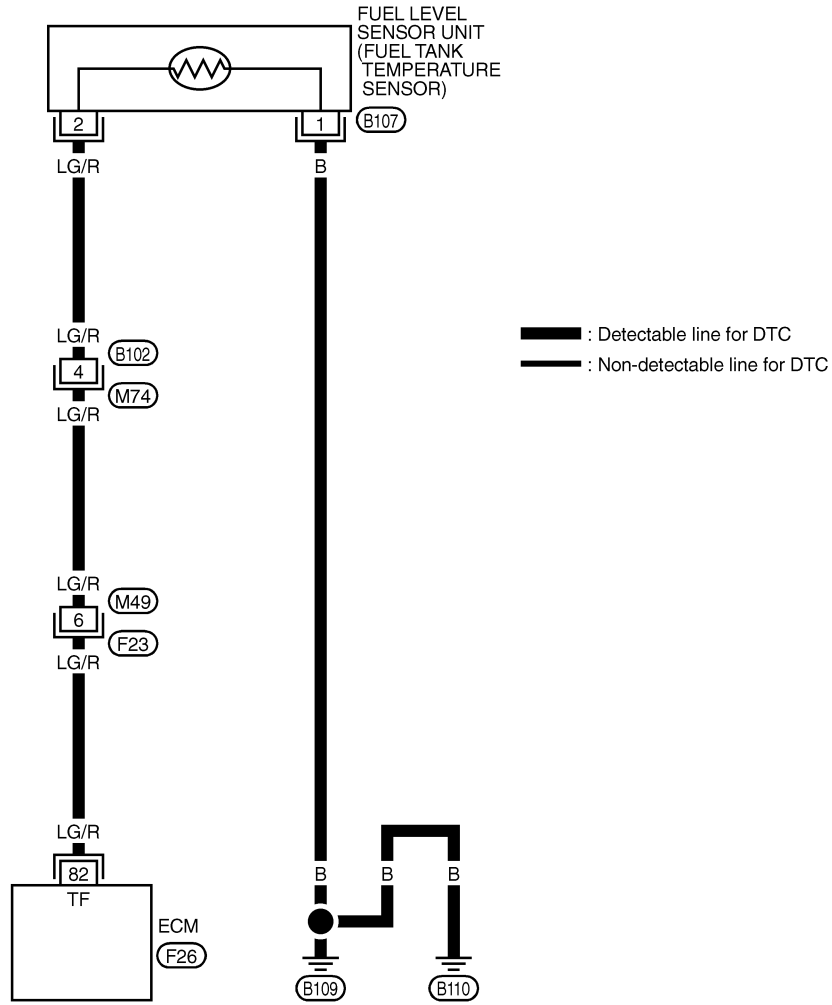
# DTC P0180 FUEL TANK TEMPERATURE SENSOR

Wiring Diagram

## Wiring Diagram

NCEC0199

EC-TFTS-01

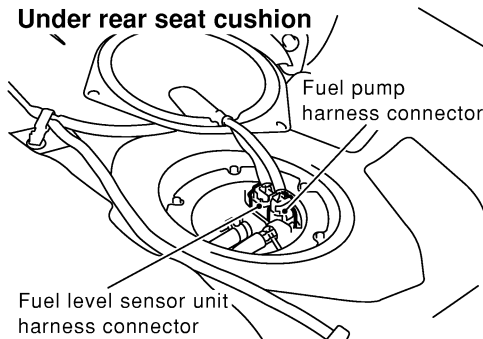
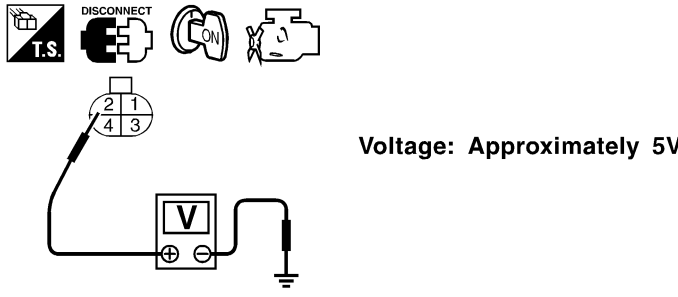


TEC707



## Diagnostic Procedure

NCEC0200

|          |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                               |
|----------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>1</b> | <b>CHECK POWER SUPPLY</b> | <p>1. Turn ignition switch "OFF".<br/>2. Disconnect fuel level sensor unit harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON".<br/>4. Check voltage between fuel level sensor unit terminal 2 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p><b>Voltage: Approximately 5V</b></p> </div> <p style="text-align: center;"><b>OK or NG</b></p> | <p>GI<br/>MA<br/>EM<br/>LC<br/><b>EC</b><br/>FE<br/>CL<br/>MT<br/>AT<br/>AX<br/>SU<br/>BR</p> |
| OK       | ▶                         | GO TO 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                               |
| NG       | ▶                         | GO TO 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                               |

|          |                                   |                                                                                                                                                                                                                                                                                                  |                         |
|----------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>2</b> | <b>DETECT MALFUNCTIONING PART</b> | <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors B102, M74</li> <li>● Harness connectors M49, F23</li> <li>● Harness for open or short between ECM and fuel level sensor unit</li> </ul> <p style="text-align: right;">▶ Repair harness or connector.</p> | <p>ST<br/>RS<br/>BT</p> |
|----------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|

|          |                             |                                                                                                                                                                                                                                                                                                    |                                 |
|----------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| <b>3</b> | <b>CHECK GROUND CIRCUIT</b> | <p>1. Turn ignition switch "OFF".<br/>2. Check harness continuity between fuel level sensor unit terminal 1 and body ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b><br/>3. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> | <p>HA<br/>SC<br/>EL<br/>IDX</p> |
| OK       | ▶                           | GO TO 4.                                                                                                                                                                                                                                                                                           |                                 |
| NG       | ▶                           | Repair open circuit or short to power in harness or connectors.                                                                                                                                                                                                                                    |                                 |

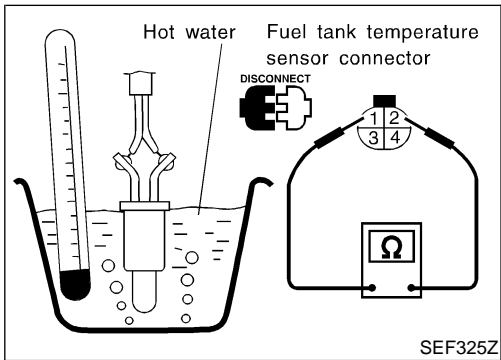
# DTC P0180 FUEL TANK TEMPERATURE SENSOR

Diagnostic Procedure (Cont'd)

|                                          |                                           |                                       |
|------------------------------------------|-------------------------------------------|---------------------------------------|
| <b>4</b>                                 | <b>CHECK FUEL TANK TEMPERATURE SENSOR</b> |                                       |
| Refer to "Component Inspection", EC-290. |                                           |                                       |
| OK or NG                                 |                                           |                                       |
| OK                                       | ▶                                         | GO TO 5.                              |
| NG                                       | ▶                                         | Replace fuel tank temperature sensor. |

|                                                                |                                    |                         |
|----------------------------------------------------------------|------------------------------------|-------------------------|
| <b>5</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |                         |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                         |
|                                                                |                                    | ▶ <b>INSPECTION END</b> |



## Component Inspection

### FUEL TANK TEMPERATURE SENSOR

NCEC0201

NCEC0201S01

Check resistance by heating with hot water or heat gun as shown in the figure.

| Temperature °C (°F) | Resistance kΩ |
|---------------------|---------------|
| 20 (68)             | 2.3 - 2.7     |
| 50 (122)            | 0.79 - 0.90   |

If NG, replace fuel tank temperature sensor.

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

System Description

## System Description

NCEC0505

NCEC0505S01

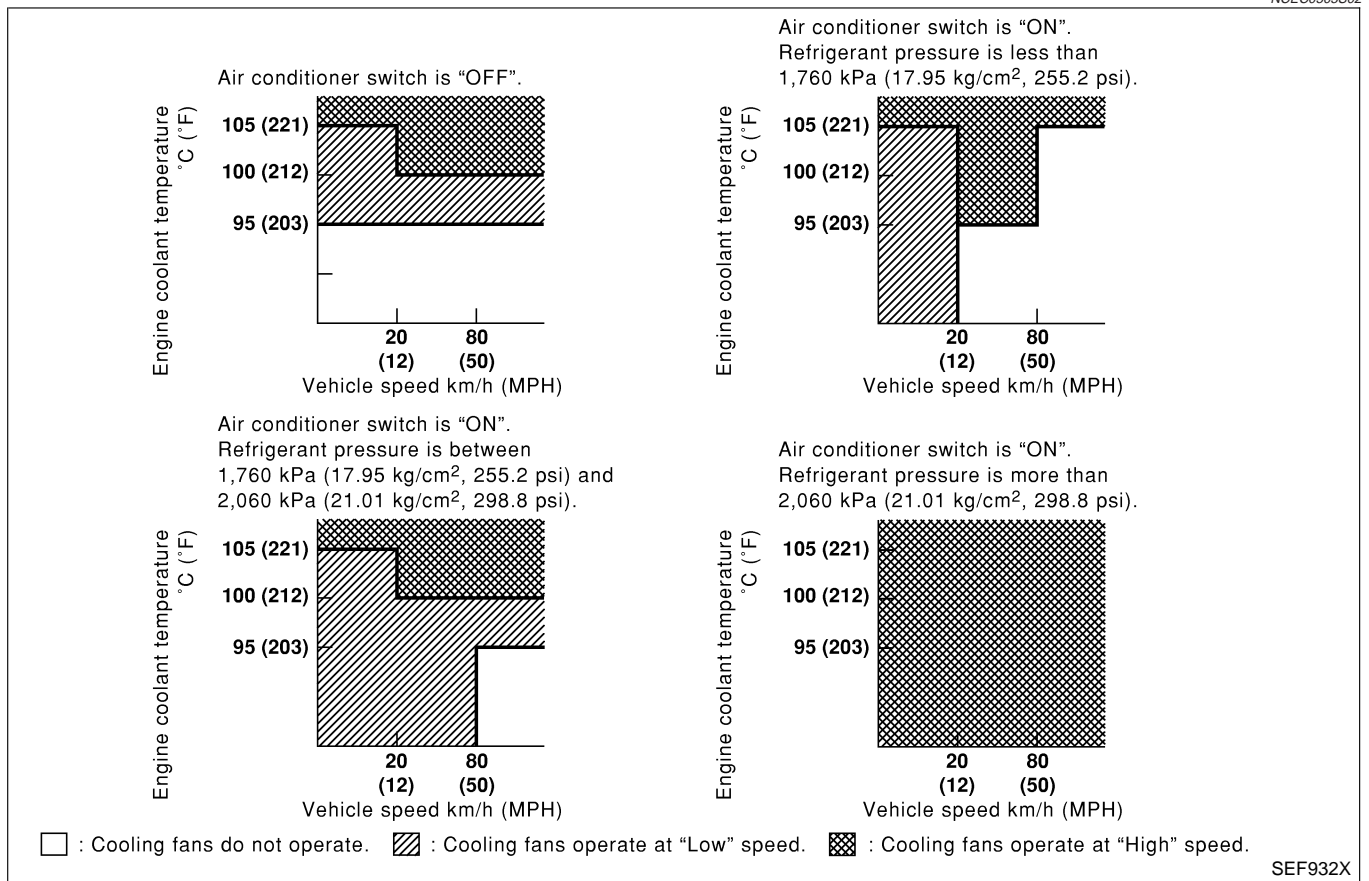
### COOLING FAN CONTROL

| Sensor                            | Input Signal to ECM         | ECM function        | Actuator             |
|-----------------------------------|-----------------------------|---------------------|----------------------|
| Vehicle speed sensor              | Vehicle speed               | Cooling fan control | Cooling fan relay(s) |
| Engine coolant temperature sensor | Engine coolant temperature  |                     |                      |
| Air conditioner switch            | Air conditioner "ON" signal |                     |                      |
| Ignition switch                   | Start signal                |                     |                      |
| Refrigerant pressure sensor       | Refrigerant pressure        |                     |                      |

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

### OPERATION

NCEC0505S02



SEF932X

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0506

Specification data are reference values.

| MONITOR ITEM | CONDITION                                   | SPECIFICATION                                    |
|--------------|---------------------------------------------|--------------------------------------------------|
| AIR COND SIG | • Engine: After warming up, idle the engine | Air conditioner switch: OFF                      |
|              |                                             | Air conditioner switch: ON (Compressor operates) |

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

| MONITOR ITEM | CONDITION                                                                                                                        |                                                                      | SPECIFICATION |
|--------------|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------|
| COOLING FAN  | <ul style="list-style-type: none"> <li>After warming up engine, idle the engine.</li> <li>Air conditioner switch: OFF</li> </ul> | Engine coolant temperature is 94°C (201°F) or less                   | OFF           |
|              |                                                                                                                                  | Engine coolant temperature is between 95°C (203°F) and 104°C (219°F) | LOW           |
|              |                                                                                                                                  | Engine coolant temperature is 105°C (221°F) or more                  | HIGH          |

## ECM Terminals and Reference Value

NCEC0643

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                     | CONDITION                                                | DATA (DC Voltage)             |
|----------------------|---------------|--------------------------|----------------------------------------------------------|-------------------------------|
| 12                   | LG            | Cooling fan relay (High) | [Engine is running]<br>● Cooling fan is not operating    | BATTERY VOLTAGE<br>(11 - 14V) |
|                      |               |                          | [Engine is running]<br>● Cooling fan (High) is operating | 0 - 0.6V                      |
| 13                   | L/Y           | Cooling fan relay (Low)  | [Engine is running]<br>● Cooling fan is not operating    | BATTERY VOLTAGE<br>(11 - 14V) |
|                      |               |                          | [Engine is running]<br>● Cooling fan is operating        | 0 - 0.6V                      |

## On Board Diagnosis Logic

NCEC0507

This diagnosis checks whether the engine coolant temperature is extraordinary high, even when the load is not heavy.

When malfunction is detected, the malfunction indicator lamp (MIL) will light up even in the first trip.

Malfunction is detected when engine coolant temperature is excessively high under normal engine speed.

## Possible Cause

NCEC0508

- Harness or connectors (The cooling fan circuit is open or shorted)
- Cooling fan
- Thermostat
- Improper ignition timing
- Engine coolant temperature sensor
- Blocked radiator
- Blocked front end (Improper fitting of nose mask)

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Possible Cause (Cont'd)

- Crushed vehicle frontal area (Vehicle frontal is collided but not repaired)
- Blocked air passage by improper installation of front fog lamp or fog lamps.
- Improper mixture ratio of coolant
- Damaged bumper

For more information, refer to "MAIN 12 CAUSES OF OVERHEATING", EC-308.

## CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to MA-14, "Changing Engine Coolant". Also, replace the engine oil. Refer to MA-18, "Changing Engine Oil".

- 1) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-12, "Anti-freeze Coolant Mixture Ratio".
- 2) After refilling coolant, run engine to ensure that no water-flow noise is emitted.

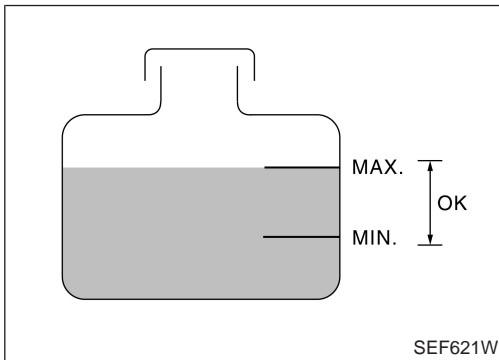
## Overall Function Check

Use this procedure to check the overall function of the coolant overtemperature enrichment protection check, a DTC might not be confirmed.

## WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high-pressure fluid escaping from the radiator.

Wrap a thick cloth around the cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.



## WITH CONSULT-II

- 1) Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator.  
**Allow engine to cool before checking coolant level and mixture ratio.**
  - If the coolant level in the reservoir and/or radiator is below the proper range, go to "Diagnostic Procedure", EC-297.
  - If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure MA-14, "Changing Engine Coolant".
- a) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to MA-12, "Anti-freeze Coolant Mixture Ratio".
- b) After refilling coolant, run engine to ensure that no water-flow noise is emitted.
- c) After checking or replacing coolant, go to step 3 below.
- 2) Ask the customer if engine coolant has been added. If it has been added, go to "Diagnostic Procedure", EC-297. After repair, go to the next step.
- 3) Start engine and let it idle.
- 4) Make sure that A/C switch is "OFF" and air conditioner is not

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Overall Function Check (Cont'd)

operating. If NG, check air conditioner circuit. Refer to HA-23 or HA-140, "TROUBLE DIAGNOSES". After repair, go to the next step.

- 5) Perform "ENG COOLANT TEMP" in "ACTIVE TEST" mode with CONSULT-II.
  - a) Set "ENG COOLANT TEMP" to 95°C (203°F) and make sure that cooling fan operates at low speed.  
If NG, go to "Diagnostic Procedure", EC-297.
  - b) Set "ENG COOLANT TEMP" to 105°C (221°F) and make sure that cooling fan operates at high speed. If NG, go to "Diagnostic Procedure", EC-297. After repair, go to the next step.
- 6) Check for blocked coolant passage.
  - a) Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows.  
If NG, go to "Diagnostic Procedure", EC-297. After repair, go to the next step.  
**Be extremely careful not to touch any moving or adjacent parts.**
- 7) Check for blocked radiator air passage.
  - a) When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator.
  - b) Check the front end for clogging caused by insects or debris.
  - c) Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front.  
If NG, take appropriate action and then go to the next step.
- 8) Check function of ECT sensor.  
Refer to step 7 of "Diagnostic Procedure", EC-297.  
If NG, replace ECT sensor and go to the next step.
- 9) Check ignition timing. Refer to basic inspection, EC-107.  
Make sure that ignition timing is 15°±2° at idle.  
If NG, adjust ignition timing and then recheck.

## WITH GST

NCEC0509S02

- 1) Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator.  
**Allow engine to cool before checking coolant level and mixture ratio.**
  - If the coolant level in the reservoir and/or radiator is below the proper range, and go to "Diagnostic Procedure", EC-297.
  - If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure MA-14, "Changing Engine Coolant".
- a) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to MA-12, "Anti-freeze Coolant Mixture Ratio".
- b) After refilling coolant, run engine to ensure that no water-flow noise is emitted.
- c) After checking or replacing coolant, go to step 3 below.
- 2) Ask the customer if engine coolant has been added. If it has been added, go to "Diagnostic Procedure", EC-297. After repair, go to the next step.
- 3) Start engine and let it idle.
- 4) Make sure that A/C switch is "OFF" and air conditioner is not operating. If NG, check air conditioner circuit. Refer to HA-23 or HA-140, "TROUBLE DIAGNOSES". After repair, go to the next step.

## EC-294

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Overall Function Check (Cont'd)

- 5) Turn ignition switch "OFF"
- 6) Disconnect engine coolant temperature sensor harness connector. GI
- 7) Connect 150Ω resistor to engine coolant temperature sensor.
- 8) Start engine and make sure that cooling fan operates. MA  
**Be careful not to overheat engine.**  
If NG, go to "Diagnostic Procedure", EC-297. After repair, go to the next step. EM
- 9) Check for blocked coolant passage.
- a) Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows. LC  
If NG, go to "Diagnostic Procedure", EC-297. After repair, go to the next step. **EC**  
**Be extremely careful not to touch any moving or adjacent parts.**
- 10) Check for blocked radiator air passage. FE
- a) When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator. CL
- b) Check the front end for clogging caused by insects or debris.
- c) Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front. MT  
If NG, take appropriate action and then go to the next step.
- 11) Check function of ECT sensor. AT  
Refer to step 6 of "Diagnostic Procedure", EC-297.  
If NG, replace ECT sensor and go to the next step.
- 12) Check ignition timing. Refer to basic inspection, EC-107. AX  
Make sure that ignition timing is  $15^{\circ} \pm 2^{\circ}$  at idle.  
If NG, adjust ignition timing and then recheck. SU

BR

ST

RS

BT

HA

SC

EL

IDX

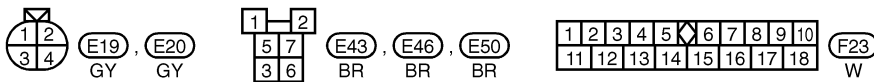
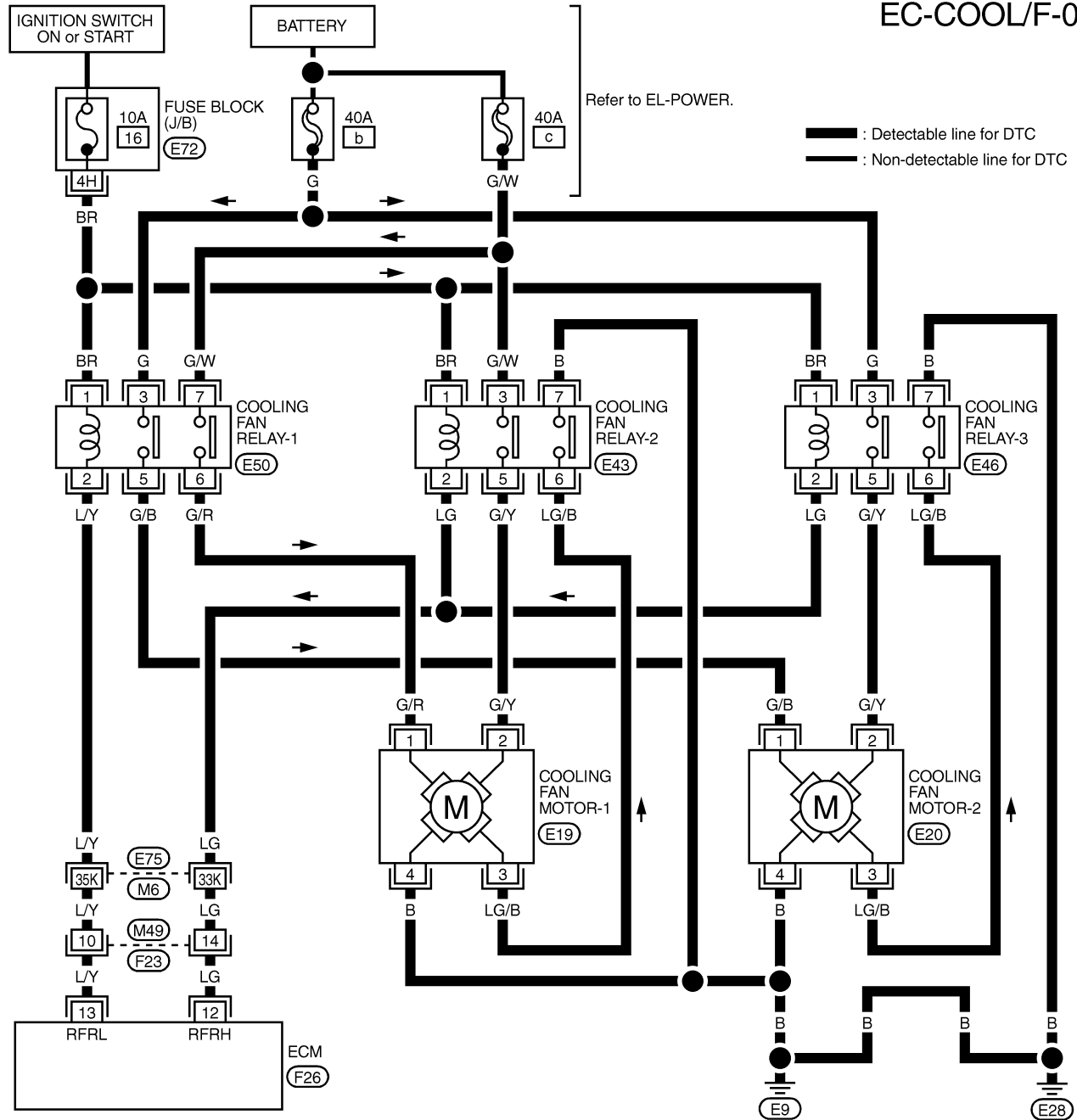
# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Wiring Diagram

## Wiring Diagram

NCEC0510

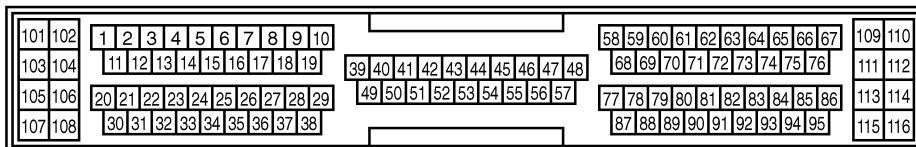
EC-COOL/F-01



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(E72) -FUSE BLOCK-JUNCTION BOX (J/B)



TEC777


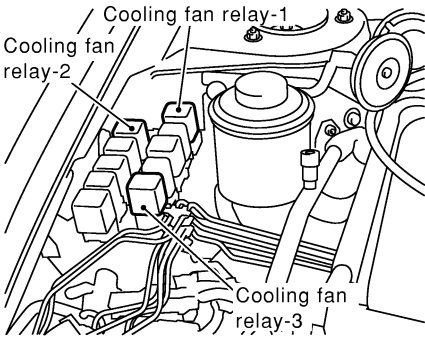


## Diagnostic Procedure

NCEC0511

|                         |                         |          |
|-------------------------|-------------------------|----------|
| <b>1</b>                | <b>INSPECTION START</b> |          |
| Do you have CONSULT-II? |                         |          |
| <b>Yes or No</b>        |                         |          |
| Yes                     | ▶                       | GO TO 2. |
| No                      | ▶                       | GO TO 4. |

GI  
MA  
EM

| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>CHECK COOLING FAN LOW SPEED OPERATION</b> |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------|--|-------------|-----|---------|--|---------------|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <p>1. Disconnect cooling fan relays-2 and -3.</p> <div style="text-align: center;">  </div> <p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p> <div style="text-align: center;"> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>LOW</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> </div> <p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                              |                                                                           | ACTIVE TEST |  | COOLING FAN | LOW | MONITOR |  | COOLAN TEMP/S | XXX °C |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| COOLING FAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | LOW                                          |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| COOLAN TEMP/S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | XXX °C                                       |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶                                            | GO TO 3.                                                                  |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶                                            | Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-303.) |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

LC

**EC**

FE

CL

MT

SEF857X

AT

AX

SU

BR

ST

SEF784Z

RS

BT

HA

SC

EL

IDX

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (Cont'd)

| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>CHECK COOLING FAN HIGH SPEED OPERATION</b> |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------------|--|-------------|------|---------|--|---------------|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p>Ⓟ <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Reconnect cooling fan relays-2 and -3.</li> <li>3. Disconnect cooling fan relay-1.</li> <li>4. Turn ignition switch "ON".</li> <li>5. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</li> </ol>                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>HIGH</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> |                                               | ACTIVE TEST                                                                |  | COOLING FAN | HIGH | MONITOR |  | COOLAN TEMP/S | XXX °C |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| COOLING FAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | HIGH                                          |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| COOLAN TEMP/S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | XXX °C                                        |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SEF785Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <p>6. Make sure that cooling fans-1 and -2 operate at higher speed than low speed.</p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                                                                                                                                                                                                                                          |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶                                             | GO TO 6.                                                                   |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶                                             | Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-306.) |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

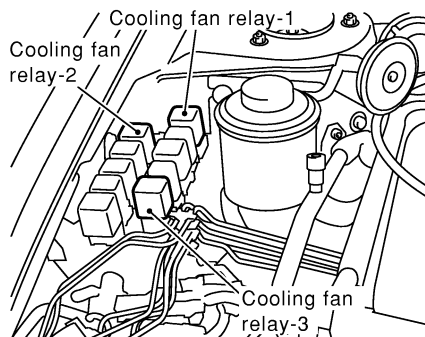
Diagnostic Procedure (Cont'd)

GI  
MA  
EM  
LC  
EC  
FE  
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IDX

## 4 CHECK COOLING FAN LOW SPEED OPERATION

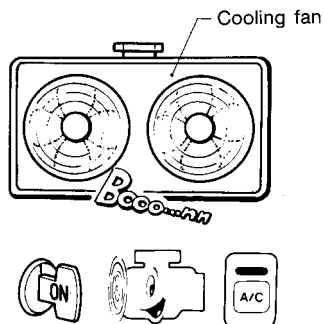
⊗ Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3.



SEF857X

2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fans-1 and -2 operate at low speed.



SEC163BA

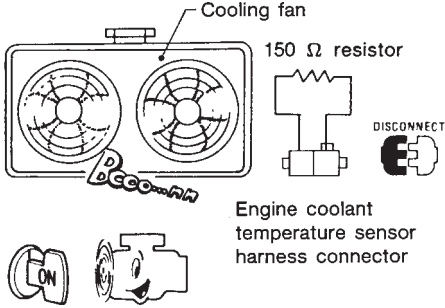
OK or NG

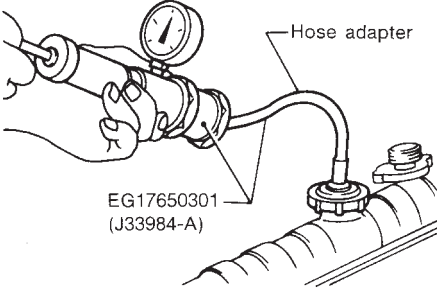
OK ► GO TO 5.

NG ► Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-303.)

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (Cont'd)

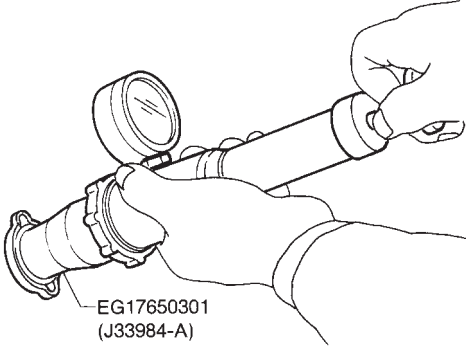
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                               |                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>CHECK COOLING FAN HIGH SPEED OPERATION</b> |                                                                            |
| <p>⊗ <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Turn ignition switch "OFF".</li> <li>Reconnect cooling fan relays-2 and -3.</li> <li>Disconnect cooling fan relay-1.</li> <li>Turn air conditioner switch and blower fan switch "OFF".</li> <li>Disconnect engine coolant temperature sensor harness connector.</li> <li>Connect 150Ω resistor to engine coolant temperature sensor harness connector.</li> <li>Restart engine and make sure that cooling fans-1 and -2 operate at higher speed than low speed.</li> </ol> |                                               |                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |
| MEF613EA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                               |                                                                            |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                               |                                                                            |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶                                             | GO TO 6.                                                                   |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶                                             | Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-306.) |

|                                                                                                                                                                                                                                                              |                                      |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------|
| <b>6</b>                                                                                                                                                                                                                                                     | <b>CHECK COOLING SYSTEM FOR LEAK</b> |          |
| <p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p><b>Testing pressure: 157 kPa (1.6 kg/cm<sup>2</sup>, 23 psi)</b></p> <p><b>CAUTION:</b><br/>Higher than the specified pressure may cause radiator damage.</p> |                                      |          |
|                                                                                                                                                                          |                                      |          |
| SLC754A                                                                                                                                                                                                                                                      |                                      |          |
| <b>Pressure should not drop.</b>                                                                                                                                                                                                                             |                                      |          |
| <b>OK or NG</b>                                                                                                                                                                                                                                              |                                      |          |
| OK                                                                                                                                                                                                                                                           | ▶                                    | GO TO 8. |
| NG                                                                                                                                                                                                                                                           | ▶                                    | GO TO 7. |

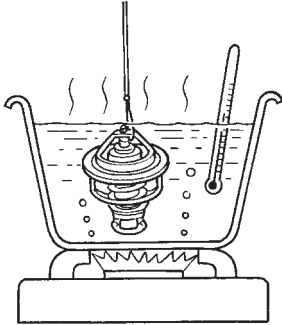
|                                                                                                                                                                   |                                   |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--|
| <b>7</b>                                                                                                                                                          | <b>DETECT MALFUNCTIONING PART</b> |  |
| <p>Check the following for leak.</p> <ul style="list-style-type: none"> <li>Hose</li> <li>Radiator</li> <li>Water pump (Refer to LC-10, "Water Pump".)</li> </ul> |                                   |  |
| ▶ Repair or replace.                                                                                                                                              |                                   |  |

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (Cont'd)

|          |                           |                                                                                                               |
|----------|---------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>8</b> | <b>CHECK RADIATOR CAP</b> |                                                                                                               |
|          |                           | Apply pressure to cap with a tester and check radiator cap relief pressure.                                   |
|          |                           |                             |
|          |                           | <p><b>Radiator cap relief pressure:</b><br/> <b>59 - 98 kPa (0.6 - 1.0 kg/cm<sup>2</sup>, 9 - 14 psi)</b></p> |
|          |                           | SLC755A                                                                                                       |
|          |                           | <b>OK or NG</b>                                                                                               |
| OK       | ▶                         | GO TO 9.                                                                                                      |
| NG       | ▶                         | Replace radiator cap.                                                                                         |

GI  
 MA  
 EM  
 LC  
**EC**

|          |                         |                                                                                                                                                                                                                                                |
|----------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>9</b> | <b>CHECK THERMOSTAT</b> |                                                                                                                                                                                                                                                |
|          |                         | <ol style="list-style-type: none"> <li>1. Remove thermostat.</li> <li>2. Check valve seating condition at normal room temperatures.<br/> <b>It should seat tightly.</b></li> <li>3. Check valve opening temperature and valve lift.</li> </ol> |
|          |                         |                                                                                                                                                             |
|          |                         | SLC343                                                                                                                                                                                                                                         |
|          |                         | <p><b>Valve opening temperature:</b><br/> <b>82°C (180°F) [standard]</b></p> <p><b>Valve lift:</b><br/> <b>More than 8 mm/95°C (0.31 in/203°F)</b></p>                                                                                         |
|          |                         | 4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-12, "Thermostat".                                                                                                                           |
|          |                         | <b>OK or NG</b>                                                                                                                                                                                                                                |
| OK       | ▶                       | GO TO 10.                                                                                                                                                                                                                                      |
| NG       | ▶                       | Replace thermostat                                                                                                                                                                                                                             |

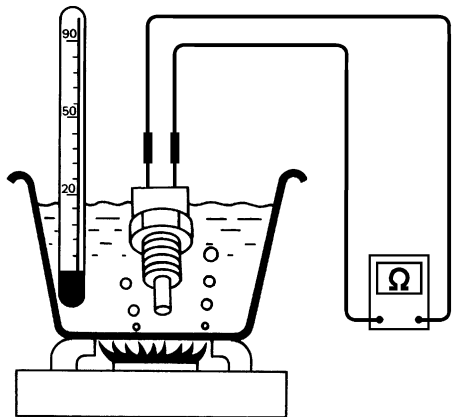
MT  
 AT  
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 RS  
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 EL  
 IDX

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (Cont'd)

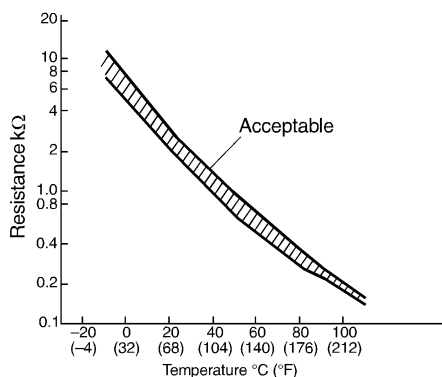
## 10 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Remove engine coolant temperature sensor.
2. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



### <Reference data>

| Temperature °C (°F) | Resistance kΩ |
|---------------------|---------------|
| 20 (68)             | 2.1 - 2.9     |
| 50 (122)            | 0.68 - 1.00   |
| 90 (194)            | 0.236 - 0.260 |



SEF304X

**OK or NG**

- |    |   |                                            |
|----|---|--------------------------------------------|
| OK | ▶ | GO TO 11.                                  |
| NG | ▶ | Replace engine coolant temperature sensor. |

## 11 CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to "MAIN 12 CAUSES OF OVERHEATING", EC-308.

▶ **INSPECTION END**

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (Cont'd)

## PROCEDURE A

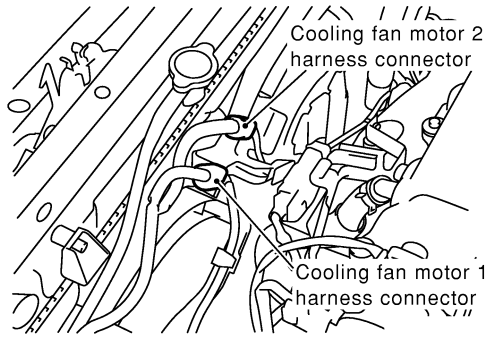
=NCEC0511S01

|          |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |
|----------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <b>1</b> | <b>CHECK COOLING FAN POWER SUPPLY CIRCUIT</b> | <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect cooling fan relay-1.<br/>                 3. Turn ignition switch "ON".<br/>                 4. Check voltage between cooling fan relay-1 terminals 1, 3, 7 and ground with CONSULT-II or tester.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF727W</p> <p style="text-align: center;"><b>Voltage: Battery voltage</b></p> <p style="text-align: center;"><b>OK or NG</b></p> | GI<br>MA<br>EM<br>LC<br><b>EC</b><br>FE<br>CL<br>MT |
| OK       | ▶                                             | GO TO 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                     |
| NG       | ▶                                             | GO TO 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                     |

|          |                                   |                                                                                                                                                                                                                                                                              |                                                                 |
|----------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>2</b> | <b>DETECT MALFUNCTIONING PART</b> | <p>Check the following.</p> <ul style="list-style-type: none"> <li>● 10A fuse</li> <li>● 40A fusible links</li> <li>● Harness for open or short between cooling fan relay-1 and fuse</li> <li>● Harness for open or short between cooling fan relay-1 and battery</li> </ul> | AT<br>AX<br>SU<br>BR<br>ST<br>RS<br>BT<br>HA<br>SC<br>EL<br>IDX |
|          | ▶                                 | Repair open circuit or short to ground or short to power in harness or connectors.                                                                                                                                                                                           |                                                                 |

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                           |                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT</b> |                                                                                    |
| <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                           |                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |                                                                                    |
| SEF854X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                           |                                                                                    |
| <ol style="list-style-type: none"> <li>3. Check harness continuity between cooling fan relay-1 terminal 6 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>4. Also check harness for short to ground and short to power.</li> <li>5. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>6. Also check harness for short to ground and short to power.</li> </ol> |                                                           |                                                                                    |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                           |                                                                                    |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                                                         | GO TO 4.                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                                                         | Repair open circuit or short to ground or short to power in harness or connectors. |

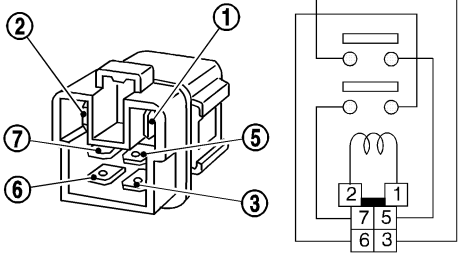
|                                                                                                                                                                                                                                                                                                                             |                                                                   |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                    | <b>CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |          |
| <ol style="list-style-type: none"> <li>1. Disconnect ECM harness connector.</li> <li>2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>3. Also check harness for short to ground and short to power.</li> </ol> |                                                                   |          |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                             |                                                                   |          |
| OK                                                                                                                                                                                                                                                                                                                          | ▶                                                                 | GO TO 6. |
| NG                                                                                                                                                                                                                                                                                                                          | ▶                                                                 | GO TO 5. |

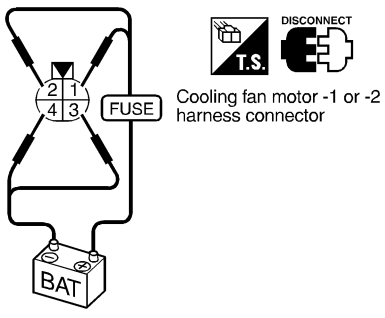
|                                                                                                                                                                                                                            |                                   |                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                   | <b>DETECT MALFUNCTIONING PART</b> |                                                                                    |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E75, M6</li> <li>● Harness connectors M49, F23</li> <li>● Harness for open or short between cooling fan relay-1 and ECM</li> </ul> |                                   |                                                                                    |
| <b>OK or NG</b>                                                                                                                                                                                                            |                                   |                                                                                    |
|                                                                                                                                                                                                                            | ▶                                 | Repair open circuit or short to ground or short to power in harness or connectors. |



# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (Cont'd)

| <b>6</b>                                                                                                       | <b>CHECK COOLING FAN RELAY-1</b> |                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |                                                     |     |                   |    |
|----------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|-----------------------------------------------------|-----|-------------------|----|
| <p>Check continuity between cooling fan relay-1 terminals 3 and 5, 6 and 7 under the following conditions.</p> |                                  |                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |                                                     |     |                   |    |
|                               |                                  | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th style="width: 30%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> | Conditions | Continuity | 12V direct current supply between terminals 1 and 2 | Yes | No current supply | No |
| Conditions                                                                                                     | Continuity                       |                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |                                                     |     |                   |    |
| 12V direct current supply between terminals 1 and 2                                                            | Yes                              |                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |                                                     |     |                   |    |
| No current supply                                                                                              | No                               |                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |                                                     |     |                   |    |
| <b>OK or NG</b>                                                                                                |                                  | SEF591X                                                                                                                                                                                                                                                                                                                                                                                                |            |            |                                                     |     |                   |    |
| OK                                                                                                             | ▶                                | GO TO 7.                                                                                                                                                                                                                                                                                                                                                                                               |            |            |                                                     |     |                   |    |
| NG                                                                                                             | ▶                                | Replace cooling fan relay.                                                                                                                                                                                                                                                                                                                                                                             |            |            |                                                     |     |                   |    |

| <b>7</b>                                                                           | <b>CHECK COOLING FAN MOTORS-1 AND -2</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |       |           |  |     |     |                            |     |   |   |      |      |      |
|------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|-----------|--|-----|-----|----------------------------|-----|---|---|------|------|------|
| <p>Supply battery voltage between the following terminals and check operation.</p> |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |       |           |  |     |     |                            |     |   |   |      |      |      |
|  |                                          | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor -1 or -2</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table> |      | Speed | Terminals |  | (+) | (-) | Cooling fan motor -1 or -2 | Low | 1 | 4 | High | 1, 2 | 3, 4 |
|                                                                                    | Speed                                    | Terminals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |       |           |  |     |     |                            |     |   |   |      |      |      |
|                                                                                    |                                          | (+)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (-)  |       |           |  |     |     |                            |     |   |   |      |      |      |
| Cooling fan motor -1 or -2                                                         | Low                                      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4    |       |           |  |     |     |                            |     |   |   |      |      |      |
|                                                                                    | High                                     | 1, 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3, 4 |       |           |  |     |     |                            |     |   |   |      |      |      |
| <b>OK or NG</b>                                                                    |                                          | SEF937X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |       |           |  |     |     |                            |     |   |   |      |      |      |
| OK                                                                                 | ▶                                        | GO TO 8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |       |           |  |     |     |                            |     |   |   |      |      |      |
| NG                                                                                 | ▶                                        | Replace cooling fan motors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |       |           |  |     |     |                            |     |   |   |      |      |      |

|                                                                       |                                    |                       |
|-----------------------------------------------------------------------|------------------------------------|-----------------------|
| <b>8</b>                                                              | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| <p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p> |                                    |                       |
| ▶                                                                     |                                    | <b>INSPECTION END</b> |

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# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (Cont'd)

## PROCEDURE B

=NCEC0511S02

|                                                                                                                                                                                                                                                                                    |                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                           | <b>CHECK COOLING FAN POWER SUPPLY CIRCUIT</b> |
| <ol style="list-style-type: none"> <li>Turn ignition switch "OFF".</li> <li>Disconnect cooling fan relays-2 and -3.</li> <li>Turn ignition switch "ON".</li> <li>Check voltage between cooling fan relays-2 and -3 terminals 1, 3 and ground with CONSULT-II or tester.</li> </ol> |                                               |
|                                                                                                                                                                                                                                                                                    |                                               |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                    |                                               |
| OK                                                                                                                                                                                                                                                                                 | ▶ GO TO 3.                                    |
| NG                                                                                                                                                                                                                                                                                 | ▶ GO TO 2.                                    |

SEF593X

|                                                                                                                                                                                                                                                  |                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>2</b>                                                                                                                                                                                                                                         | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness for open or short between cooling fan relays-2 and -3 and fuse</li> <li>● Harness for open or short between cooling fan relays-2 and -3 and fusible link</li> </ul> |                                   |
|                                                                                                                                                                                                                                                  | ▶ Repair harness or connectors.   |

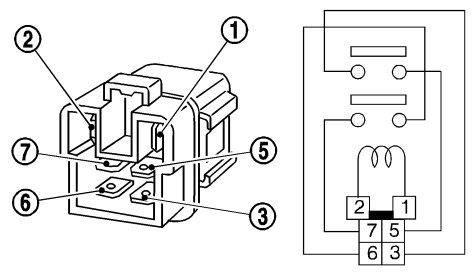
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT</b>                            |
| <ol style="list-style-type: none"> <li>Turn ignition switch "OFF".</li> <li>Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</li> <li>Check harness continuity between cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2, cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3, cooling fan relay-2 terminal 7 and body ground. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>Also check harness for short to ground and short to power.</li> <li>Check harness continuity between cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 2, cooling fan relay-3 terminal 6 and cooling fan motor-2 terminal 3, cooling fan relay-3 terminal 7 and body ground. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>Also check harness for short to ground and short to power.</li> </ol> |                                                                                      |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ GO TO 4.                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

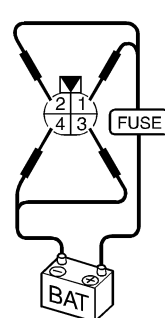


|                                                                                                                                                                                                                                                                                                                                                    |                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                           | <b>CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |
| <ol style="list-style-type: none"> <li>Disconnect ECM harness connector.</li> <li>Check harness continuity between ECM terminal 12 and cooling fan relay-2 terminal 2, cooling fan relay-3 terminal 2. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>Also check harness for short to ground and short to power.</li> </ol> |                                                                   |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                    |                                                                   |
| OK                                                                                                                                                                                                                                                                                                                                                 | ▶ GO TO 6.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                 | ▶ GO TO 5.                                                        |

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                             |                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                    | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| Check the following. <ul style="list-style-type: none"> <li>● Harness connectors E75, M6</li> <li>● Harness connectors M49, F23</li> <li>● Harness for open or short between cooling fan relays-2 and -3 and ECM</li> </ul> |                                                                                    |
| ▶                                                                                                                                                                                                                           | Repair open circuit or short to ground or short to power in harness or connectors. |

| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                               | <b>CHECK COOLING FAN RELAYS-2 AND -3</b> |            |            |                                                     |     |                   |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------|------------|-----------------------------------------------------|-----|-------------------|----|
| Check continuity between cooling fan relay-2, -3 terminals 3 and 5, 6 and 7 under the following conditions.                                                                                                                                                                                                                                                                                            |                                          |            |            |                                                     |     |                   |    |
|                                                                                                                                                                                                                                                                                                                       |                                          |            |            |                                                     |     |                   |    |
| <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th style="width: 30%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> |                                          | Conditions | Continuity | 12V direct current supply between terminals 1 and 2 | Yes | No current supply | No |
| Conditions                                                                                                                                                                                                                                                                                                                                                                                             | Continuity                               |            |            |                                                     |     |                   |    |
| 12V direct current supply between terminals 1 and 2                                                                                                                                                                                                                                                                                                                                                    | Yes                                      |            |            |                                                     |     |                   |    |
| No current supply                                                                                                                                                                                                                                                                                                                                                                                      | No                                       |            |            |                                                     |     |                   |    |
| SEF591X                                                                                                                                                                                                                                                                                                                                                                                                |                                          |            |            |                                                     |     |                   |    |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                        |                                          |            |            |                                                     |     |                   |    |
| OK                                                                                                                                                                                                                                                                                                                                                                                                     | ▶ GO TO 7.                               |            |            |                                                     |     |                   |    |
| NG                                                                                                                                                                                                                                                                                                                                                                                                     | ▶ Replace cooling fan relays.            |            |            |                                                     |     |                   |    |

| <b>7</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>CHECK COOLING FAN MOTORS-1 AND -2</b> |      |       |           |  |     |     |                            |     |   |   |      |      |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------|-------|-----------|--|-----|-----|----------------------------|-----|---|---|------|------|------|
| Supply battery voltage between the following terminals and check operation.                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |      |       |           |  |     |     |                            |     |   |   |      |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |      |       |           |  |     |     |                            |     |   |   |      |      |      |
|   Cooling fan motor -1 or -2 harness connector                                                                                                                                                                                                                                                                                            |                                          |      |       |           |  |     |     |                            |     |   |   |      |      |      |
| <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor -1 or -2</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table> |                                          |      | Speed | Terminals |  | (+) | (-) | Cooling fan motor -1 or -2 | Low | 1 | 4 | High | 1, 2 | 3, 4 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Speed                                    |      |       | Terminals |  |     |     |                            |     |   |   |      |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          | (+)  | (-)   |           |  |     |     |                            |     |   |   |      |      |      |
| Cooling fan motor -1 or -2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Low                                      | 1    | 4     |           |  |     |     |                            |     |   |   |      |      |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | High                                     | 1, 2 | 3, 4  |           |  |     |     |                            |     |   |   |      |      |      |
| SEF937X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                          |      |       |           |  |     |     |                            |     |   |   |      |      |      |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |      |       |           |  |     |     |                            |     |   |   |      |      |      |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ GO TO 8.                               |      |       |           |  |     |     |                            |     |   |   |      |      |      |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ Replace cooling fan motors.            |      |       |           |  |     |     |                            |     |   |   |      |      |      |

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>8</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
| ▶                                                              | <b>INSPECTION END</b>              |

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# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Main 12 Causes of Overheating

## Main 12 Causes of Overheating

NCEC0512

| Engine | Step | Inspection item                                                                                                                                        | Equipment                                                                                      | Standard                                                           | Reference page                                  |
|--------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------|
| OFF    | 1    | <ul style="list-style-type: none"> <li>Blocked radiator</li> <li>Blocked condenser</li> <li>Blocked radiator grille</li> <li>Blocked bumper</li> </ul> | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | No blocking                                                        | —                                               |
|        | 2    | <ul style="list-style-type: none"> <li>Coolant mixture</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>Coolant tester</li> </ul>                               | 50 - 50% coolant mixture                                           | See MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS". |
|        | 3    | <ul style="list-style-type: none"> <li>Coolant level</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | Coolant up to MAX level in reservoir tank and radiator filler neck | See MA-14, "Changing Engine Coolant".           |
|        | 4    | <ul style="list-style-type: none"> <li>Radiator cap</li> </ul>                                                                                         | <ul style="list-style-type: none"> <li>Pressure tester</li> </ul>                              | 59 - 98 kPa (0.6 - 1.0 kg/cm <sup>2</sup> , 9 - 14 psi) (Limit)    | See LC-9, "System Check".                       |
| ON*2   | 5    | <ul style="list-style-type: none"> <li>Coolant leaks</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | No leaks                                                           | See LC-9, "System Check".                       |
| ON*2   | 6    | <ul style="list-style-type: none"> <li>Thermostat</li> </ul>                                                                                           | <ul style="list-style-type: none"> <li>Touch the upper and lower radiator hoses</li> </ul>     | Both hoses should be hot                                           | See LC-12, "Thermostat" and LC-14, "Radiator".  |
| ON*1   | 7    | <ul style="list-style-type: none"> <li>Cooling fan</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li>CONSULT-II</li> </ul>                                   | Operating                                                          | See trouble diagnosis for DTC P0217 (EC-291).   |
| OFF    | 8    | <ul style="list-style-type: none"> <li>Combustion gas leak</li> </ul>                                                                                  | <ul style="list-style-type: none"> <li>Color checker chemical tester 4 Gas analyzer</li> </ul> | Negative                                                           | —                                               |
| ON*3   | 9    | <ul style="list-style-type: none"> <li>Coolant temperature gauge</li> </ul>                                                                            | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | Gauge less than 3/4 when driving                                   | —                                               |
|        |      | <ul style="list-style-type: none"> <li>Coolant overflow to reservoir tank</li> </ul>                                                                   | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | No overflow during driving and idling                              | See MA-14, "Changing Engine Coolant".           |
| OFF*4  | 10   | <ul style="list-style-type: none"> <li>Coolant return from reservoir tank to radiator</li> </ul>                                                       | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | Should be initial level in reservoir tank                          | See MA-13, "ENGINE MAINTENANCE".                |
| OFF    | 11   | <ul style="list-style-type: none"> <li>Cylinder head</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>Straight gauge feeler gauge</li> </ul>                  | 0.1 mm (0.004 in) Maximum distortion (warping)                     | See EM-36, "Inspection".                        |
|        | 12   | <ul style="list-style-type: none"> <li>Cylinder block and pistons</li> </ul>                                                                           | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | No scuffing on cylinder walls or piston                            | See EM-59, "Inspection".                        |

\*1: Turn the ignition switch ON.

\*2: Engine running at 3,000 rpm for 10 minutes.

\*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

\*4: After 60 minutes of cool down time.

For more information, refer to LC-15, "OVERHEATING CAUSE ANALYSIS".

# DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

On Board Diagnosis Logic

## On Board Diagnosis Logic

NCEC0202

When a misfire occurs, engine speed will fluctuate (vary). If the engine speed fluctuates enough to cause the CKP sensor to vary, ECM can detect a misfire.

| Sensor                           | Input Signal to ECM | ECM function                  |
|----------------------------------|---------------------|-------------------------------|
| Crankshaft position sensor (OBD) | Engine speed        | On board diagnosis of misfire |

The misfire detection logic consists of the following two conditions.

### 1. One Trip Detection Logic (Three Way Catalyst Damage)

On the first trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.

When a misfire condition occurs, the ECM monitors the CKP sensor (OBD) signal every 200 engine revolutions for a change.

When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.

If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.

When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.

If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.

### 2. Two Trip Detection Logic (Exhaust quality deterioration)

For misfire conditions that will not cause damage to the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor (OBD) signal every 1,000 engine revolutions.

A misfire malfunction can be detected on any one cylinder or on-multiple cylinders.

| DTC No. | Malfunction is detected when ...                                              | Check Items (Possible Cause)                                                                                                                                 |
|---------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0300   | <ul style="list-style-type: none"> <li>Multiple cylinders misfire.</li> </ul> | <ul style="list-style-type: none"> <li>Improper spark plug</li> <li>Insufficient compression</li> </ul>                                                      |
| P0301   | <ul style="list-style-type: none"> <li>No. 1 cylinder misfires.</li> </ul>    | <ul style="list-style-type: none"> <li>Incorrect fuel pressure</li> <li>EGR volume control valve</li> <li>The injector circuit is open or shorted</li> </ul> |
| P0302   | <ul style="list-style-type: none"> <li>No. 2 cylinder misfires.</li> </ul>    | <ul style="list-style-type: none"> <li>Injectors</li> <li>Intake air leak</li> </ul>                                                                         |
| P0303   | <ul style="list-style-type: none"> <li>No. 3 cylinder misfires.</li> </ul>    | <ul style="list-style-type: none"> <li>The ignition secondary circuit is open or shorted</li> <li>Lack of fuel</li> <li>Drive plate/Flywheel</li> </ul>      |
| P0304   | <ul style="list-style-type: none"> <li>No. 4 cylinder misfires.</li> </ul>    | <ul style="list-style-type: none"> <li>Heated oxygen sensor 1 (front)</li> <li>Incorrect distributor roter</li> </ul>                                        |

4

| DATA MONITOR |         |
|--------------|---------|
| MONITOR      | NO DTC  |
| ENG SPEED    | XXX rpm |

SEF058Y

## DTC Confirmation Procedure

NCEC0203

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### With CONSULT-II

- 1) Turn ignition switch "ON", and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine again and drive at 1,500 to 3,000 rpm for at least 3 minutes.  
Hold the accelerator pedal as steady as possible.

### NOTE:

Refer to the freeze frame data for the test driving conditions.

- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-310.

#### With GST

Follow the procedure "With CONSULT-II" above.

# DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

Diagnostic Procedure

## Diagnostic Procedure

NCEC0204

|                                                                                              |                                          |
|----------------------------------------------------------------------------------------------|------------------------------------------|
| <b>1</b>                                                                                     | <b>CHECK FOR INTAKE AIR LEAK</b>         |
| 1. Start engine and run it at idle speed.<br>2. Listen for the sound of the intake air leak. |                                          |
| <b>OK or NG</b>                                                                              |                                          |
| OK                                                                                           | ▶ GO TO 2.                               |
| NG                                                                                           | ▶ Discover air leak location and repair. |

|                                                                                        |                                          |
|----------------------------------------------------------------------------------------|------------------------------------------|
| <b>2</b>                                                                               | <b>CHECK FOR EXHAUST SYSTEM CLOGGING</b> |
| Stop engine and visually check exhaust tube, three way catalyst and muffler for dents. |                                          |
| <b>OK or NG</b>                                                                        |                                          |
| OK                                                                                     | ▶ GO TO 3.                               |
| NG                                                                                     | ▶ Repair or replace it.                  |

|                                                                                           |                           |
|-------------------------------------------------------------------------------------------|---------------------------|
| <b>3</b>                                                                                  | <b>CHECK EGR FUNCTION</b> |
| Perform DTC Confirmation Procedure for DTC P1402 EGR FUNCTION (OPEN).<br>Refer to EC-481. |                           |
| <b>OK or NG</b>                                                                           |                           |
| OK                                                                                        | ▶ GO TO 4.                |
| NG                                                                                        | ▶ Repair EGR system.      |

# DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

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## 4 PERFORM POWER BALANCE TEST

With CONSULT-II

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.

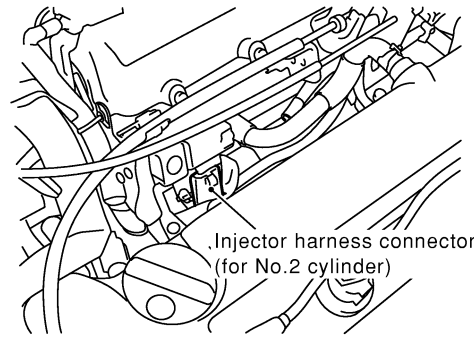
| ACTIVE TEST   |          |
|---------------|----------|
| POWER BALANCE |          |
| MONITOR       |          |
| ENG SPEED     | XXX rpm  |
| MAS A/F SE-B1 | XXX V    |
| IACV-AAC/V    | XXX step |
|               |          |
|               |          |

SEF190Y

2. Is there any cylinder which does not produce a momentary engine speed drop?

Without CONSULT-II

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



SEF846X

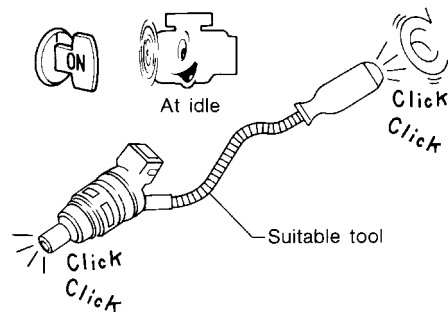
Yes or No

Yes ► GO TO 5.

No ► GO TO 8.

## 5 CHECK INJECTOR

Does each injector make an operating sound at idle?



MEC703B

Yes or No

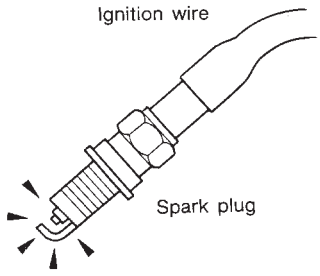
Yes ► GO TO 6.

No ► Check injector(s) and circuit(s). Refer to EC-574.

# DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

|                                          |                                           |
|------------------------------------------|-------------------------------------------|
| <b>6</b>                                 | <b>CHECK IGNITION SIGNAL CIRCUIT</b>      |
| Refer to "Diagnostic Procedure", EC-569. |                                           |
| <b>OK or NG</b>                          |                                           |
| OK                                       | ▶ GO TO 7.                                |
| NG                                       | ▶ Repair or replace malfunctioning parts. |

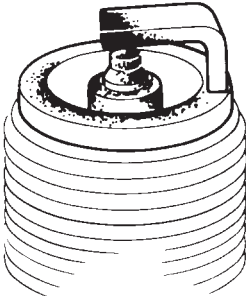
|                                                                                                                                                                                                                                                                                                                 |                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>7</b>                                                                                                                                                                                                                                                                                                        | <b>CHECK IGNITION SPARK</b> |
| <ol style="list-style-type: none"><li>1. Turn Ignition switch "OFF".</li><li>2. Disconnect ignition wire from spark plug.</li><li>3. Connect a known good spark plug to the ignition wire.</li><li>4. Place end of spark plug against a suitable ground and crank engine.</li><li>5. Check for spark.</li></ol> |                             |
|                                                                                                                                                                                                                                |                             |
| SEF282G                                                                                                                                                                                                                                                                                                         |                             |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                 |                             |
| OK                                                                                                                                                                                                                                                                                                              | ▶ GO TO 9.                  |
| NG                                                                                                                                                                                                                                                                                                              | ▶ GO TO 8.                  |

|                                          |                                                                                                                                |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>8</b>                                 | <b>CHECK IGNITION WIRES</b>                                                                                                    |
| Refer to "Component Inspection", EC-315. |                                                                                                                                |
| <b>OK or NG</b>                          |                                                                                                                                |
| OK                                       | ▶ Check distributor rotor head for incorrect parts. Check ignition coil, power transistor and their circuits. Refer to EC-566. |
| NG                                       | ▶ Replace.                                                                                                                     |



# DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

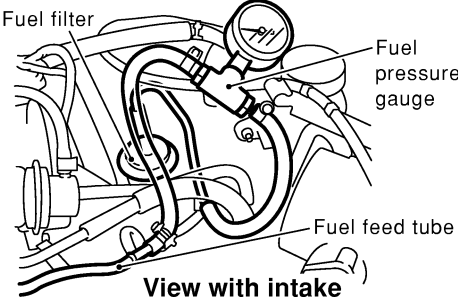
Diagnostic Procedure (Cont'd)

|                                                                                   |                          |                                                                                                                       |
|-----------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>9</b>                                                                          | <b>CHECK SPARK PLUGS</b> |                                                                                                                       |
| Remove the spark plugs and check for fouling, etc.                                |                          |                                                                                                                       |
|  |                          |                                                                                                                       |
| SEF156I                                                                           |                          |                                                                                                                       |
| <b>OK or NG</b>                                                                   |                          |                                                                                                                       |
| OK                                                                                | ▶                        | GO TO 10.                                                                                                             |
| NG                                                                                | ▶                        | Repair or replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-13, "ENGINE MAINTENANCE". |

GI  
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EC

|                                                                                                                                                                                                                                                                                                                                                                                                   |                                   |                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------|
| <b>10</b>                                                                                                                                                                                                                                                                                                                                                                                         | <b>CHECK COMPRESSION PRESSURE</b> |                                                                             |
| Refer to EM-13, "Measurement of Compression Pressure".                                                                                                                                                                                                                                                                                                                                            |                                   |                                                                             |
| <ul style="list-style-type: none"> <li>● Check compression pressure. <ul style="list-style-type: none"> <li><b>Standard:</b><br/>1,275 kPa (13.0 kg/cm<sup>2</sup>, 185 psi)/300 rpm</li> <li><b>Minimum:</b><br/>1,079 kPa (11.0 kg/cm<sup>2</sup>, 156 psi)/300 rpm</li> <li><b>Difference between each cylinder:</b><br/>98 kPa (1.0 kg/cm<sup>2</sup>, 14 psi)/300 rpm</li> </ul> </li> </ul> |                                   |                                                                             |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                   |                                   |                                                                             |
| OK                                                                                                                                                                                                                                                                                                                                                                                                | ▶                                 | GO TO 11.                                                                   |
| NG                                                                                                                                                                                                                                                                                                                                                                                                | ▶                                 | Check pistons, piston rings, valves, valve seats and cylinder head gaskets. |

MT  
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BR

|                                                                                                                                                                                                             |                            |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------|
| <b>11</b>                                                                                                                                                                                                   | <b>CHECK FUEL PRESSURE</b> |           |
| <ol style="list-style-type: none"> <li>1. Install any parts removed.</li> <li>2. Release fuel pressure to zero. Refer to EC-50.</li> <li>3. Install fuel pressure gauge and check fuel pressure.</li> </ol> |                            |           |
|                                                                                                                         |                            |           |
| SEF826X                                                                                                                                                                                                     |                            |           |
| <b>OK or NG</b>                                                                                                                                                                                             |                            |           |
| OK                                                                                                                                                                                                          | ▶                          | GO TO 13. |
| NG                                                                                                                                                                                                          | ▶                          | GO TO 12. |

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BT  
HA  
SC  
EL  
IDX



# DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                     |                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>12</b>                                                                                                                                                                                                                                                           | <b>DETECT MALFUNCTIONING PART</b> |
| Check the following. <ul style="list-style-type: none"><li>● Fuel pump and circuit (Refer to EC-583.)</li><li>● Fuel pressure regulator (Refer to EC-51.)</li><li>● Fuel lines. Refer to MA-16, "Checking Fuel Lines".</li><li>● Fuel filter for clogging</li></ul> |                                   |
|                                                                                                                                                                                                                                                                     | ▶ Repair or replace.              |

|                                     |                              |
|-------------------------------------|------------------------------|
| <b>13</b>                           | <b>CHECK IGNITION TIMING</b> |
| Perform "Basic Inspection", EC-107. |                              |
| <b>OK or NG</b>                     |                              |
| OK                                  | ▶ GO TO 14.                  |
| NG                                  | ▶ Adjust ignition timing.    |

|                                          |                                             |
|------------------------------------------|---------------------------------------------|
| <b>14</b>                                | <b>CHECK HEATED OXYGEN SENSOR 1 (FRONT)</b> |
| Refer to "Component Inspection", EC-202. |                                             |
| <b>OK or NG</b>                          |                                             |
| OK                                       | ▶ GO TO 15.                                 |
| NG                                       | ▶ Replace heated oxygen sensor 1 (front).   |

|                                                                                                                                                                                                                                                              |                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>15</b>                                                                                                                                                                                                                                                    | <b>CHECK MASS AIR FLOW SENSOR</b> |
|  <b>With CONSULT-II</b><br>Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.<br><b>at idling: 2.5 - 5.0 g-m/sec</b><br><b>at 2,500 rpm: 7.1 - 12.5 g-m/sec</b> |                                   |
|  <b>With GST</b><br>Check mass air flow sensor signal in MODE 1 with GST.<br><b>at idling: 2.5 - 5.0 g-m/sec</b><br><b>at 2,500 rpm: 7.1 - 12.5 g-m/sec</b>               |                                   |
| <b>OK or NG</b>                                                                                                                                                                                                                                              |                                   |
| OK                                                                                                                                                                                                                                                           | ▶ GO TO 17.                       |
| NG                                                                                                                                                                                                                                                           | ▶ GO TO 16.                       |

|                                                                                                                                    |                         |
|------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>16</b>                                                                                                                          | <b>CHECK CONNECTORS</b> |
| Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-154. |                         |
| <b>OK or NG</b>                                                                                                                    |                         |
| NG                                                                                                                                 | ▶ Repair or replace it. |

|                                                                          |                                   |
|--------------------------------------------------------------------------|-----------------------------------|
| <b>17</b>                                                                | <b>CHECK SYMPTOM MATRIX CHART</b> |
| Check items on the rough idle symptom in "Symptom Matrix Chart", EC-125. |                                   |
| <b>OK or NG</b>                                                          |                                   |
| OK                                                                       | ▶ GO TO 18.                       |
| NG                                                                       | ▶ Repair or replace.              |

# DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

|                                                                                                                                          |                               |
|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>18</b>                                                                                                                                | <b>ERASE THE 1ST TRIP DTC</b> |
| Some tests may cause a 1st trip DTC to be set.<br>Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to EC-79. |                               |
| ▶                                                                                                                                        | GO TO 19.                     |

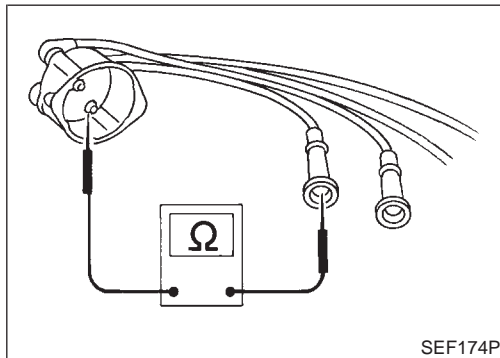
GI

MA

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>19</b>                                                      | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
| ▶                                                              | <b>INSPECTION END</b>              |

EM

LC



## Component Inspection

### IGNITION WIRES

NCEC0205

NCEC0205S01

EC

1. Inspect wires for cracks, damage, burned terminals and for improper fit.
2. Measure the resistance of wires to their distributor cap terminal. Move each wire while testing to check for intermittent breaks.

FE

CL

#### Resistance:

**13.6 - 18.4 kΩ/m (4.15 - 5.61 kΩ/ft) at 25°C (77°F)**

MT

If the resistance exceeds the above specification, inspect ignition wire to distributor cap connection. Clean connection or replace the ignition wire with a new one.

AT

AX

SU

BR

ST

RS

BT

HA

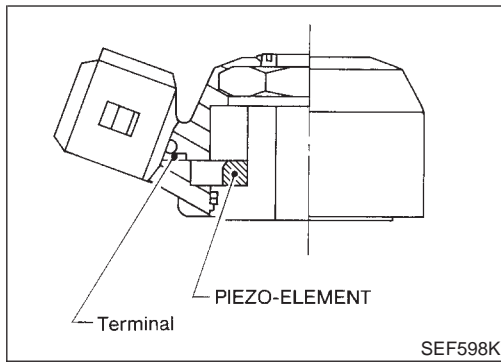
SC

EL

IDX

# DTC P0325 KNOCK SENSOR (KS)

## Component Description



## Component Description

NCEC0206

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM. **Freeze frame data will not be stored in the ECM for the knock sensor. The MIL will not light for knock sensor malfunction. The knock sensor has one trip detection logic.**

## ECM Terminals and Reference Value

NCEC0207

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

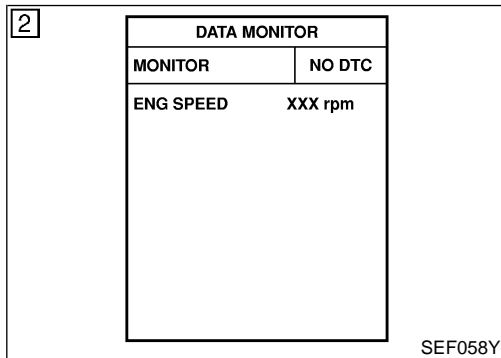
**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM         | CONDITION                           | DATA (DC Voltage)  |
|----------------------|---------------|--------------|-------------------------------------|--------------------|
| 81                   | W             | Knock sensor | [Engine is running]<br>● Idle speed | Approximately 2.5V |

## On Board Diagnosis Logic

NCEC0208

| DTC No. | Malfunction is detected when ...                                           | Check Items (Possible Cause)                                                                |
|---------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| P0325   | ● An excessively low or high voltage from the knock sensor is sent to ECM. | ● Harness or connectors<br>(The knock sensor circuit is open or shorted.)<br>● Knock sensor |



## DTC Confirmation Procedure

NCEC0209

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

**Before performing the following procedure, confirm that battery voltage is more than 10V at idle.**

#### Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 10 seconds at idle speed.
- 3) If DTC is detected, go to "Diagnostic Procedure", EC-318.

#### Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

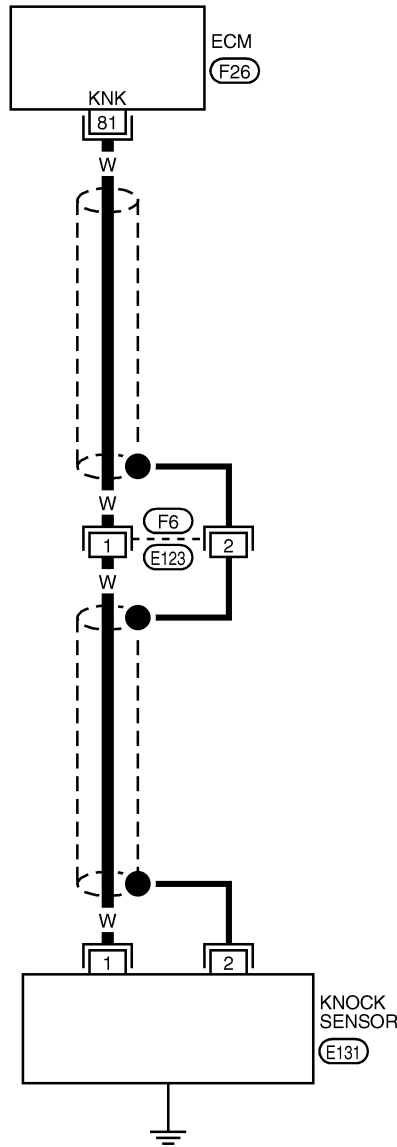
# DTC P0325 KNOCK SENSOR (KS)

Wiring Diagram

## Wiring Diagram

NCEC0210

EC-KS-01 GI



: Detectable line for DTC  
 : Non-detectable line for DTC

MA

EM

LC

**EC**

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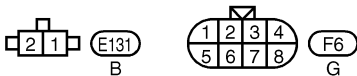
BT

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|     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |     |    |    |    |     |     |     |
|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|----|----|----|-----|-----|-----|
| 101 | 102 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |    |    |    |    | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 109 | 110 |    |    |    |     |     |     |
| 103 | 104 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |    | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 68 | 69 | 70 | 71 | 72  | 73  | 74 | 75 | 76 | 111 | 112 |     |
| 105 | 106 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 |    | 77 | 78 | 79 | 80 | 81  | 82  | 83 | 84 | 85 | 86  | 113 | 114 |
| 107 | 108 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |    |    |    |    |    |    |    |    |    |    |    | 87 | 88 | 89 | 90 | 91  | 92  | 93 | 94 | 95 | 115 | 116 |     |



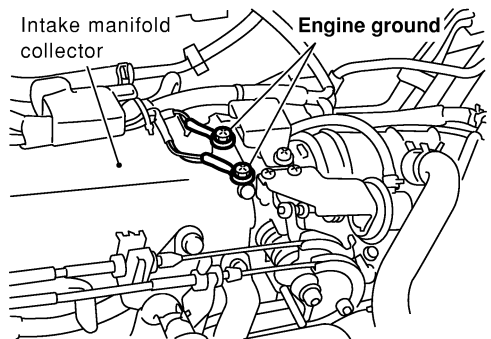
TEC708

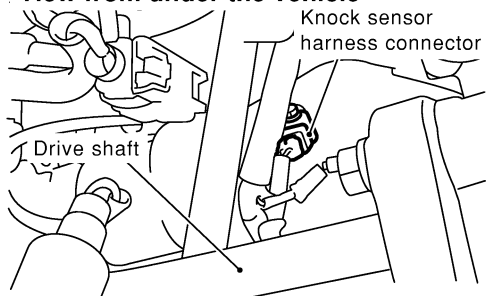
# DTC P0325 KNOCK SENSOR (KS)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0211

|                                                                                    |                                |
|------------------------------------------------------------------------------------|--------------------------------|
| <b>1</b>                                                                           | <b>RETIGHTEN GROUND SCREWS</b> |
| Loosen and retighten engine ground screws.                                         |                                |
|  |                                |
| SEF839X                                                                            |                                |
| ▶                                                                                  | GO TO 2.                       |

|                                                                                                                                                                                                                                                                                                                     |                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                                                                            | <b>CHECK INPUT SIGNAL CIRCUIT-1</b> |
| <ol style="list-style-type: none"> <li>Turn ignition switch "OFF".</li> <li>Disconnect ECM harness connector and knock sensor harness connector.</li> </ol>                                                                                                                                                         |                                     |
| <b>View from under the vehicle</b><br>                                                                                                                                                                                           |                                     |
| SEF856X                                                                                                                                                                                                                                                                                                             |                                     |
| <ol style="list-style-type: none"> <li>Check harness continuity between knock sensor terminal 1 and ECM terminal 81. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>Also check harness for short to ground and short to power.</li> </ol> <p style="text-align: center;"><b>OK or NG</b></p> |                                     |
| OK                                                                                                                                                                                                                                                                                                                  | ▶ GO TO 4.                          |
| NG                                                                                                                                                                                                                                                                                                                  | ▶ GO TO 3.                          |

|                                                                                                                                                   |                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>3</b>                                                                                                                                          | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| Check the following.                                                                                                                              |                                                                                    |
| <ul style="list-style-type: none"> <li>● Harness connectors F6, E123</li> <li>● Harness for open or short between knock sensor and ECM</li> </ul> |                                                                                    |
| ▶                                                                                                                                                 | Repair open circuit or short to ground or short to power in harness or connectors. |

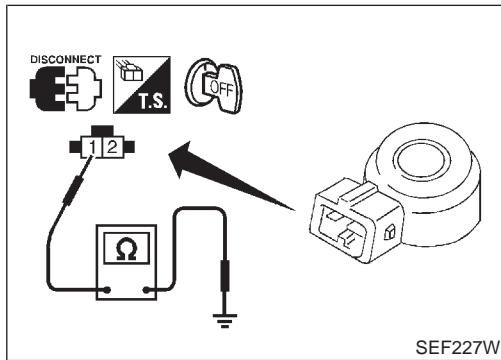
|                                                          |                           |
|----------------------------------------------------------|---------------------------|
| <b>4</b>                                                 | <b>CHECK KNOCK SENSOR</b> |
| Knock sensor<br>Refer to "Component Inspection", EC-319. |                           |
| <b>OK or NG</b>                                          |                           |
| OK                                                       | ▶ GO TO 5.                |
| NG                                                       | ▶ Replace knock sensor.   |

# DTC P0325 KNOCK SENSOR (KS)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>CHECK SHIELD CIRCUIT</b> |                                                                 |
| <ol style="list-style-type: none"> <li>1. Reconnect harness connectors disconnected.</li> <li>2. Disconnect harness connectors F6, E123.</li> <li>3. Check harness continuity between harness connector E123 terminal 2 and engine ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>4. Also check harness for short to power.</li> <li>5. Then reconnect harness connectors.</li> </ol> |                             |                                                                 |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                          |                             |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶                           | GO TO 6.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶                           | Repair open circuit or short to power in harness or connectors. |

|                                                                |                                    |                       |
|----------------------------------------------------------------|------------------------------------|-----------------------|
| <b>6</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                       |
| ▶                                                              |                                    | <b>INSPECTION END</b> |



## Component Inspection KNOCK SENSOR

NCEC0212

- Use an ohmmeter which can measure more than 10 MΩ.
- 1. Disconnect knock sensor harness connector.
- 2. Check resistance between terminal 1 and ground.

NCEC0212S01

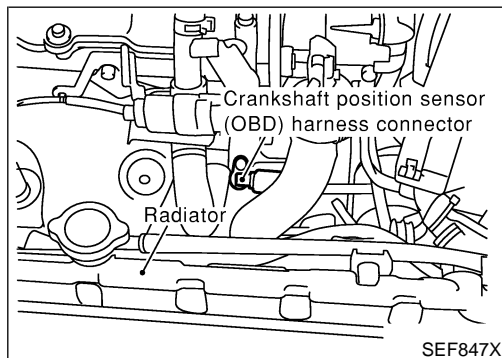
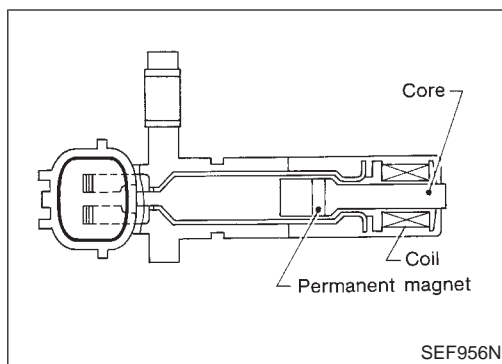
**Resistance: 500 - 620 kΩ [at 20°C (68°F)]**

**CAUTION:**  
Discard any knock sensors that have been dropped or physically damaged. Use only new ones.

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# DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD)

## Component Description



## Component Description

NCEC0213

The crankshaft position sensor (OBD) is located on the transaxle housing facing the gear teeth (cogs) of the flywheel or drive plate. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet, core and coil.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

This sensor is not directly used to control the engine system. It is used only for the on board diagnosis.

## ECM Terminals and Reference Value

NCEC0214

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                             | CONDITION                                                                                                              | DATA (AC Voltage)            |
|----------------------|---------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 65                   | W             | Crankshaft position sensor (OBD) | <p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul> | <p>3 - 5V</p> <p>SEF721W</p> |
|                      |               |                                  | <p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm</li> </ul>               | <p>6 - 9V</p> <p>SEF722W</p> |

## On Board Diagnosis Logic

NCEC0215

| DTC No. | Malfunction is detected when ...                                                                                                                                                                    | Check Items (Possible Cause)                                                                                                                                                  |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0335   | <ul style="list-style-type: none"> <li>● The proper pulse signal from the crankshaft position sensor (OBD) is not sent to ECM while the engine is running at the specified engine speed.</li> </ul> | <ul style="list-style-type: none"> <li>● Harness or connectors (The crankshaft position sensor (OBD) circuit is open.)</li> <li>● Crankshaft position sensor (OBD)</li> </ul> |



# DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD)

DTC Confirmation Procedure

NCEC0216

|   |              |         |
|---|--------------|---------|
| 2 | DATA MONITOR |         |
|   | MONITOR      | NO DTC  |
|   | ENG SPEED    | XXX rpm |

SEF058Y

## DTC Confirmation Procedure

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 10 seconds at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-323.

#### Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

GI

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EM

LC

**EC**

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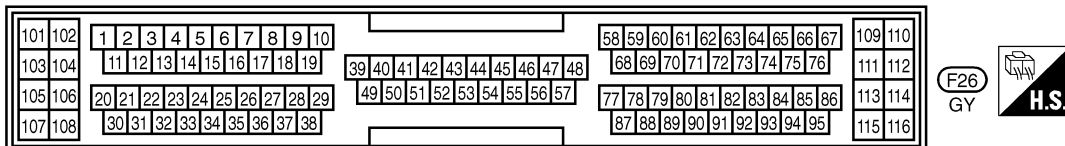
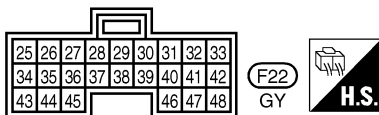
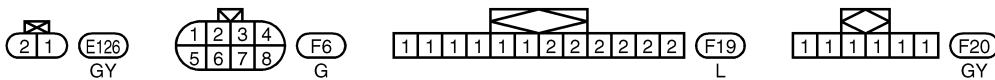
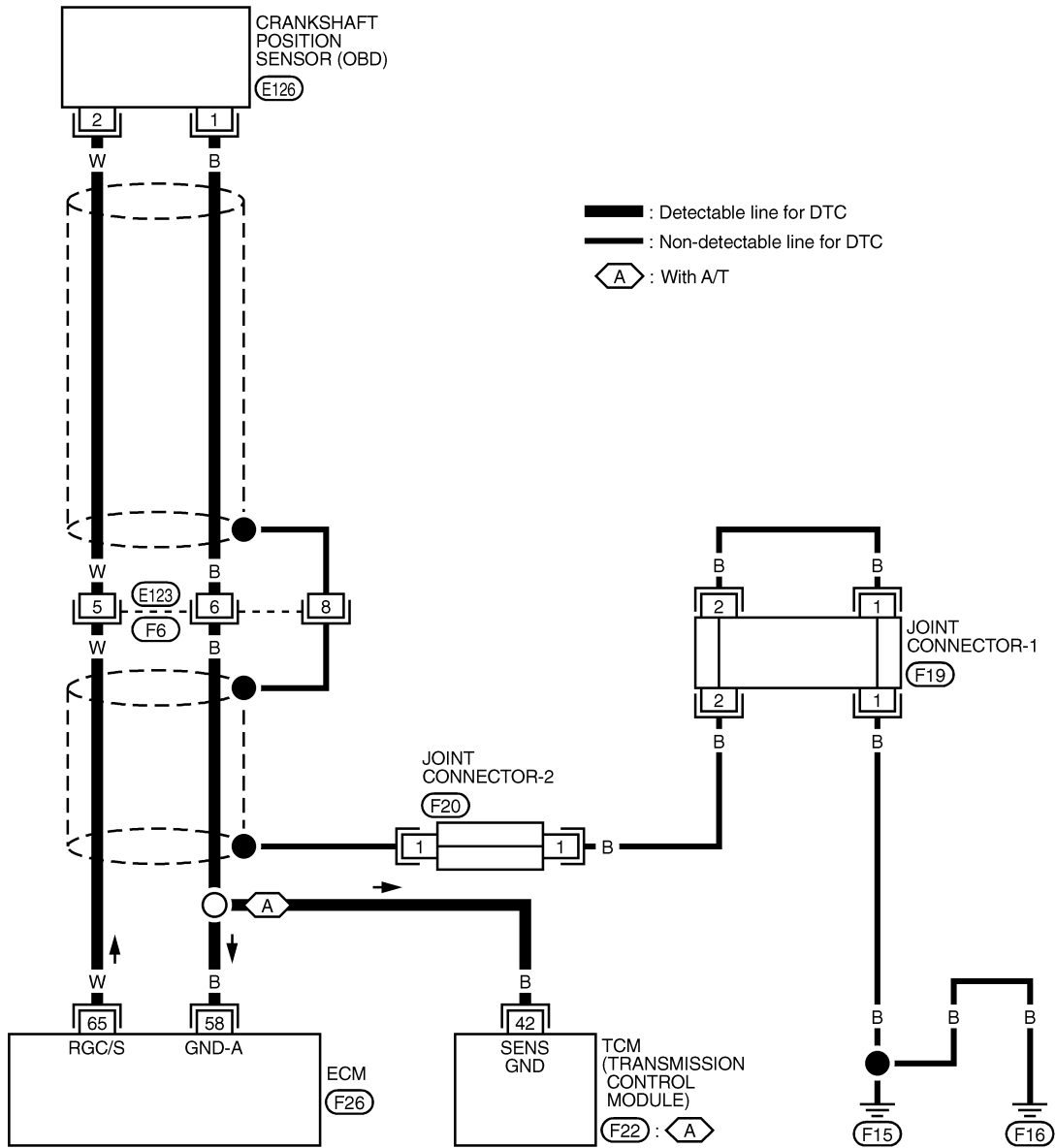
# DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD)

Wiring Diagram

## Wiring Diagram

NCEC0217

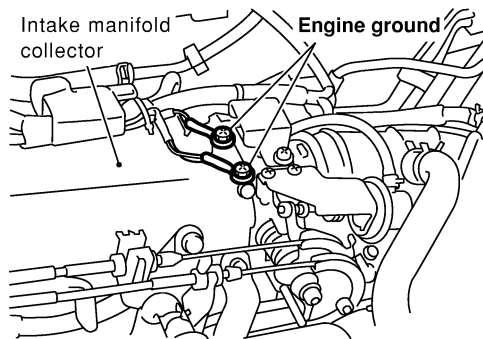
EC-CKPS-01

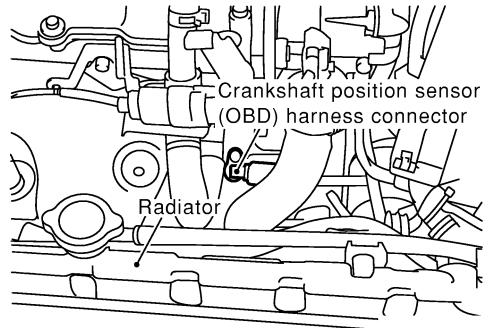


TEC709

## Diagnostic Procedure

NCEC0218

|          |                                |                                                                                                                                                                                                                                                                                                                   |                                         |
|----------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>1</b> | <b>RETIGHTEN GROUND SCREWS</b> | <p>1. Turn ignition switch "OFF".<br/>2. Loosen and retighten engine ground screws.</p> <div style="text-align: center;">  <p>Intake manifold collector      Engine ground</p> </div> <p style="text-align: right;">SEF839X</p> | GI<br>MA<br>EM<br>LC<br><b>EC</b><br>FE |
| ▶        |                                | GO TO 2.                                                                                                                                                                                                                                                                                                          |                                         |

|          |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |
|----------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>2</b> | <b>CHECK INPUT SIGNAL CIRCUIT</b> | <p>1. Disconnect crankshaft position sensor (OBD) and ECM harness connectors.</p> <div style="text-align: center;">  <p>Crankshaft position sensor (OBD) harness connector<br/>Radiator</p> </div> <p style="text-align: right;">SEF847X</p> <p>2. Check continuity between ECM terminal 65 and CKPS (OBD) terminal 2.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> | MT<br>AT<br>AX<br>SU<br>BR<br>ST<br>RS |
| OK       |                                   | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GO TO 4.                               |
| NG       |                                   | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GO TO 3.                               |

|          |                                   |                                                                                                                                                                                                   |          |
|----------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>3</b> | <b>DETECT MALFUNCTIONING PART</b> | <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors F6, E123</li> <li>● Harness for open or short between crankshaft position sensor (OBD) and ECM</li> </ul> | HA<br>SC |
| ▶        |                                   | Repair open circuit or short to ground or short to power in harness or connectors.                                                                                                                |          |

GI  
MA  
EM  
LC  
**EC**  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

# DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD)

Diagnostic Procedure (Cont'd)

|                                                                                                                                              |                             |          |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|
| <b>4</b>                                                                                                                                     | <b>CHECK GROUND CIRCUIT</b> |          |
| <p>1. Reconnect ECM harness connector.<br/>                 2. Check harness continuity between CKPS (OBD) terminal 1 and engine ground.</p> |                             |          |
|                                                                                                                                              |                             |          |
| <p><b>Continuity should exist.</b></p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p>   |                             |          |
| OK                                                                                                                                           | ▶                           | GO TO 6. |
| NG                                                                                                                                           | ▶                           | GO TO 5. |

SEF229W

|                                                                                                                                                                                                                                                                                                                       |                                   |                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                                                                              | <b>DETECT MALFUNCTIONING PART</b> |                                                                 |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors F6, E123</li> <li>● Harness for open or short between crankshaft position sensor (OBD) and ECM</li> <li>● Harness for open or short between crankshaft position sensor (OBD) and TCM (Transmission control module)</li> </ul> |                                   |                                                                 |
| ▶                                                                                                                                                                                                                                                                                                                     |                                   | Repair open circuit or short to power in harness or connectors. |

|                                                                                                                                                                                                                                                                                                                                                                                                                 |                             |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|
| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                                        | <b>CHECK SHIELD CIRCUIT</b> |          |
| <p>1. Disconnect harness connectors F6, E123.<br/>                 2. Check harness continuity between harness connector F6 terminal 8 and engine ground.<br/>                 Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b></p> <p>3. Also check harness for short to power.<br/>                 4. Then reconnect harness connectors.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                             |          |
| OK                                                                                                                                                                                                                                                                                                                                                                                                              | ▶                           | GO TO 8. |
| NG                                                                                                                                                                                                                                                                                                                                                                                                              | ▶                           | GO TO 7. |

|                                                                                                                                                                                                                                                                          |                                   |                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------|
| <b>7</b>                                                                                                                                                                                                                                                                 | <b>DETECT MALFUNCTIONING PART</b> |                                                                 |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors F6, E123</li> <li>● Joint connector-1 and -2 (Refer to EL-314, "HARNESS LAYOUT".)</li> <li>● Harness for open or short between harness connector F6 and Engine ground</li> </ul> |                                   |                                                                 |
| ▶                                                                                                                                                                                                                                                                        |                                   | Repair open circuit or short to power in harness or connectors. |

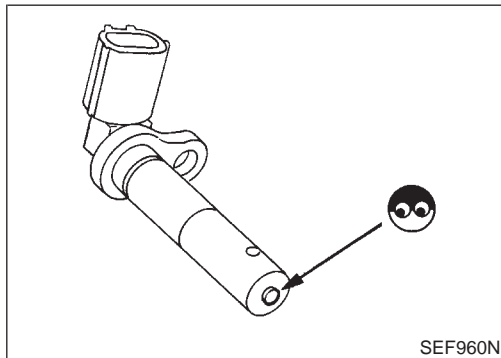
|                                                                                                    |                                               |                                           |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------|
| <b>8</b>                                                                                           | <b>CHECK CRANKSHAFT POSITION SENSOR (OBD)</b> |                                           |
| <p>Refer to "Component Inspection", EC-325.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                               |                                           |
| OK                                                                                                 | ▶                                             | GO TO 9.                                  |
| NG                                                                                                 | ▶                                             | Replace crankshaft position sensor (OBD). |

# DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD)

Diagnostic Procedure (Cont'd)

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>9</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
| ▶                                                              | <b>INSPECTION END</b>              |

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
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BT  
HA  
SC  
EL  
IDX



## Component Inspection CRANKSHAFT POSITION SENSOR (OBD)

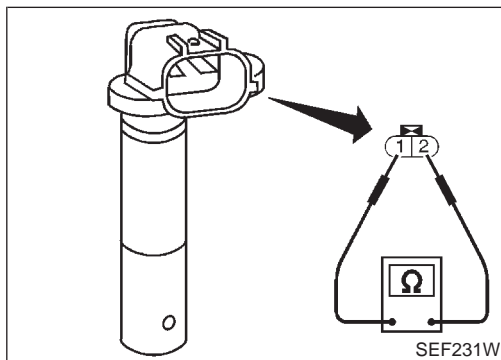
NCEC0219

NCEC0219S01

1. Disconnect crankshaft position sensor (OBD) harness connector.
  2. Loosen the fixing bolt of the sensor.
  3. Remove the sensor.
  4. Visually check the sensor for chipping.
- 
5. Check resistance as shown in the figure.

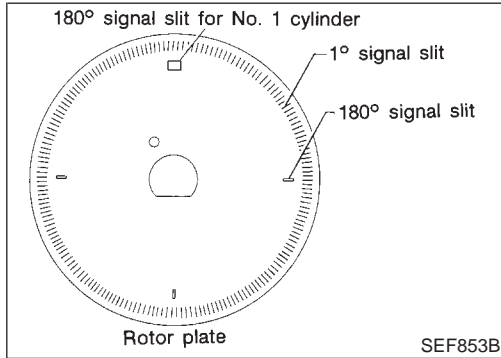
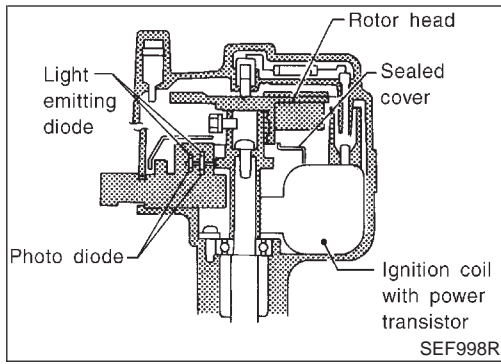
**Resistance: 166 - 204  $\Omega$  [at 20°C (68°F)]**

If NG, replace crankshaft position sensor (OBD).



# DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

## Component Description



## Component Description

NCEC0220

The camshaft position sensor is a basic component of the engine control system. It monitors engine speed and piston position. These input signals to the engine control system are used to control fuel injection, ignition timing and other functions.

The camshaft position sensor has a rotor plate and a wave-forming circuit. The rotor plate has 360 slits for a 1° (POS) signal and 4 slits for a 180° (REF) signal. The wave-forming circuit consists of Light Emitting Diodes (LED) and photo diodes.

The rotor plate is positioned between the LED and the photo diode. The LED transmits light to the photo diode. As the rotor plate turns, the slits cut the light to generate rough-shaped pulses. These pulses are converted into on-off signals by the wave-forming circuit and sent to the ECM.

The distributor is not repairable and must be replaced as an assembly except distributor cap and rotor head.

## ECM Terminals and Reference Value

NCEC0221

Specification data are reference values and are measured between each terminal and ground.

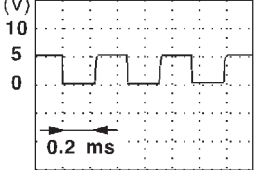
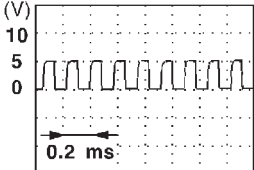
### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                                        | CONDITION                                                  | DATA (DC Voltage)         |
|----------------------|---------------|---------------------------------------------|------------------------------------------------------------|---------------------------|
| 66                   | L             | Camshaft position sensor (Reference signal) | [Engine is running]<br>● Warm-up condition<br>● Idle speed | 0.1 - 0.4V<br><br>SEF006W |
| 75                   | L             |                                             | [Engine is running]<br>● Engine speed is 2,000 rpm         | 0.1 - 0.4V<br><br>SEF007W |

# DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

ECM Terminals and Reference Value (Cont'd)

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                                       | CONDITION                                                                                                              | DATA (DC Voltage)                                                                                                    |
|----------------------|---------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| 85                   | B/W           | Camshaft position sensor (Position signal) | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Idle speed</li> </ul> | Approximately 2.6V<br><br>SEF004W |
|                      |               |                                            | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>• Engine speed is 2,000 rpm</li> </ul>               | Approximately 2.5V<br><br>SEF005W |

## On Board Diagnosis Logic

NCEC0222

| DTC No. | Malfunction is detected when ...                                                                                              | Check Items (Possible Cause)                                                                                                                                                                                                                                                                                                                  |
|---------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0340   | A) Either 1° or 180° signal is not sent to ECM for the first few seconds during engine cranking.                              | <ul style="list-style-type: none"> <li>• Harness or connectors (The camshaft position sensor circuit is open or shorted.)</li> <li>• Camshaft position sensor</li> <li>• Starter motor (Refer to SC-10, "STARTING SYSTEM".)</li> <li>• Starting system circuit (Refer to SC-10, "STARTING SYSTEM".)</li> <li>• Dead (Weak) battery</li> </ul> |
|         | B) Either 1° or 180° signal is not sent to ECM often enough while the engine speed is higher than the specified engine speed. |                                                                                                                                                                                                                                                                                                                                               |
|         | C) The relation between 1° and 180° signal is not in the normal range during the specified engine speed.                      |                                                                                                                                                                                                                                                                                                                                               |

## DTC Confirmation Procedure

NCEC0223

Perform "Procedure for malfunction A" first. If DTC cannot be confirmed, perform "Procedure for malfunction B and C".

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V.

|   |              |         |
|---|--------------|---------|
| 2 | DATA MONITOR |         |
|   | MONITOR      | NO DTC  |
|   | ENG SPEED    | XXX rpm |

SEF058Y

## PROCEDURE FOR MALFUNCTION A

NCEC0223S01

### With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Crank engine for at least 2 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-330.

### With GST

Follow the procedure "With CONSULT-II" above.

# DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

DTC Confirmation Procedure (Cont'd)

3

| DATA MONITOR |         |
|--------------|---------|
| MONITOR      | NO DTC  |
| ENG SPEED    | XXX rpm |

SEF058Y

## PROCEDURE FOR MALFUNCTION B AND C

NCEC0223S02

### With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and run it for at least 2 seconds at idle speed.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-330.

### With GST

Follow the procedure "With CONSULT-II" above.



# DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

Wiring Diagram

## Wiring Diagram

NCEC0224

EC-CMPS-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

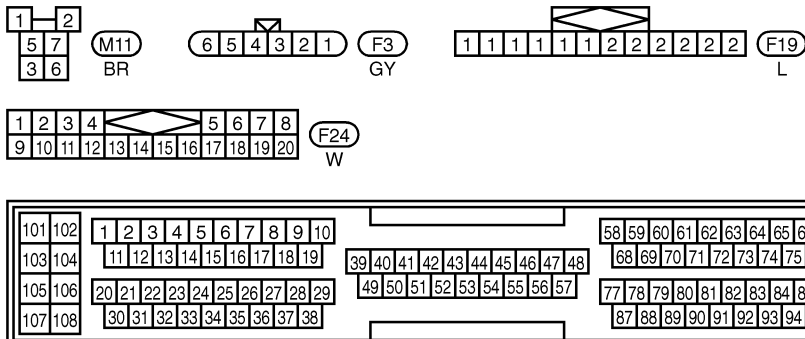
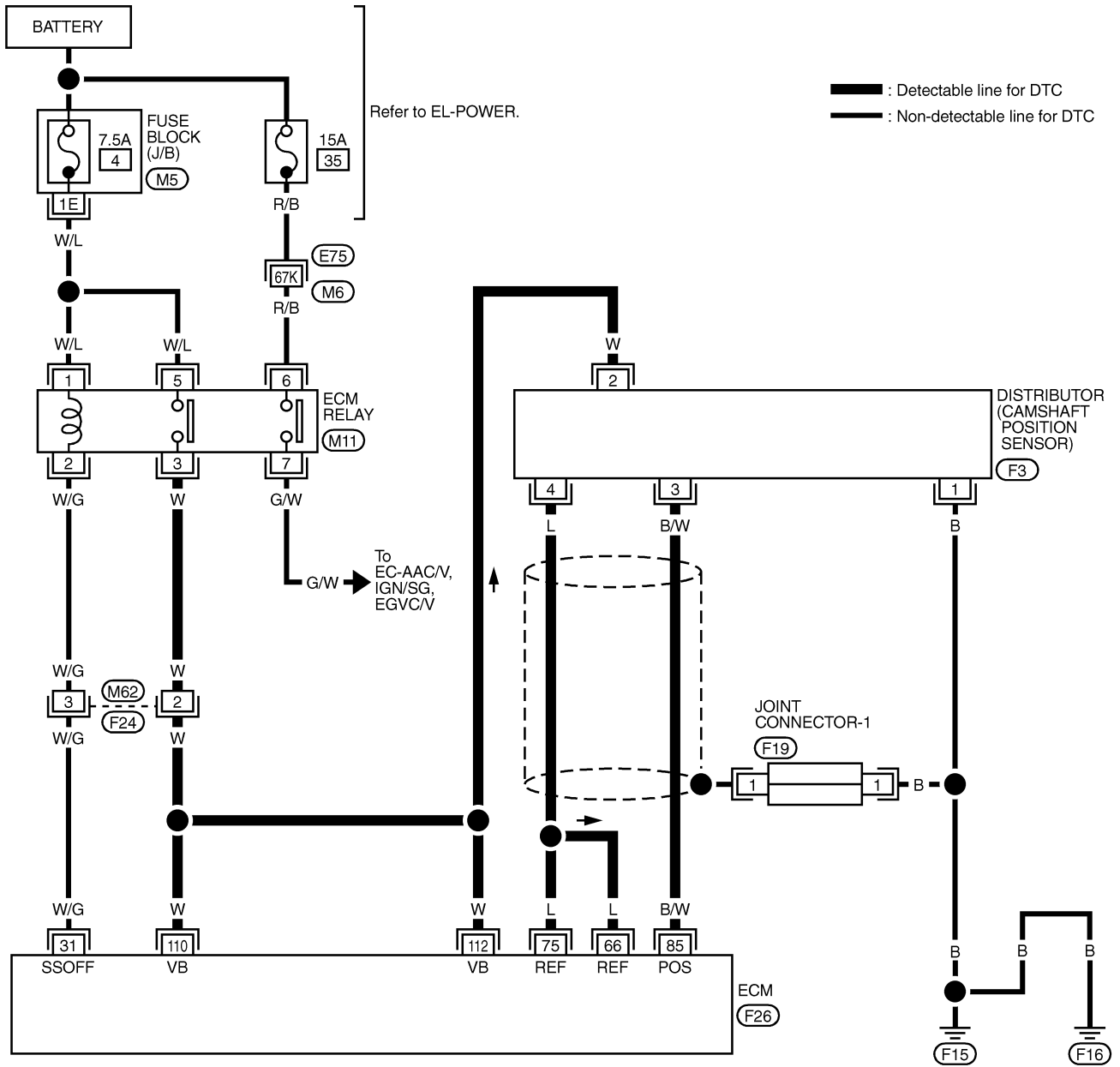
BT

HA

SC

EL

IDX



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(M5) -FUSE BLOCK-JUNCTION BOX (J/B)



TEC710

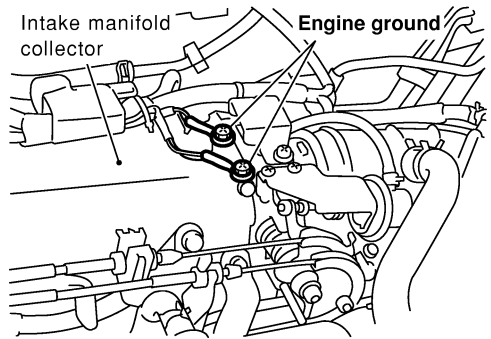
# DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

Diagnostic Procedure

## Diagnostic Procedure

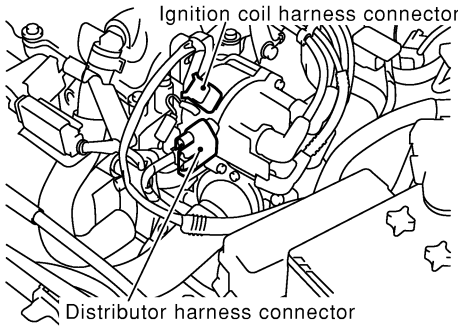
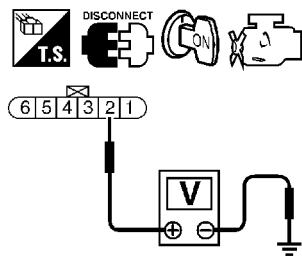
NCEC0225

|                                                                 |                                                               |
|-----------------------------------------------------------------|---------------------------------------------------------------|
| <b>1</b>                                                        | <b>CHECK STARTING SYSTEM</b>                                  |
| Does the engine turn over?<br>(Does the starter motor operate?) |                                                               |
| <b>Yes or No</b>                                                |                                                               |
| Yes                                                             | ▶ GO TO 2.                                                    |
| No                                                              | ▶ Check starting system. (Refer to SC-10, "STARTING SYSTEM".) |

|                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>RETIGHTEN GROUND SCREWS</b> |
| 1. Turn ignition switch "OFF".<br>2. Loosen and retighten engine ground screws.                                                                                                                                                                                                                                                                                                                                                          |                                |
|  <p>The diagram shows a cross-section of an engine with various components. Two specific ground screws are highlighted with circles and arrows. One is labeled 'Intake manifold collector' and the other is labeled 'Engine ground'. The diagram is a technical line drawing showing the internal structure of the engine and its mounting points.</p> |                                |
| SEF839X                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                |
| ▶                                                                                                                                                                                                                                                                                                                                                                                                                                        | GO TO 3.                       |

# DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

Diagnostic Procedure (Cont'd)

|          |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                      |
|----------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>3</b> | <b>CHECK POWER SUPPLY</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                      |
|          |                           | <p>1. Disconnect distributor harness connector.</p> <div style="text-align: center;">  <p>Ignition coil harness connector</p> <p>Distributor harness connector</p> </div> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between distributor terminal 2 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>SEF848X</p> </div> <p><b>Voltage: Battery voltage</b></p> <p style="text-align: center;"><b>OK or NG</b></p> | <p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p><b>EC</b></p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> |
|          | OK                        | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | GO TO 5.                                                                                                             |
|          | NG                        | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | GO TO 4.                                                                                                             |

|          |                                   |                                                                                                                                                                                                                                                                                                                                                                            |  |
|----------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>4</b> | <b>DETECT MALFUNCTIONING PART</b> |                                                                                                                                                                                                                                                                                                                                                                            |  |
|          |                                   | <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M62, F24</li> <li>● Harness for open or short between distributor and ECM relay</li> <li>● Harness for open or short between distributor and ECM</li> </ul> <p style="text-align: right;">▶ Repair open circuit or short to ground or short to power in harness or connectors.</p> |  |

|          |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                    |
|----------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>5</b> | <b>CHECK INPUT SIGNAL CIRCUIT</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                    |
|          |                                   | <p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between distributor terminal 3 and ECM terminal 85, distributor terminal 4 and ECM terminals 66, 75.</p> <p style="padding-left: 20px;">Refer to Wiring Diagram.</p> <p style="padding-left: 20px;"><b>Continuity should exist.</b></p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> | <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>   |
|          | OK                                | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | GO TO 6.                                                                           |
|          | NG                                | ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Repair open circuit or short to ground or short to power in harness or connectors. |

# DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

Diagnostic Procedure (Cont'd)

|                                                                                                                                            |                             |                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|
| <b>6</b>                                                                                                                                   | <b>CHECK GROUND CIRCUIT</b> |                                                                 |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Check harness continuity between distributor terminal 1 and engine ground.</p>   |                             |                                                                 |
|                                                                                                                                            |                             |                                                                 |
| <p><b>Continuity should exist.</b></p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                             |                                                                 |
| OK                                                                                                                                         | ▶                           | GO TO 7.                                                        |
| NG                                                                                                                                         | ▶                           | Repair open circuit or short to power in harness or connectors. |

SEF234W

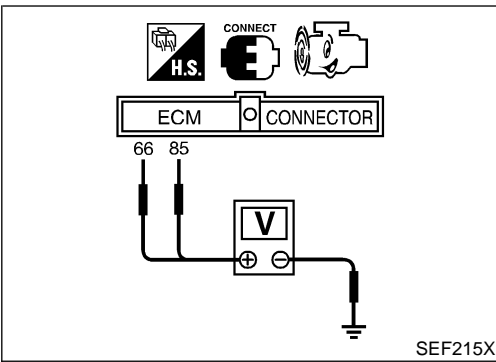
|                                                                                                    |                                       |                                   |
|----------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| <b>7</b>                                                                                           | <b>CHECK CAMSHAFT POSITION SENSOR</b> |                                   |
| <p>Refer to "Component Inspection", EC-333.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                       |                                   |
| OK                                                                                                 | ▶                                     | GO TO 8.                          |
| NG                                                                                                 | ▶                                     | Replace camshaft position sensor. |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|
| <b>8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK SHIELD CIRCUIT</b> |                                                                 |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect joint connector-1.<br/>                 3. Check the following.</p> <ul style="list-style-type: none"> <li>● Continuity between joint connector-1 terminal 1 and ground<br/>                     Refer to Wiring Diagram.</li> <li>● Joint connector-1<br/>                     (Refer to EL-314, "HARNESS LAYOUT".)<br/> <b>Continuity should exist.</b></li> </ul> <p>4. Also check harness for short to power.<br/>                 5. Then reconnect joint connector-1.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                             |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                           | GO TO 9.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                           | Repair open circuit or short to power in harness or connectors. |

|                                                                       |                                    |                       |
|-----------------------------------------------------------------------|------------------------------------|-----------------------|
| <b>9</b>                                                              | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| <p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p> |                                    |                       |
|                                                                       | ▶                                  | <b>INSPECTION END</b> |

# DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

Component Inspection



## Component Inspection

### CAMSHAFT POSITION SENSOR

=NCEC0226

NCEC0226S01

1. Start engine and warm it up to normal operating temperature.
2. Check voltage between ECM terminals 66, 85 and engine ground under the following conditions.

#### Terminal 66 (or 75) and engine ground

| Condition    | Idle           | 2,000 rpm      |
|--------------|----------------|----------------|
| Voltage      | 0.1 - 0.4V     | 0.1 - 0.4V     |
| Pulse signal | <p>SEF006W</p> | <p>SEF007W</p> |

#### Terminal 85 and engine ground

| Condition    | Idle               | 2,000 rpm          |
|--------------|--------------------|--------------------|
| Voltage      | Approximately 2.5V | Approximately 2.4V |
| Pulse signal | <p>SEF004W</p>     | <p>SEF005W</p>     |

If NG, replace distributor assembly with camshaft position sensor.

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
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HA  
SC  
EL  
IDX

# DTC P0400 EGR FUNCTION (CLOSE)

Description

## Description SYSTEM DESCRIPTION

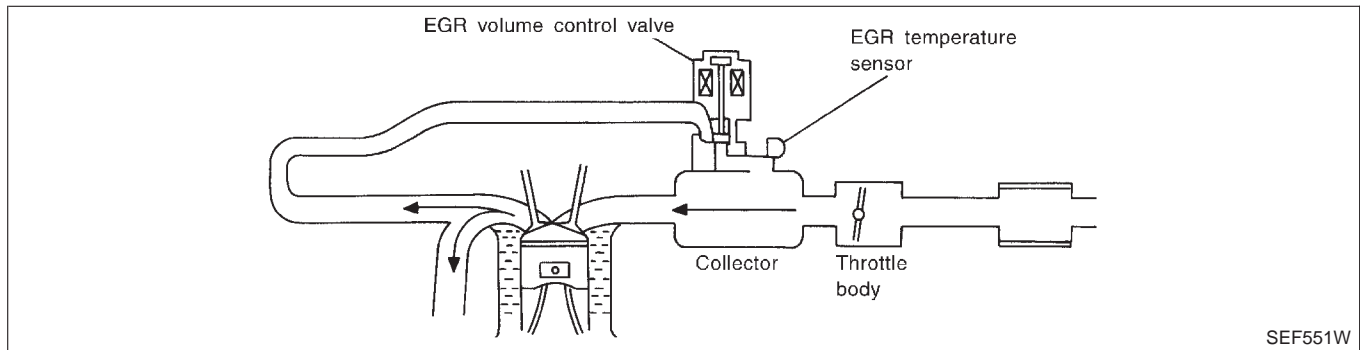
NCEC0513

NCEC0513S01

| Sensor                             | Input Signal to ECM            | ECM function       | Actuator                 |
|------------------------------------|--------------------------------|--------------------|--------------------------|
| Camshaft position sensor           | Engine speed                   | EGR volume control | EGR volume control valve |
| Vehicle speed sensor               | Vehicle speed                  |                    |                          |
| Engine coolant temperature sensor  | Engine coolant temperature     |                    |                          |
| Ignition switch                    | Start signal                   |                    |                          |
| Throttle position sensor           | Throttle position              |                    |                          |
| Battery                            | Battery voltage                |                    |                          |
| Mass air flow sensor               | Amount of intake air           |                    |                          |
| Air conditioner switch             | Air conditioner operation      |                    |                          |
| Power steering oil pressure switch | Power steering load signal     |                    |                          |
| Electrical load                    | Electrical load signal         |                    |                          |
| PNP switch                         | Park/Neutral position signal   |                    |                          |
| TCM (Transmission Control Module)  | Gear position, shifting signal |                    |                          |

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

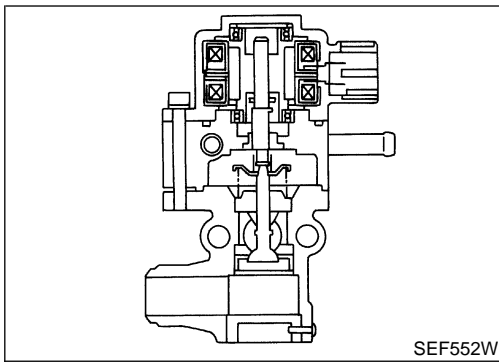
- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage



SEF551W

# DTC P0400 EGR FUNCTION (CLOSE)

Description (Cont'd)



## COMPONENT DESCRIPTION

### EGR volume control valve

NCEC0513S02

NCEC0513S0201

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

GI  
MA  
EM  
LC

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0514

Specification data are reference values.

EC

| MONITOR ITEM  | CONDITION                                                                                                                                                            |                                        | SPECIFICATION  |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------|
| EGR TEMP SEN  | ● Engine: After warming up                                                                                                                                           |                                        | Less than 4.5V |
| EGR VOL CON/V | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N"</li> <li>● No-load</li> </ul> | Idle                                   | 0 step         |
|               |                                                                                                                                                                      | Revving engine up to 3,000 rpm quickly | 10 - 55 step   |

FE  
CL  
MT

## ECM Terminals and Reference Value

NCEC0644

Specification data are reference values and are measured between each terminal and ground.

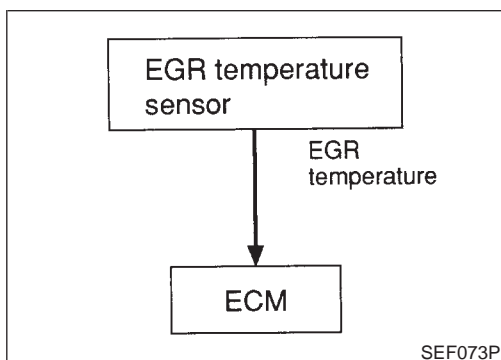
### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

AT  
AX

| TERMI-NAL NO.      | WIRE COLOR              | ITEM                     | CONDITION                                                               | DATA (DC Voltage) |
|--------------------|-------------------------|--------------------------|-------------------------------------------------------------------------|-------------------|
| 8<br>9<br>17<br>18 | SB<br>W/B<br>R/W<br>G/R | EGR volume control valve | [Engine is running]<br>● Idle speed                                     | 0.1 - 14V         |
| 58                 | B                       | Sensor's ground          | [Engine is running]<br>● Warm-up condition<br>● Idle speed              | Approximately 0V  |
| 72                 | R/B                     | EGR temperature sensor   | [Engine is running]<br>● Warm-up condition<br>● Idle speed              | Less than 4.5V    |
|                    |                         |                          | [Engine is running]<br>● Warm-up condition<br>● EGR system is operating | 0 - 1.5V          |

SU  
BR  
ST  
RS  
BT  
HA



## On Board Diagnosis Logic

NCEC0515

If the absence of EGR flow is detected by EGR temperature sensor under the condition that calls for EGR, a low-flow malfunction is diagnosed.

Malfunction is detected when no EGR flow is detected under condition that calls for EGR.

SC  
EL  
IDX

# DTC P0400 EGR FUNCTION (CLOSE)

Possible Cause

## Possible Cause

NCEC0516

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve stuck closed
- Dead (Weak) battery
- EGR passage clogged
- EGR temperature sensor and circuit
- Exhaust gas leaks

|              |                  |         |
|--------------|------------------|---------|
| 5            | EGR SYSTEM P0400 |         |
|              | OUT OF CONDITION |         |
|              | MONITOR          |         |
|              | ENG SPEED        | XXX rpm |
|              | THRTL POS SEN    | XXX V   |
| B/FUEL SCHDL | XXX msec         |         |
| SEF191Y      |                  |         |

|              |                  |         |
|--------------|------------------|---------|
| 8            | EGR SYSTEM P0400 |         |
|              | TESTING          |         |
|              | MONITOR          |         |
|              | ENG SPEED        | XXX rpm |
|              | THRTL POS SEN    | XXX V   |
| B/FUEL SCHDL | XXX msec         |         |
| SEF192Y      |                  |         |

|         |                  |  |
|---------|------------------|--|
| 8       | EGR SYSTEM P0400 |  |
|         | COMPLETED        |  |
| SEF235Y |                  |  |

## DTC Confirmation Procedure

NCEC0517

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.
- P0400 will not be displayed at “SELF-DIAG RESULTS” mode with CONSULT-II even though DTC work support test result is NG.

### TESTING CONDITION:

- Before performing the following procedure, confirm battery voltage is more than 10V at idle, then stop engine immediately.
- For best results, perform the test at a temperature of 5°C (41°F) or higher.

### WITH CONSULT-II

NCEC0517S01

- 1) Turn ignition switch “OFF” and wait at least 10 seconds.
- 2) Turn ignition switch “ON”
- 3) Check “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.  
Confirm COOLAN TEMP/S value is within the range listed below.  
**COOLAN TEMP/S: Less than 40°C (104°F)**  
If the value is out of range, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to lower the engine coolant temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.
- 4) Start engine and let it idle monitoring “COOLAN TEMP/S” value. When the “COOLAN TEMP/S” value reaches 70°C (158°F), immediately go to the next step.
- 5) Select “EGR SYSTEM P0400” of “EGR SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
- 6) Touch “START”.
- 7) Accelerate vehicle to a speed of 40 km/h (25 MPH) once and then stop vehicle with engine running.  
If “COMPLETED” appears on CONSULT-II screen, go to step 10.  
If “COMPLETED” does not appear on CONSULT-II screen, go to the following step.
- 8) Check the output voltage of “THRTL POS SEN” (at closed throttle position) and note it.
- 9) When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions



# DTC P0400 EGR FUNCTION (CLOSE)

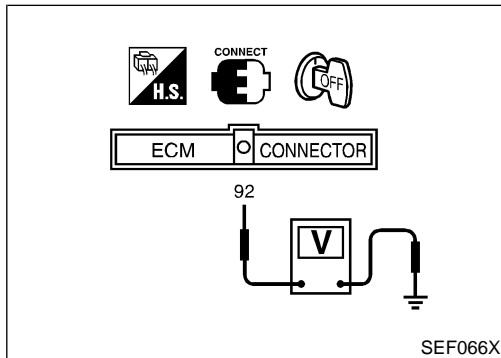
DTC Confirmation Procedure (Cont'd)

until "TESTING" changes to "COMPLETED". (It will take approximately 30 seconds or more.)

|                |                                                                   |
|----------------|-------------------------------------------------------------------|
| ENG SPEED      | 1,800 - 2,800 rpm                                                 |
| Vehicle speed  | More than 10 km/h (6 MPH)                                         |
| B/FUEL SCHDL   | 5.0 - 8.5 msec                                                    |
| THRTL POS SEN  | (X + 0.05) – (X + 0.87) V<br>X = Voltage value measured at step 8 |
| Selector lever | Suitable position                                                 |

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 10) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-339.



## WITH GST

- 1) Turn ignition switch "OFF" and wait at least 10 seconds.
- 2) Turn ignition switch "ON".
- 3) Check engine coolant temperature in MODE 1 with GST. **Engine coolant temperature: Less than 40°C (104°F)**  
If the value is out of range, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to lower the coolant temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.
- 4) Start engine and let it idle monitoring the value of "COOLAN TEMP/S". When the engine coolant temperature reaches 70°C (158°F), immediately go to the next step.
- 5) Maintain the following conditions for at least 1 minute.  
**Engine speed: 1,800 - 2,800 rpm**  
**Vehicle speed: More than 10 km/h (6 MPH)**  
**Voltage between ECM terminal 92 and ground: 0.86 - 2.0V**  
**Selector lever: Suitable position**
- 6) Stop vehicle.
- 7) Turn ignition switch "OFF" and wait at least 10 seconds, then turn "ON".
- 8) Repeat step 3 to 5.
- 9) Select "MODE 3" with GST.
- 10) If DTC is detected, go to "Diagnostic Procedure", EC-339.
  - When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

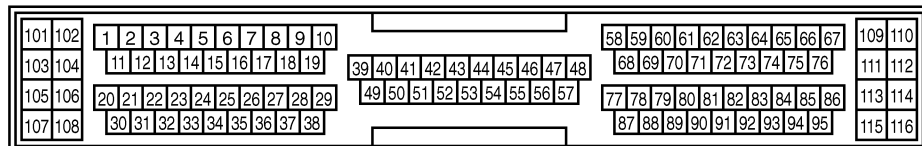
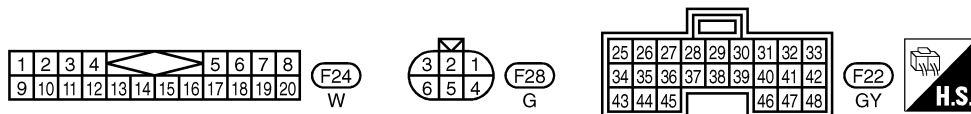
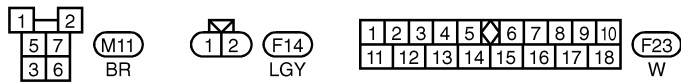
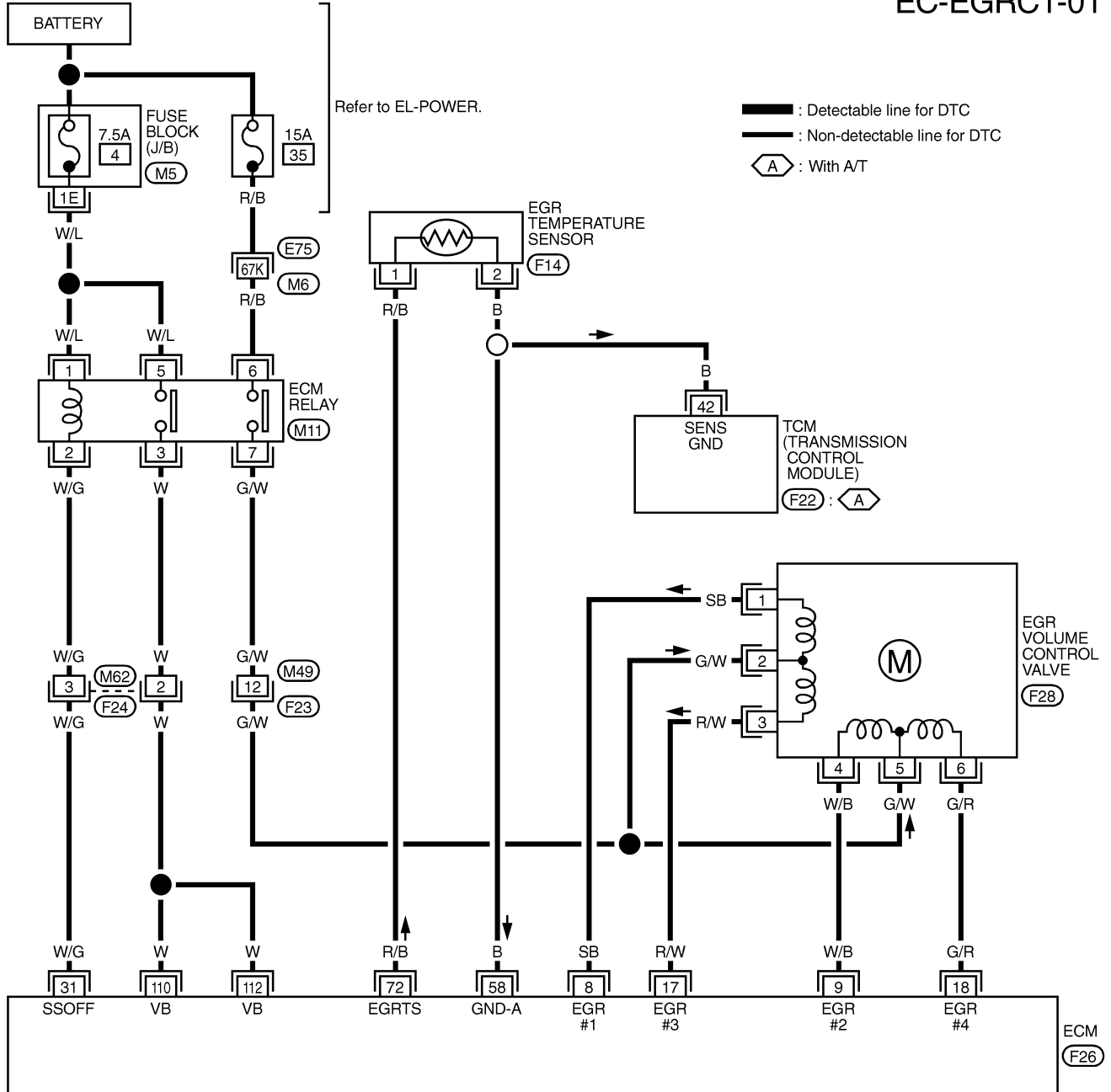
# DTC P0400 EGR FUNCTION (CLOSE)

Wiring Diagram

## Wiring Diagram

NCEC0518

EC-EGRC1-01



REFER TO THE FOLLOWING.

E75 -SUPER MULTIPLE JUNCTION (SMJ)

M5 -FUSE BLOCK-JUNCTION BOX (J/B)

F26 GY

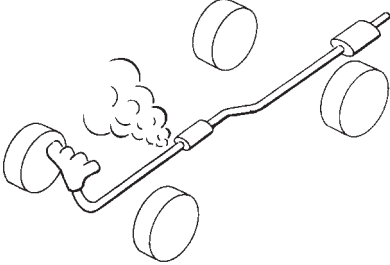
TEC755

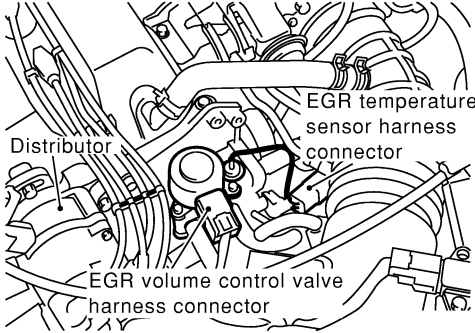
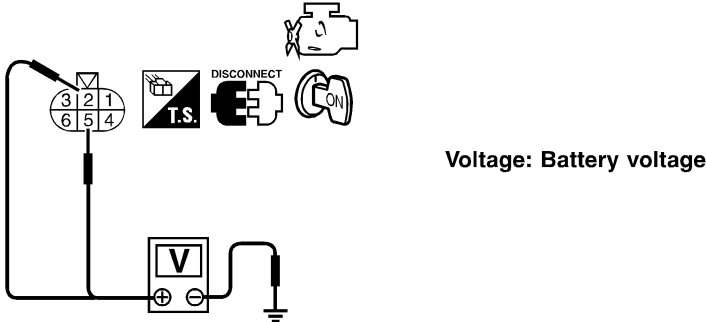
# DTC P0400 EGR FUNCTION (CLOSE)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0519

|          |                             |                                                                                                                                                                                                                                                                                                    |                                               |
|----------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>1</b> | <b>CHECK EXHAUST SYSTEM</b> | <p>1. Start engine.<br/>2. Check exhaust pipes and muffler for leaks.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF099P</p> <p style="text-align: center;"><b>OK or NG</b></p> | GI<br>MA<br>EM<br>LC<br><b>EC</b><br>FE<br>CL |
| OK       | ▶                           | GO TO 2.                                                                                                                                                                                                                                                                                           |                                               |
| NG       | ▶                           | Repair or replace exhaust system.                                                                                                                                                                                                                                                                  |                                               |

|          |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                       |
|----------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>2</b> | <b>CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT</b> | <p>1. Disconnect EGR volume control valve harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF849X</p> <p>2. Turn ignition switch "ON".<br/>3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;"><b>OK or NG</b></p> </div> <p style="text-align: right;">SEF327X</p> | MT<br>AT<br>AX<br>SU<br>BR<br>ST<br>RS<br>BT<br>HA<br>SC<br>EL<br>IDX |
| OK       | ▶                                                          | GO TO 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                       |
| NG       | ▶                                                          | GO TO 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                       |

# DTC P0400 EGR FUNCTION (CLOSE)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                       |                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>3</b>                                                                                                                                                                              | <b>DETECT MALFUNCTIONING PART</b> |
| Check the following. <ul style="list-style-type: none"><li>● Harness connectors F23, M49</li><li>● Harness for open or short between ECM relay and EGR volume control valve</li></ul> |                                   |
| ▶                                                                                                                                                                                     | Repair harness or connectors.     |

| <b>4</b>                                                                                                                                                                                                                                      | <b>CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b>       |              |                          |   |   |   |   |    |   |    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------|--------------------------|---|---|---|---|----|---|----|---|
| 1. Turn ignition switch "OFF".<br>2. Disconnect ECM harness connector.<br>3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows.<br>Refer to Wiring Diagram.                                    |                                                                                      |              |                          |   |   |   |   |    |   |    |   |
| <table border="1"><thead><tr><th>ECM terminal</th><th>EGR volume control valve</th></tr></thead><tbody><tr><td>8</td><td>1</td></tr><tr><td>9</td><td>4</td></tr><tr><td>17</td><td>3</td></tr><tr><td>18</td><td>6</td></tr></tbody></table> |                                                                                      | ECM terminal | EGR volume control valve | 8 | 1 | 9 | 4 | 17 | 3 | 18 | 6 |
| ECM terminal                                                                                                                                                                                                                                  | EGR volume control valve                                                             |              |                          |   |   |   |   |    |   |    |   |
| 8                                                                                                                                                                                                                                             | 1                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| 9                                                                                                                                                                                                                                             | 4                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| 17                                                                                                                                                                                                                                            | 3                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| 18                                                                                                                                                                                                                                            | 6                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| MTBL0389                                                                                                                                                                                                                                      |                                                                                      |              |                          |   |   |   |   |    |   |    |   |
| <b>Continuity should exist.</b>                                                                                                                                                                                                               |                                                                                      |              |                          |   |   |   |   |    |   |    |   |
| 4. Also check harness for short to ground and short to power.                                                                                                                                                                                 |                                                                                      |              |                          |   |   |   |   |    |   |    |   |
| <b>OK or NG</b>                                                                                                                                                                                                                               |                                                                                      |              |                          |   |   |   |   |    |   |    |   |
| OK                                                                                                                                                                                                                                            | ▶ GO TO 5.                                                                           |              |                          |   |   |   |   |    |   |    |   |
| NG                                                                                                                                                                                                                                            | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |              |                          |   |   |   |   |    |   |    |   |

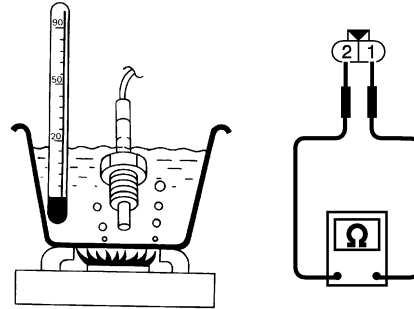
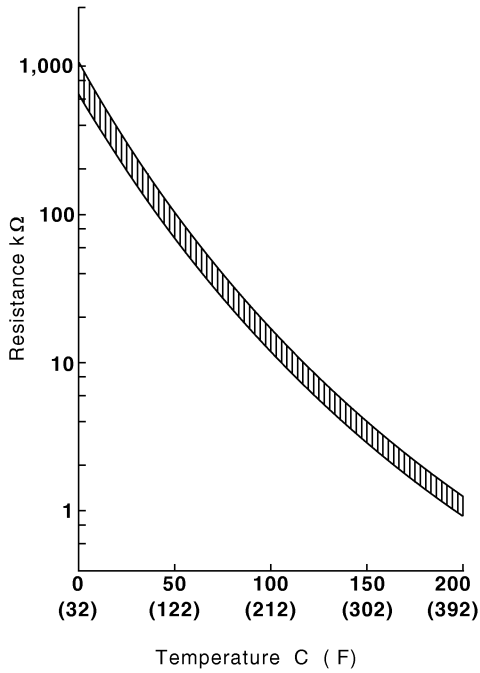
|                                            |                                  |
|--------------------------------------------|----------------------------------|
| <b>5</b>                                   | <b>CHECK EGR PASSAGE</b>         |
| Check EGR passage for clogging and cracks. |                                  |
| <b>OK or NG</b>                            |                                  |
| OK                                         | ▶ GO TO 6.                       |
| NG                                         | ▶ Repair or replace EGR passage. |

# DTC P0400 EGR FUNCTION (CLOSE)

Diagnostic Procedure (Cont'd)

## 6 CHECK EGR TEMPERATURE SENSOR AND CIRCUIT

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

| EGR temperature<br>C ( F ) | Voltage<br>V | Resistance<br>MΩ |
|----------------------------|--------------|------------------|
| 0 (32)                     | 4.56         | 0.73 - 0.89      |
| 50 (122)                   | 2.25         | 0.074 - 0.082    |
| 100 (212)                  | 0.59         | 0.012 - 0.014    |

SEF919Z

OK or NG

|    |   |                                 |
|----|---|---------------------------------|
| OK | ▶ | GO TO 7.                        |
| NG | ▶ | Replace EGR temperature sensor. |

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# DTC P0400 EGR FUNCTION (CLOSE)

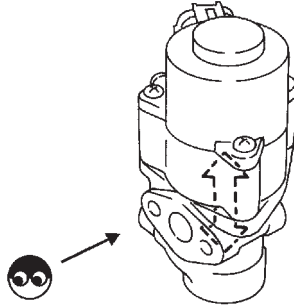
Diagnostic Procedure (Cont'd)

|                                                                                                                        |                                         |                                                                      |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------|
| <b>7</b>                                                                                                               | <b>CHECK EGR VOLUME CONTROL VALVE-I</b> |                                                                      |
| <p>Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p> |                                         |                                                                      |
|                                                                                                                        |                                         | <p><b>Resistance:</b><br/> <b>20.9 - 23.1 Ω [At 20°C (68°F)]</b></p> |
| SEF588X                                                                                                                |                                         |                                                                      |
| <b>OK or NG</b>                                                                                                        |                                         |                                                                      |
| OK (With CONSULT-II)                                                                                                   | ▶                                       | GO TO 8.                                                             |
| OK (Without CONSULT-II)                                                                                                | ▶                                       | GO TO 9.                                                             |
| NG                                                                                                                     | ▶                                       | Replace EGR volume control valve.                                    |

| <b>8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>CHECK EGR VOLUME CONTROL VALVE-II</b> |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|--|----------------|---------|---------|--|-----------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Remove EGR volume control valve.</li> <li>2. Reconnect ECM harness connector and EGR volume control valve harness connector.</li> <li>3. Turn ignition switch "ON".</li> <li>4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.</li> <li>5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps.</li> </ol>                                                                                                                                               |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> |                                          | ACTIVE TEST                       |  | EGR VOL CONT/V | 20 step | MONITOR |  | ENG SPEED | XXX rpm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| EGR VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20 step                                  |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | XXX rpm                                  |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SEF067Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶                                        | GO TO 10.                         |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶                                        | Replace EGR volume control valve. |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

# DTC P0400 EGR FUNCTION (CLOSE)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|
| <b>9</b>                                                                                                                                                                                                                                                                                                                                                                                                   | <b>CHECK EGR VOLUME CONTROL VALVE-II</b> |                                   |
| <p>⊗ <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Remove EGR volume control valve.</li> <li>2. Reconnect ECM harness connector and EGR volume control valve harness connector.</li> <li>3. Turn ignition switch "ON" and "OFF".</li> <li>4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position.</li> </ol> |                                          |                                   |
|                                                                                                                                                                                                                                                                                                                           |                                          |                                   |
| SEF560W                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |                                   |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                   |
| OK                                                                                                                                                                                                                                                                                                                                                                                                         | ▶                                        | GO TO 10.                         |
| NG                                                                                                                                                                                                                                                                                                                                                                                                         | ▶                                        | Replace EGR volume control valve. |

|                                                                 |                                    |                       |
|-----------------------------------------------------------------|------------------------------------|-----------------------|
| <b>10</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                       |
|                                                                 | ▶                                  | <b>INSPECTION END</b> |

GI  
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AT  
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BR  
ST  
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BT  
HA  
SC  
EL  
IDX

# DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Description

## Description SYSTEM DESCRIPTION

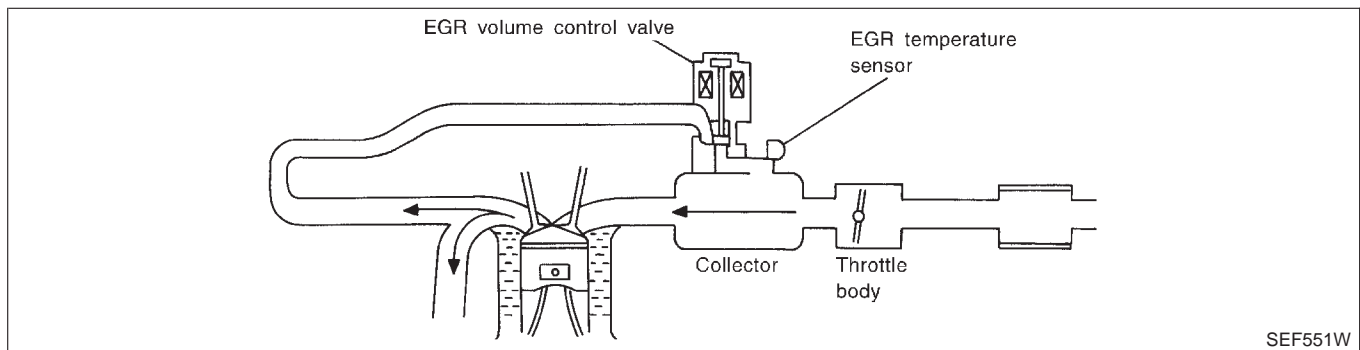
NCEC0520

NCEC0520S01

| Sensor                             | Input Signal to ECM            | ECM function       | Actuator                 |
|------------------------------------|--------------------------------|--------------------|--------------------------|
| Camshaft position sensor           | Engine speed                   | EGR volume control | EGR volume control valve |
| Vehicle speed sensor               | Vehicle speed                  |                    |                          |
| Engine coolant temperature sensor  | Engine coolant temperature     |                    |                          |
| Ignition switch                    | Start signal                   |                    |                          |
| Throttle position sensor           | Throttle position              |                    |                          |
| Battery                            | Battery voltage                |                    |                          |
| Mass air flow sensor               | Amount of intake air           |                    |                          |
| Air conditioner switch             | Air conditioner operation      |                    |                          |
| Power steering oil pressure switch | Power steering load signal     |                    |                          |
| Electrical load                    | Electrical load signal         |                    |                          |
| PNP switch                         | Park/Neutral position signal   |                    |                          |
| TCM (Transmission Control Module)  | Gear position, shifting signal |                    |                          |

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage

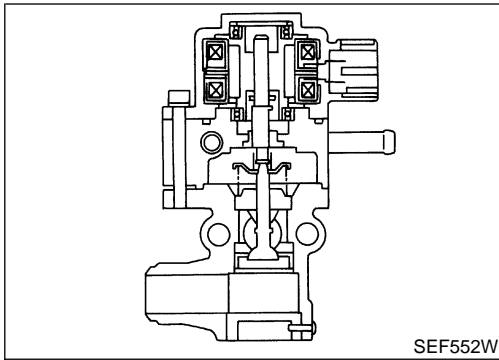


SEF551W



# DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Description (Cont'd)



## COMPONENT DESCRIPTION

### EGR volume control valve

NCEC0520S02

NCEC0520S0201

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

GI  
MA  
EM  
LC

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0521

Specification data are reference values.

EC

| MONITOR ITEM  | CONDITION                                                                                                                                                    |                                       | SPECIFICATION |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------|
| EGR VOL CON/V | <ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Air conditioner switch: "OFF"</li> <li>Shift lever: "N"</li> <li>No-load</li> </ul> | Idle                                  | 0 step        |
|               |                                                                                                                                                              | Revvng engine up to 3,000 rpm quickly | 10 - 55 step  |

FE

CL

MT

## ECM Terminals and Reference Value

NCEC0645

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

AT

AX

| TER-MINAL NO. | WIRE COLOR | ITEM                     | CONDITION                                                                               | DATA (DC Voltage) |
|---------------|------------|--------------------------|-----------------------------------------------------------------------------------------|-------------------|
| 8             | SB         | EGR volume control valve | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Idle speed</li> </ul> | 0.1 - 14V         |
| 9             | W/B        |                          |                                                                                         |                   |
| 17            | R/W        |                          |                                                                                         |                   |
| 18            | G/R        |                          |                                                                                         |                   |

SU

BR

ST

RS

BT

HA

## On Board Diagnosis Logic

NCEC0522

Malfunction is detected when an improper voltage signal is sent to ECM through the valve.

### FAIL-SAFE MODE

NCEC0522S01

When the ECM enters the fail-safe mode, the MIL illuminates.

SC

EL

IDX

| Detected items                   | Engine operating condition in fail-safe mode                        |
|----------------------------------|---------------------------------------------------------------------|
| EGR volume control valve circuit | Engine speed will not rise more than 2,800 rpm due to the fuel cut. |

# DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Possible Cause

## Possible Cause

NCEC0523

- Harness or connectors  
(EGR volume control valve circuit is open or shorted.)
- EGR volume control valve

| DATA MONITOR  |         |
|---------------|---------|
| MONITOR       | NO DTC  |
| ENG SPEED     | XXX rpm |
| COOLAN TEMP/S | XXX °C  |

SEF174Y

## DTC Confirmation Procedure

NCEC0524

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

**Before performing the following procedure, confirm that battery voltage is more than 10V at idle.**

### ④ WITH CONSULT-II

NCEC0524S01

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Rev engine from idle to 2,000 rpm 10 times.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-348.

### ④ WITH GST

NCEC0524S02

Follow the procedure "With CONSULT-II" above.

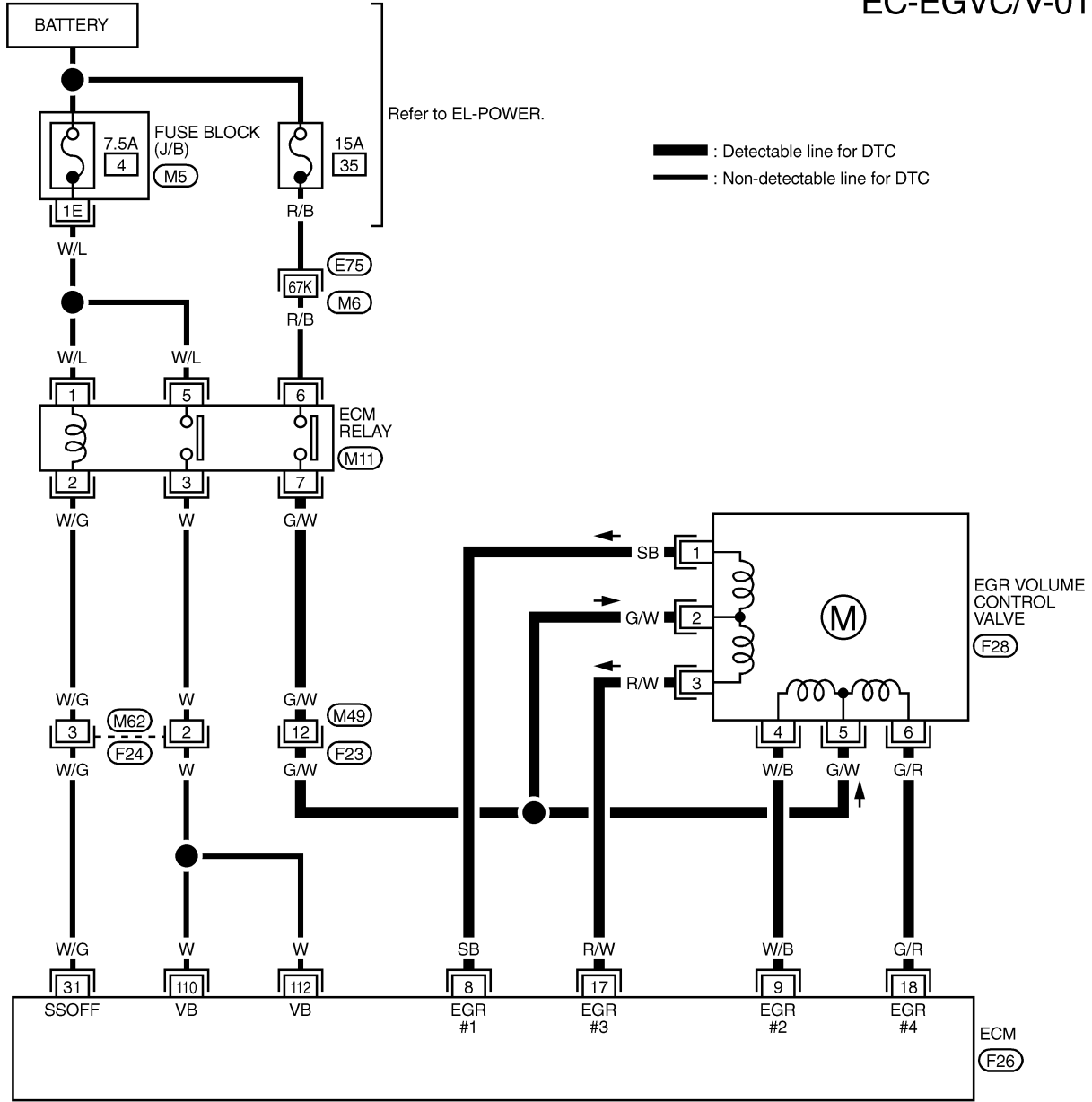
# DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Wiring Diagram

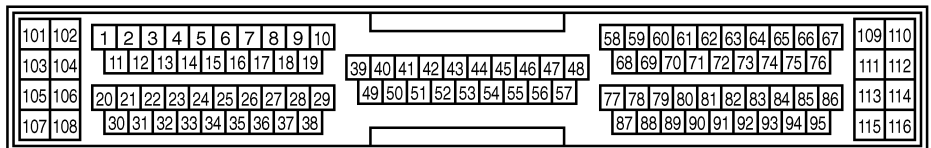
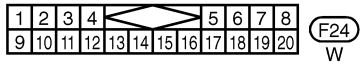
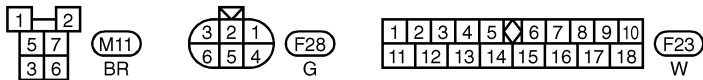
## Wiring Diagram

=NCEC0525

EC-EGVC/V-01



GI  
MA  
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**EC**  
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EL  
IDX



REFER TO THE FOLLOWING.  
 (E75) -SUPER MULTIPLE JUNCTION (SMJ)  
 (M5) -FUSE BLOCK-JUNCTION BOX (J/B)

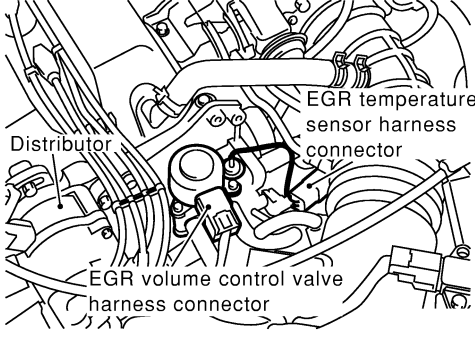
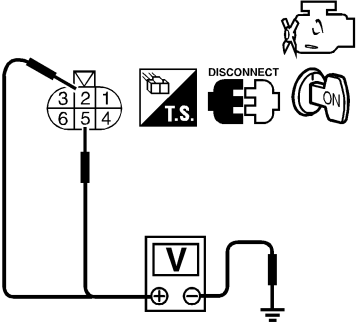


# DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0526

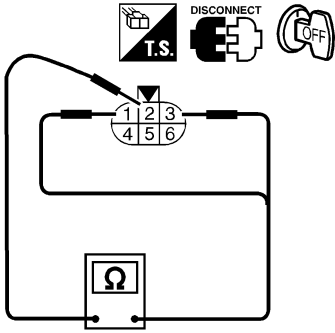
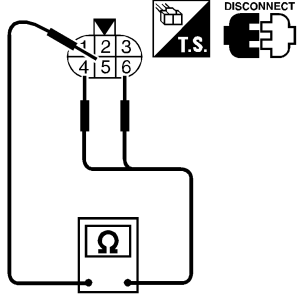
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT</b> |
| <p>1. Disconnect EGR volume control valve harness connector.</p>  <p style="text-align: right;">SEF849X</p> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">SEF327X</p> <p style="text-align: center;">OK or NG</p> |                                                            |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ▶ GO TO 3.                                                 |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ▶ GO TO 2.                                                 |

|                                                                                                                                                                                                 |                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>2</b>                                                                                                                                                                                        | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors F23, M49</li> <li>● Harness for open or short between ECM relay and EGR volume control valve</li> </ul> |                                   |
| ▶                                                                                                                                                                                               | Repair harness or connectors.     |

# DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)


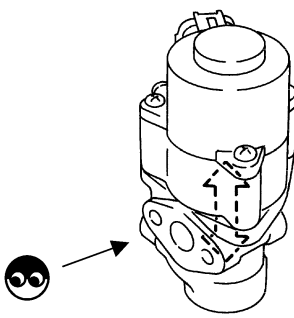
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b>       |              |                          |   |   |   |   |    |   |    |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------|--------------------------|---|---|---|---|----|---|----|---|
| <p>1. Turn ignition switch "OFF".<br/>                 2. disconnect ECM harness connector.<br/>                 3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows.<br/>                 Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">EGR volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">9</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">17</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">18</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 20px;">MTBL0389</p> <p><b>Continuity should exist.</b></p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                      | ECM terminal | EGR volume control valve | 8 | 1 | 9 | 4 | 17 | 3 | 18 | 6 |
| ECM terminal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | EGR volume control valve                                                             |              |                          |   |   |   |   |    |   |    |   |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 6                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ▶ GO TO 4.                                                                           |              |                          |   |   |   |   |    |   |    |   |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |              |                          |   |   |   |   |    |   |    |   |


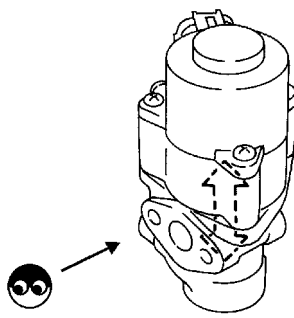
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>CHECK EGR VOLUME CONTROL VALVE-I</b> |
| <p>Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p><b>Resistance:</b><br/> <b>20.9 - 23.1 Ω [At 20°C (68°F)]</b></p> </div> </div> <p style="text-align: right; margin-right: 20px;">SEF588X</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                         |
| OK (With CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶ GO TO 5.                              |
| OK (Without CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ GO TO 6.                              |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶ Replace EGR volume control valve.     |

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# DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

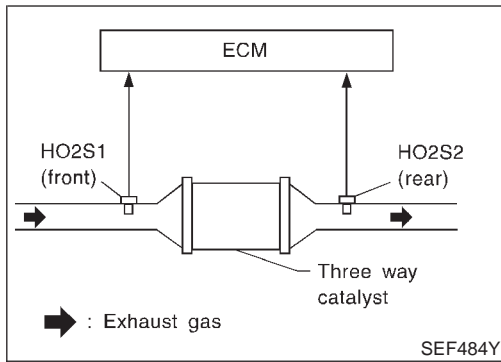
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>CHECK EGR VOLUME CONTROL VALVE-II</b> |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|-------------|--|----------------|---------|---------|--|-----------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Remove EGR volume control valve.</li> <li>2. Reconnect ECM harness connector and EGR volume control valve harness connector.</li> <li>3. Turn ignition switch "ON".</li> <li>4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.</li> <li>5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps.</li> </ol>                                                                                                                                                |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1" style="display: inline-table; border-collapse: collapse; margin-right: 20px;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>  |                                          |                                   | ACTIVE TEST |  | EGR VOL CONT/V | 20 step | MONITOR |  | ENG SPEED | XXX rpm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| EGR VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 20 step                                  |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | XXX rpm                                  |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SEF067Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶                                        | GO TO 7.                          |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶                                        | Replace EGR volume control valve. |             |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|
| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>CHECK EGR VOLUME CONTROL VALVE-II</b> |                                   |
| <p> <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Remove EGR volume control valve.</li> <li>2. Reconnect ECM harness connector and EGR volume control valve harness connector.</li> <li>3. Turn ignition switch "ON" and "OFF".</li> <li>4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position.</li> </ol> |                                          |                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                          |                                          |                                   |
| SEF560W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |                                   |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                        | GO TO 7.                          |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                        | Replace EGR volume control valve. |

|                                                                 |                                    |                       |
|-----------------------------------------------------------------|------------------------------------|-----------------------|
| <b>7</b>                                                        | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                       |
| ▶                                                               |                                    | <b>INSPECTION END</b> |

# DTC P0420 THREE WAY CATALYST FUNCTION

On Board Diagnosis Logic



## On Board Diagnosis Logic

NCEC0240

The ECM monitors the switching frequency ratio of heated oxygen sensor 1 (front) and 2 (rear).

A three way catalyst with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2 (rear). As oxygen storage capacity decreases, the heated oxygen sensor 2 (rear) switching frequency will increase.

When the frequency ratio of heated oxygen sensor 1 (front) and 2 (rear) approaches a specified limit value, the three way catalyst malfunction is diagnosed.

| DTC No. | Malfunction is detected when ...                                                                                                                                          | Check Items (Possible Cause)                                                                                                                                                                                          |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0420   | <ul style="list-style-type: none"> <li>Three way catalyst does not operate properly.</li> <li>Three way catalyst does not have enough oxygen storage capacity.</li> </ul> | <ul style="list-style-type: none"> <li>Three way catalyst</li> <li>Exhaust tube</li> <li>Intake air leaks</li> <li>Injectors</li> <li>Injector leaks</li> <li>Spark plug</li> <li>Improper ignition timing</li> </ul> |

| SRT WORK SUPPORT |          |
|------------------|----------|
| CATALYST         | INCMP    |
| EVAP SYSTEM      | INCMP    |
| O2 SEN HEATER    | CMPLT    |
| O2 SENSOR        | INCMP    |
| EGR SYSTEM       | INCMP    |
| MONITOR          |          |
| ENG SPEED        | XXX rpm  |
| MAS A/F SE B1    | XXX V    |
| B/FUEL SCHDL     | XXX msec |
| A/F ALPHA-B1     | XXX V    |
| COOLAN TEMP/S    | XX °C    |
| HO2S1 (B1)       | XXX V    |

SEF671Y

| SRT WORK SUPPORT |          |
|------------------|----------|
| CATALYST         | CMPLT    |
| EVAP SYSTEM      | INCMP    |
| O2 SEN HEATER    | CMPLT    |
| O2 SENSOR        | INCMP    |
| EGR SYSTEM       | INCMP    |
| MONITOR          |          |
| ENG SPEED        | XXX rpm  |
| MAS A/F SE B1    | XXX V    |
| B/FUEL SCHDL     | XXX msec |
| A/F ALPHA-B1     | XXX V    |
| COOLAN TEMP/S    | XX °C    |
| HO2S1 (B1)       | XXX V    |

SEF672Y

| SELF DIAG RESULTS                                    |      |
|------------------------------------------------------|------|
| DTC RESULTS                                          | TIME |
| NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED. |      |
|                                                      |      |
|                                                      |      |

SEF560X

## DTC Confirmation Procedure

NCEC0241

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### WITH CONSULT-II

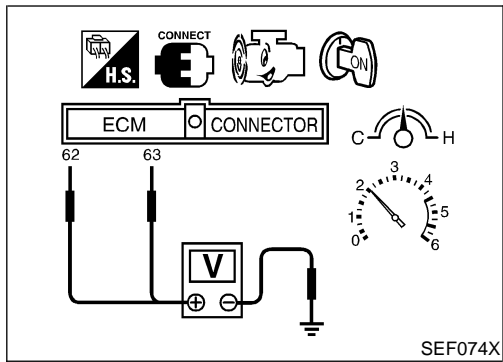
NCEC0241S01

### TESTING CONDITION:

- Open engine hood before conducting the following procedure.
- Do not hold engine speed for more than the specified minutes below.
  - Turn ignition switch "ON".
  - Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
  - Start engine.
  - Rev engine up to 3,000±500 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
  - Wait 5 seconds at idle.
  - Rev engine up to 2,500±500 rpm and maintain it until "INCMP" of CATALYST changes to "CMPLT" (It will take approximately 5 minutes).  
If not "CMPLT", stop engine and cool it down to less than 70°C (158°F) and then retest from step 1.
  - Select "SELF-DIAG RESULTS" mode with CONSULT-II.
  - Confirm that the 1st trip DTC is not detected.  
If the 1st trip DTC is detected, go to "Diagnostic Procedure", EC-352.

# DTC P0420 THREE WAY CATALYST FUNCTION

## Overall Function Check



## Overall Function Check

NCEC0242

Use this procedure to check the overall function of the three way catalyst. During this check, a 1st trip DTC might not be confirmed.

### With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeters probes between ECM terminals 62 [Heated oxygen sensor 1 (front) signal], 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Keep engine speed at 2,000 rpm constant under no load.
- 5) Make sure that the voltage switching frequency (high & low) between ECM terminal 63 and engine ground is much less than that of ECM terminal 62 and engine ground.

**Switching frequency ratio = A/B**

**A: Heated oxygen sensor 2 (rear) voltage switching frequency**

**B: Heated oxygen sensor 1 (front) voltage switching frequency**

**This ratio should be less than 0.75.**

If the ratio is greater than above, it means three way catalyst does not operate properly.

### NOTE:

If the voltage at terminal 62 does not switch periodically more than 5 times within 10 seconds at step 4, perform trouble diagnosis for DTC P0133 first. (See EC-217.)

## Diagnostic Procedure

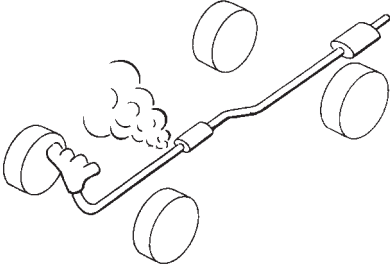
NCEC0243

|                                                    |                             |                    |
|----------------------------------------------------|-----------------------------|--------------------|
| <b>1</b>                                           | <b>CHECK EXHAUST SYSTEM</b> |                    |
| Visually check exhaust tubes and muffler for dent. |                             |                    |
| OK or NG                                           |                             |                    |
| OK                                                 | ▶                           | GO TO 2.           |
| NG                                                 | ▶                           | Repair or replace. |



# DTC P0420 THREE WAY CATALYST FUNCTION

Diagnostic Procedure (Cont'd)

|                                                                                                                 |                               |                    |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------|
| <b>2</b>                                                                                                        | <b>CHECK EXHAUST AIR LEAK</b> |                    |
| <p>1. Start engine and run it at idle.<br/>2. Listen for an exhaust air leak before the three way catalyst.</p> |                               |                    |
|                               |                               |                    |
| SEF099P                                                                                                         |                               |                    |
| <b>OK or NG</b>                                                                                                 |                               |                    |
| OK                                                                                                              | ▶                             | GO TO 3.           |
| NG                                                                                                              | ▶                             | Repair or replace. |

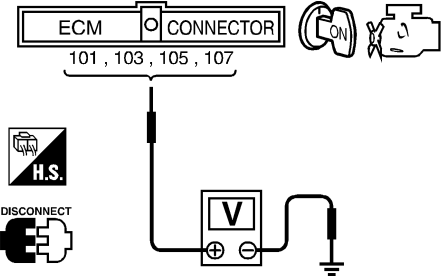
GI  
MA  
EM  
LC  
**EC**

|                                                               |                              |                    |
|---------------------------------------------------------------|------------------------------|--------------------|
| <b>3</b>                                                      | <b>CHECK INTAKE AIR LEAK</b> |                    |
| Listen for an intake air leak after the mass air flow sensor. |                              |                    |
| <b>OK or NG</b>                                               |                              |                    |
| OK                                                            | ▶                            | GO TO 4.           |
| NG                                                            | ▶                            | Repair or replace. |

MT  
AT  
AX

|                                                                    |                              |                         |
|--------------------------------------------------------------------|------------------------------|-------------------------|
| <b>4</b>                                                           | <b>CHECK IGNITION TIMING</b> |                         |
| Check for ignition timing.<br>Refer to "BASIC INSPECTION", EC-107. |                              |                         |
| <b>OK or NG</b>                                                    |                              |                         |
| OK                                                                 | ▶                            | GO TO 5.                |
| NG                                                                 | ▶                            | Adjust ignition timing. |

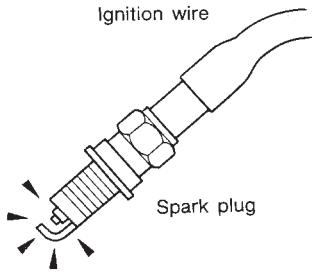
SU  
BR  
ST

|                                                                                                                                                                                                                        |                        |                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                               | <b>CHECK INJECTORS</b> |                                                  |
| <p>1. Refer to Wiring Diagram for Injectors, EC-575.<br/>2. Stop engine and then turn ignition switch "ON".<br/>3. Check voltage between ECM terminals 101, 103, 105 and 107 and ground with CONSULT-II or tester.</p> |                        |                                                  |
|                                                                                                                                    |                        |                                                  |
| SEF075X                                                                                                                                                                                                                |                        |                                                  |
| <b>Battery voltage should exist.</b>                                                                                                                                                                                   |                        |                                                  |
| <b>OK or NG</b>                                                                                                                                                                                                        |                        |                                                  |
| OK                                                                                                                                                                                                                     | ▶                      | GO TO 6.                                         |
| NG                                                                                                                                                                                                                     | ▶                      | Perform "Diagnostic Procedure" INJECTOR, EC-576. |

RS  
BT  
HA  
SC  
EL  
IDX

# DTC P0420 THREE WAY CATALYST FUNCTION

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                               |                             |          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|
| <b>6</b>                                                                                                                                                                                                                                                                      | <b>CHECK IGNITION SPARK</b> |          |
| <ol style="list-style-type: none"> <li>1. Disconnect ignition wire from spark plug.</li> <li>2. Connect a known good spark plug to the ignition wire.</li> <li>3. Place end of spark plug against a suitable ground and crank engine.</li> <li>4. Check for spark.</li> </ol> |                             |          |
|                                                                                                                                                                                              |                             |          |
| SEF282G                                                                                                                                                                                                                                                                       |                             |          |
| <b>OK or NG</b>                                                                                                                                                                                                                                                               |                             |          |
| OK                                                                                                                                                                                                                                                                            | ▶                           | GO TO 8. |
| NG                                                                                                                                                                                                                                                                            | ▶                           | GO TO 7. |

|                                          |                             |                                                                            |
|------------------------------------------|-----------------------------|----------------------------------------------------------------------------|
| <b>7</b>                                 | <b>CHECK IGNITION WIRES</b> |                                                                            |
| Refer to "Component Inspection", EC-315. |                             |                                                                            |
| <b>OK or NG</b>                          |                             |                                                                            |
| OK                                       | ▶                           | Check ignition coil, power transistor and their circuits. Refer to EC-566. |
| NG                                       | ▶                           | Replace.                                                                   |

|                                                                                                                                                                                                                                                                                                                                                         |                       |                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------|
| <b>8</b>                                                                                                                                                                                                                                                                                                                                                | <b>CHECK INJECTOR</b> |                                                      |
| <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Remove injector assembly. Refer to EC-51.<br/>Keep fuel hose and all injectors connected to injector gallery.</li> <li>3. Disconnect distributor harness connector.</li> <li>4. Turn ignition switch "ON".<br/>Make sure fuel does not drip from injector.</li> </ol> |                       |                                                      |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                         |                       |                                                      |
| OK (Does not drip)                                                                                                                                                                                                                                                                                                                                      | ▶                     | GO TO 9.                                             |
| NG (Drips)                                                                                                                                                                                                                                                                                                                                              | ▶                     | Replace the injector(s) from which fuel is dripping. |

|                                                                |                                    |                             |
|----------------------------------------------------------------|------------------------------------|-----------------------------|
| <b>9</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |                             |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                             |
| Trouble is fixed                                               | ▶                                  | <b>INSPECTION END</b>       |
| Trouble is not fixed                                           | ▶                                  | Replace three way catalyst. |

## On Board Diagnosis Logic

NCEC0527

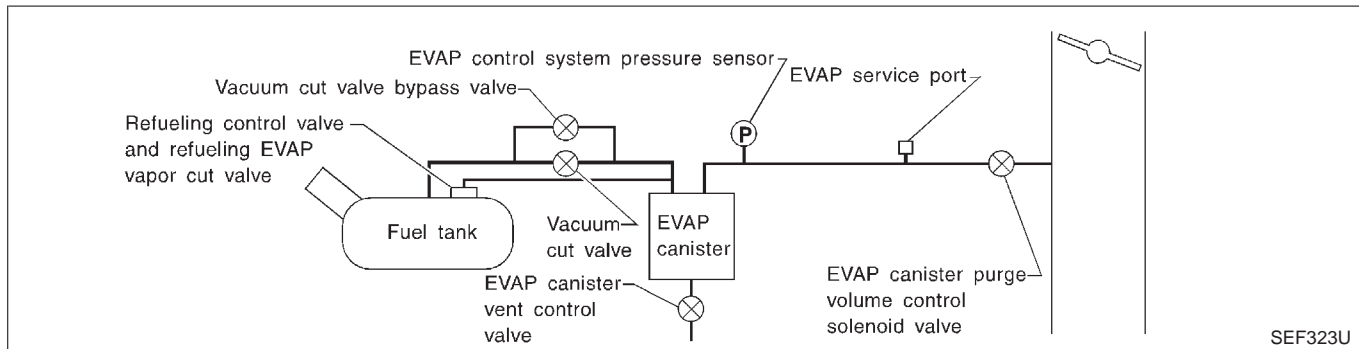
### NOTE:

If DTC P0440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-525.)

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions.

The vacuum cut valve bypass valve is opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve is opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



Malfunction is detected when EVAP control system has a leak, EVAP control system does not operate properly.

### CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

## Possible Cause

NCEC0528

- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Fuel filler cap remains open or fails to close.
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks

# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Possible Cause (Cont'd)

- EVAP purge line rubber tube bent.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- Water separator
- EVAP canister is saturated with water.
- EVAP control system pressure sensor
- Fuel level sensor and the circuit
- Refueling control valve
- ORVR system leaks

|                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EVAP SML LEAK P0440/P1440</b>                                                                                                                                                                                               |
| 1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.<br>-FUEL LEVEL: 1/4-3/4<br>-AMBIENT TEMP: 0-30 C(32-86F)<br>-OPEN ENGINE HOOD.<br>2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.<br>3)TOUCH START. |

SEF565X

|          |                                                                   |
|----------|-------------------------------------------------------------------|
| <b>5</b> | <b>EVAP SML LEAK P0440/P1440</b>                                  |
|          | WAIT<br>2 TO 10 MINUTES.<br>KEEP ENGINE RUNNING<br>AT IDLE SPEED. |

SEF566X

|          |                                                         |
|----------|---------------------------------------------------------|
| <b>5</b> | <b>EVAP SML LEAK P0440/P1440</b>                        |
|          | OK                                                      |
|          | SELF-DIAG RESULTS                                       |
|          | NO DTC DETECTED.<br>FURTHER TESTING<br>MAY BE REQUIRED. |

SEF567X

## DTC Confirmation Procedure

NCEC0529

### CAUTION:

Never remove fuel filler cap during the DTC confirmation procedure.

### NOTE:

- If DTC P0440 or P1440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-525.)
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

### WITH CONSULT-II

NCEC0529S01

- 1) Turn ignition switch "ON".
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 4) Make sure that the following conditions are met.  
**COOLAN TEMP/S: 0 - 70°C (32 - 158°F)**  
**INT/A TEMP SE: 0 - 30°C (32 - 86°F)**
- 5) Select "EVAP SML LEAK P0440/P1440" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.  
Follow the instruction displayed.

# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

DTC Confirmation Procedure (Cont'd)

**NOTE:**

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to "Basic Inspection", EC-107.

- 6) Make sure that "OK" is displayed.  
If "NG" is displayed, refer to "Diagnostic Procedure", EC-357.

 **WITH GST**

NCEC0529S02

**NOTE:**

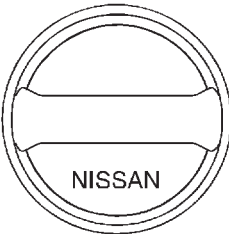
Be sure to read the explanation of "Driving Pattern" on EC-74 before driving vehicle.

- 1) Start engine.
- 2) Drive vehicle according to "Driving Pattern", EC-74.
- 3) Stop vehicle.
- 4) Select "MODE 1" with GST.
  - If SRT of EVAP system is not set yet, go to the following step.
  - If SRT of EVAP system is set, the result will be OK.
- 5) Turn ignition switch "OFF" and wait at least 10 seconds.
- 6) Start engine.
 

**It is not necessary to cool engine down before driving.**
- 7) Drive vehicle again according to the "Driving Pattern", EC-74.
- 8) Stop vehicle.
- 9) Select "MODE 3" with GST.
  - If P0440 or P1440 is displayed on the screen, go to "Diagnostic Procedure", EC-357.
  - If P1447 is displayed on the screen, go to "Diagnostic Procedure" for DTC P1447, EC-516.
  - If P0440, P1440 and P1447 are not displayed on the screen, go to the following step.
- 10) Select "MODE 1" with GST.
  - If SRT of EVAP system is set, the result will be OK.
  - If SRT of EVAP system is not set, go to step 6.

## Diagnostic Procedure

NCEC0530

|                                                                                       |                                     |                                              |
|---------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------|
| <b>1</b>                                                                              | <b>CHECK FUEL FILLER CAP DESIGN</b> |                                              |
| 1. Turn ignition switch "OFF".<br>2. Check for genuine NISSAN fuel filler cap design. |                                     |                                              |
|    |                                     |                                              |
| OK or NG                                                                              |                                     |                                              |
| OK                                                                                    | ▶                                   | GO TO 2.                                     |
| NG                                                                                    | ▶                                   | Replace with genuine NISSAN fuel filler cap. |

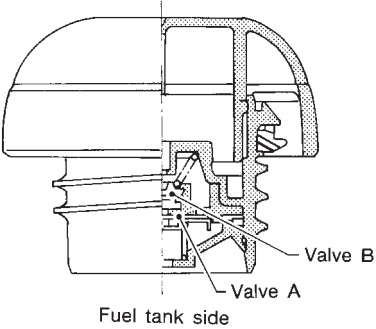
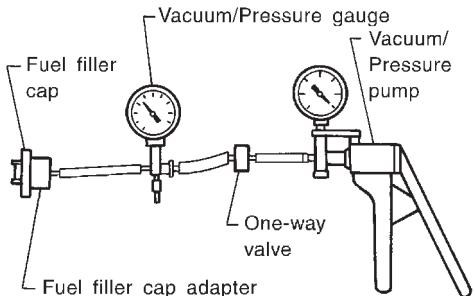
SEF915U

# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

|                                                                         |                                           |                                                                                                                                                                                               |
|-------------------------------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>2</b>                                                                | <b>CHECK FUEL FILLER CAP INSTALLATION</b> |                                                                                                                                                                                               |
| Check that the cap is tightened properly by rotating the cap clockwise. |                                           |                                                                                                                                                                                               |
| <b>OK or NG</b>                                                         |                                           |                                                                                                                                                                                               |
| OK                                                                      | ▶                                         | GO TO 3.                                                                                                                                                                                      |
| NG                                                                      | ▶                                         | <ul style="list-style-type: none"> <li>• Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.</li> <li>• Retighten until ratcheting sound is heard.</li> </ul> |

|                                                                  |                                       |          |
|------------------------------------------------------------------|---------------------------------------|----------|
| <b>3</b>                                                         | <b>CHECK FUEL FILLER CAP FUNCTION</b> |          |
| Check for air releasing sound while opening the fuel filler cap. |                                       |          |
| <b>OK or NG</b>                                                  |                                       |          |
| OK                                                               | ▶                                     | GO TO 6. |
| NG                                                               | ▶                                     | GO TO 4. |

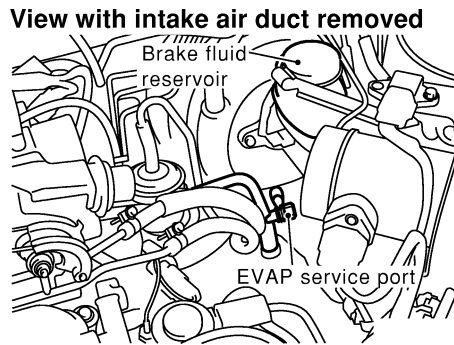
|                                                                                                                                                                                                                                                                                                                                                  |                                            |                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                         | <b>CHECK FUEL TANK VACUUM RELIEF VALVE</b> |                                             |
| <ol style="list-style-type: none"> <li>1. Wipe clean valve housing.</li> <li>2. Check valve opening pressure and vacuum.</li> </ol>                                                                                                                                                                                                              |                                            |                                             |
|                                                                                                                                                                                                                                                                |                                            |                                             |
| SEF427N                                                                                                                                                                                                                                                                                                                                          |                                            |                                             |
|                                                                                                                                                                                                                                                              |                                            |                                             |
| SEF943S                                                                                                                                                                                                                                                                                                                                          |                                            |                                             |
| <p><b>Pressure:</b><br/>15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)</p> <p><b>Vacuum:</b><br/>-6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)</p> <p><b>CAUTION:</b><br/>Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p> |                                            |                                             |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                  |                                            |                                             |
| OK                                                                                                                                                                                                                                                                                                                                               | ▶                                          | GO TO 5.                                    |
| NG                                                                                                                                                                                                                                                                                                                                               | ▶                                          | Replace fuel filler cap with a genuine one. |

# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

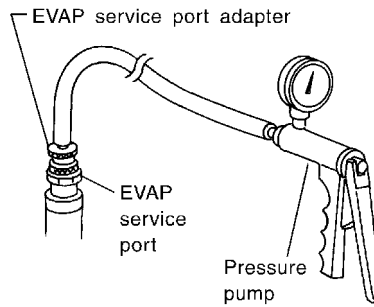
Diagnostic Procedure (Cont'd)

## 5 INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



SEF850X



SEF916U

### NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

|                             |          |
|-----------------------------|----------|
| Models with CONSULT-II ►    | GO TO 6. |
| Models without CONSULT-II ► | GO TO 7. |

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# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

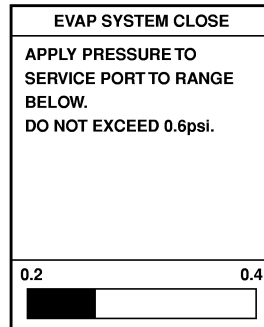
## 6 CHECK FOR EVAP LEAK

### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

#### NOTE:

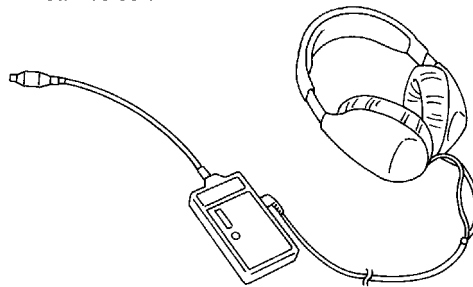
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.

Leak detector



SEF200U

OK or NG

|    |   |                    |
|----|---|--------------------|
| OK | ▶ | GO TO 8.           |
| NG | ▶ | Repair or replace. |



# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

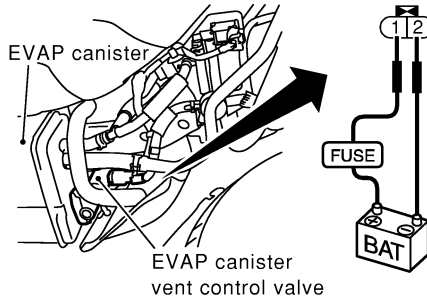
Diagnostic Procedure (Cont'd)

## 7 CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

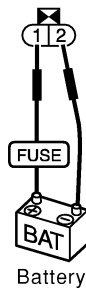
1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)

### View from under the vehicle

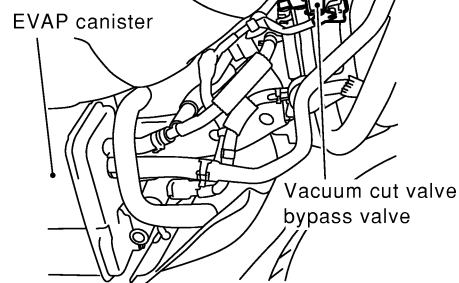


SEF323Z

3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



### View from under the vehicle



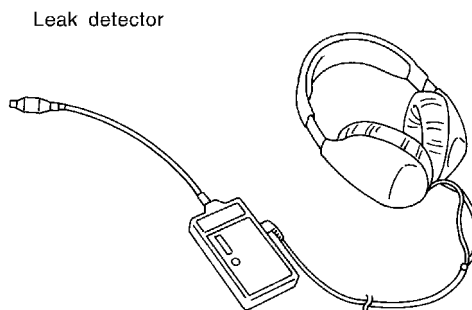
SEF869X

4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

#### NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.



SEF200U

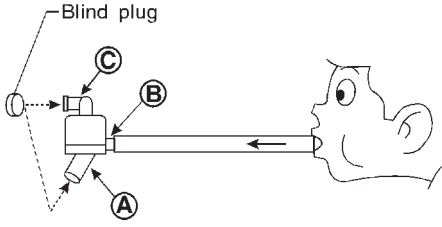
OK or NG

|    |   |                    |
|----|---|--------------------|
| OK | ▶ | GO TO 8.           |
| NG | ▶ | Repair or replace. |

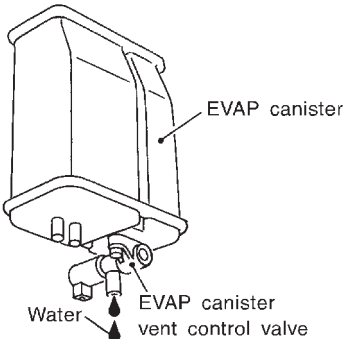
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# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | CHECK WATER SEPARATOR      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <ol style="list-style-type: none"> <li>1. Check visually for insect nests in the water separator air inlet.</li> <li>2. Check visually for cracks or flaws in the appearance.</li> <li>3. Check visually for cracks or flaws in the hose.</li> <li>4. Check that <b>A</b> and <b>C</b> are not clogged by blowing air into <b>B</b> with <b>A</b>, and then <b>C</b> plugged.</li> </ol> <div style="text-align: center;">  <p>* <b>(A)</b> : Bottom hole (To atmosphere)<br/> <b>(B)</b> : Emergency tube (From EVAP canister)<br/> <b>(C)</b> : Inlet port (To member)</p> </div> <p style="text-align: right;">SEF829T</p> |                            |
| <p>5. In case of NG in items 2 - 4, replace the parts.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Do not disassemble water separator.</li> </ul> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ GO TO 9.                 |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ Replace water separator. |

| 9                                                                                                        | CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT                            |
|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <p>Refer to "DTC Confirmation Procedure", EC-371.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                       |
| OK                                                                                                       | ▶ GO TO 10.                                                                           |
| NG                                                                                                       | ▶ Repair or replace EVAP canister vent control valve and O-ring or harness/connector. |

| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CHECK IF EVAP CANISTER SATURATED WITH WATER |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Remove EVAP canister with EVAP canister vent control valve attached.</li> <li>2. Does water drain from the EVAP canister?</li> </ol> <div style="text-align: center;">  <p style="text-align: right;">EVAP canister</p> <p style="text-align: center;">Water</p> <p style="text-align: center;">EVAP canister vent control valve</p> </div> <p style="text-align: right;">SEF596U</p> <p style="text-align: center;"><b>Yes or No</b></p> |                                             |
| Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 11.                                 |
| No (With CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ GO TO 13.                                 |
| No (Without CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶ GO TO 14.                                 |

# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

|                                                                                                                                       |                            |           |
|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------|
| <b>11</b>                                                                                                                             | <b>CHECK EVAP CANISTER</b> |           |
| Weigh the EVAP canister with the EVAP canister vent control valve attached.<br><b>The weight should be less than 1.8 kg (4.0 lb).</b> |                            |           |
| <b>OK or NG</b>                                                                                                                       |                            |           |
| OK (With CONSULT-II)                                                                                                                  | ▶                          | GO TO 13. |
| OK (Without CONSULT-II)                                                                                                               | ▶                          | GO TO 14. |
| NG                                                                                                                                    | ▶                          | GO TO 12. |

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|                                                                                                                                                                             |                                   |                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------|
| <b>12</b>                                                                                                                                                                   | <b>DETECT MALFUNCTIONING PART</b> |                                       |
| Check the following.                                                                                                                                                        |                                   |                                       |
| <ul style="list-style-type: none"> <li>● EVAP canister for damage</li> <li>● EVAP hose between EVAP canister and water separator for clogging or poor connection</li> </ul> |                                   |                                       |
|                                                                                                                                                                             | ▶                                 | Repair hose or replace EVAP canister. |

EC  
FE

| <b>13</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION</b> |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------|--|-----------------|-------|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|-----------------------------|
| <p><b>Ⓟ With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.</li> <li>2. Start engine.</li> <li>3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.</li> <li>4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.</li> <li>5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.</li> </ol>                                                               |                                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
| <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table> |                                                                          | ACTIVE TEST |  | PURG VOL CONT/V | XXX % | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | LEAN | THRTL POS SEN | XXX V |  |  |  |  |  |  | <b>Vacuum should exist.</b> |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
| PURG VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | XXX %                                                                    |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | XXX rpm                                                                  |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | XXX %                                                                    |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LEAN                                                                     |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | XXX V                                                                    |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
| SEF595Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ▶                                                                        | GO TO 16.   |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ▶                                                                        | GO TO 15.   |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                             |

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| <b>14</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION</b> |           |
| <p><b>ⓧ Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Start engine and warm it up to normal operating temperature.</li> <li>2. Stop engine.</li> <li>3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.</li> <li>4. Start engine and let it idle for at least 80 seconds.</li> <li>5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.<br/><b>Vacuum should exist.</b></li> </ol> |                                                                          |           |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                          |           |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                                                        | GO TO 18. |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                                                        | GO TO 15. |

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# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

|                                                                                          |                               |
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| <b>15</b>                                                                                | <b>CHECK VACUUM HOSE</b>      |
| Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-27. |                               |
| <b>OK or NG</b>                                                                          |                               |
| OK (With CONSULT-II) ▶                                                                   | GO TO 16.                     |
| OK (Without CONSULT-II) ▶                                                                | GO TO 17.                     |
| NG ▶                                                                                     | Repair or reconnect the hose. |

| <b>16</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE</b> |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------|--|-----------------|-------|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|
| <p>Ⓜ <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Start engine.</li> <li>Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</li> </ol>                                                                                                                                                                                                                                |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <table border="1"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table> |                                                                | ACTIVE TEST |  | PURG VOL CONT/V | XXX % | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | LEAN | THRTL POS SEN | XXX V |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| PURG VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                         | XXX %                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                               | XXX rpm                                                        |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                            | XXX %                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                         | LEAN                                                           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                           | XXX V                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| SEF801Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| OK ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | GO TO 18.                                                      |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| NG ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | GO TO 17.                                                      |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |

# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

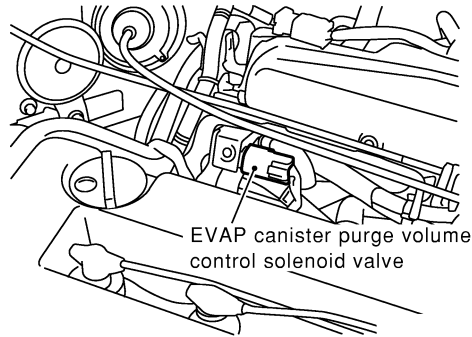
Diagnostic Procedure (Cont'd)

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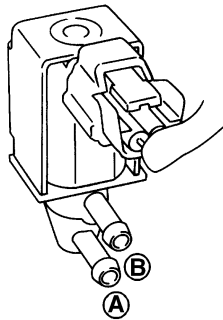
## 17 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

### Ⓟ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X

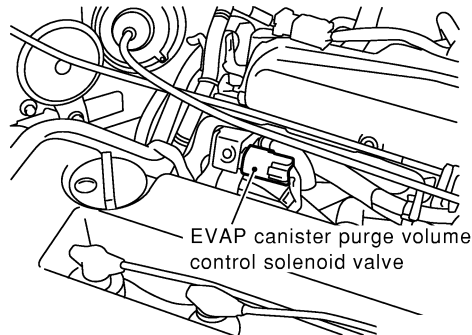


| Condition<br>PURG VOL CONT/V value | Air passage continuity<br>between A and B |
|------------------------------------|-------------------------------------------|
| 100.0%                             | Yes                                       |
| 0.0%                               | No                                        |

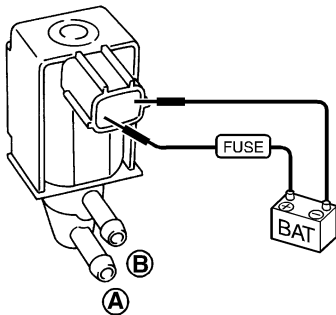
SEF334X

### ⓧ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X



| Condition                                              | Air passage continuity<br>between A and B |
|--------------------------------------------------------|-------------------------------------------|
| 12V direct current supply between<br>terminals 1 and 2 | Yes                                       |
| No supply                                              | No                                        |

SEF335X

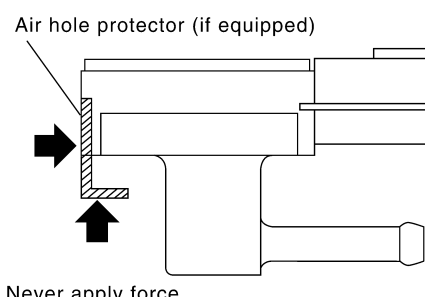
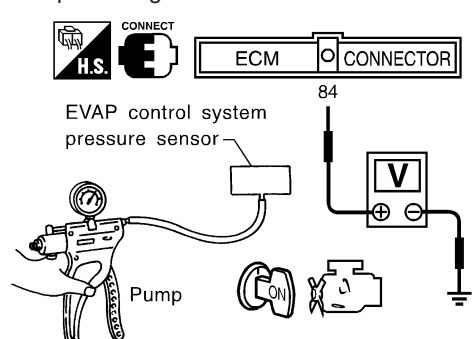
OK or NG

|    |   |                                                            |
|----|---|------------------------------------------------------------|
| OK | ▶ | GO TO 18.                                                  |
| NG | ▶ | Replace EVAP canister purge volume control solenoid valve. |

# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

|                                                                                                                         |                                           |                                 |
|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------|
| <b>18</b>                                                                                                               | <b>CHECK FUEL TANK TEMPERATURE SENSOR</b> |                                 |
| 1. Remove fuel level sensor unit.<br>2. Check fuel tank temperature sensor.<br>Refer to EC-290, "Component Inspection". |                                           |                                 |
| <b>OK or NG</b>                                                                                                         |                                           |                                 |
| OK                                                                                                                      | ▶                                         | GO TO 19.                       |
| NG                                                                                                                      | ▶                                         | Replace fuel level sensor unit. |

|                                                                                                                                                                                                                                                                                                                            |                                                  |                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------|
| <b>19</b>                                                                                                                                                                                                                                                                                                                  | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR</b> |                                              |
| 1. Remove EVAP control system pressure sensor with its harness connector connected.<br><b>CAUTION:</b><br><ul style="list-style-type: none"> <li>● Never apply force to the air hole protector of the sensor if equipped.</li> </ul>                                                                                       |                                                  |                                              |
|                                                                                                                                                                                                                                          |                                                  |                                              |
| SEF799W                                                                                                                                                                                                                                                                                                                    |                                                  |                                              |
| 2. Remove hose from EVAP control system pressure sensor.<br>3. Turn ignition switch "ON".<br>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.                                                                                                                           |                                                  |                                              |
| <b>CAUTION:</b><br><ul style="list-style-type: none"> <li>● Always calibrate the vacuum pump gauge when using it.</li> <li>● Do not apply below <math>-20</math> kPa (<math>-150</math> mmHg, <math>-5.91</math> inHg) or over <math>20</math> kPa (<math>150</math> mmHg, <math>5.91</math> inHg) of pressure.</li> </ul> |                                                  |                                              |
| 5. Check input voltage between ECM terminal 84 and ground.                                                                                                                                                                                                                                                                 |                                                  |                                              |
|                                                                                                                                                                                                                                         |                                                  |                                              |
| SEF342X                                                                                                                                                                                                                                                                                                                    |                                                  |                                              |
| <b>CAUTION:</b><br><ul style="list-style-type: none"> <li>● Discard and EVAP control system pressure sensor which has been dropped from a height of more than <math>0.5</math> m (<math>19.7</math> in) onto a hard surface such as a concrete floor; use a new one.</li> </ul>                                            |                                                  |                                              |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                            |                                                  |                                              |
| OK                                                                                                                                                                                                                                                                                                                         | ▶                                                | GO TO 20.                                    |
| NG                                                                                                                                                                                                                                                                                                                         | ▶                                                | Replace EVAP control system pressure sensor. |

| Pressure (Relative to atmospheric pressure) | Voltage V |
|---------------------------------------------|-----------|
| 0 kPa (0 mmHg, 0 inHg)                      | 3.0 - 3.6 |
| $-9.3$ kPa ( $-70$ mmHg, $-2.76$ inHg)      | 0.4 - 0.6 |

# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                          |                              |                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------|
| <b>20</b>                                                                                                                                                | <b>CHECK EVAP PURGE LINE</b> |                               |
| Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to "Evaporative Emission System", EC-33. |                              |                               |
| <b>OK or NG</b>                                                                                                                                          |                              |                               |
| OK                                                                                                                                                       | ▶                            | GO TO 21.                     |
| NG                                                                                                                                                       | ▶                            | Repair or reconnect the hose. |

GI  
MA  
EM

|                                                                |                              |           |
|----------------------------------------------------------------|------------------------------|-----------|
| <b>21</b>                                                      | <b>CLEAN EVAP PURGE LINE</b> |           |
| Clean EVAP purge line (pipe and rubber tube) using air blower. |                              |           |
|                                                                | ▶                            | GO TO 22. |

LC

|                                                                                                                                                                                                      |                                        |                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------|
| <b>22</b>                                                                                                                                                                                            | <b>CHECK REFUELING EVAP VAPOR LINE</b> |                                    |
| Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "ON BOARD REFUELING VAPOR RECOVERY (ORVR)", EC-39. |                                        |                                    |
| <b>OK or NG</b>                                                                                                                                                                                      |                                        |                                    |
| OK                                                                                                                                                                                                   | ▶                                      | GO TO 23.                          |
| NG                                                                                                                                                                                                   | ▶                                      | Repair or replace hoses and tubes. |

EC

FE

CL

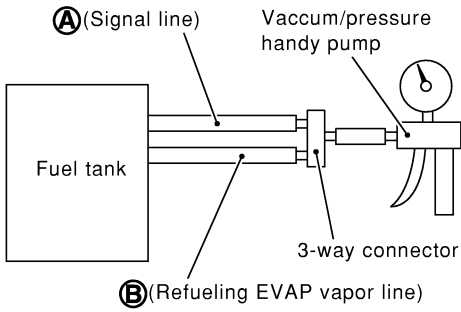
MT

|                                                                                                                                                |                                                 |                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------|
| <b>23</b>                                                                                                                                      | <b>CHECK SIGNAL LINE AND RECIRCULATION LINE</b> |                                                     |
| Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection. |                                                 |                                                     |
| <b>OK or NG</b>                                                                                                                                |                                                 |                                                     |
| OK                                                                                                                                             | ▶                                               | GO TO 24.                                           |
| NG                                                                                                                                             | ▶                                               | Repair or replace hoses, tubes or filler neck tube. |

AT

AX

SU

|                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                      |                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------|
| <b>24</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>CHECK REFUELING CONTROL VALVE</b> |                                                 |
| <ol style="list-style-type: none"> <li>Remove fuel filler cap.</li> <li>Check air continuity between hose ends A and B.<br/>Blow air into the hose end B. Air should flow freely into the fuel tank.</li> <li>Blow air into hose end A and check there is no leakage.</li> <li>Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.</li> </ol> |                                      |                                                 |
|                                                                                                                                                                                                                                                                                                                                                                     |                                      |                                                 |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                      |                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                                    | GO TO 25.                                       |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                                    | Replace refueling control valve with fuel tank. |

BR

ST

RS

BT

HA

SC

EL

IDX

# DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

|                                                 |                                   |
|-------------------------------------------------|-----------------------------------|
| <b>25</b>                                       | <b>CHECK FUEL LEVEL SENSOR</b>    |
| Refer to EL-96, "Fuel Level Sensor Unit Check". |                                   |
| <b>OK or NG</b>                                 |                                   |
| OK                                              | ▶ GO TO 26.                       |
| NG                                              | ▶ Replace fuel level sensor unit. |

|                                                                 |                                    |
|-----------------------------------------------------------------|------------------------------------|
| <b>26</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
|                                                                 | ▶ <b>INSPECTION END</b>            |



# DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

Description

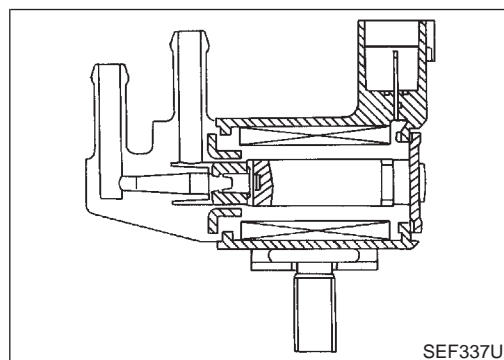
## Description SYSTEM DESCRIPTION

NCEC0531

NCEC0531S01

| Sensor                            | Input Signal to ECM                                              | ECM function                     | Actuator                                          |
|-----------------------------------|------------------------------------------------------------------|----------------------------------|---------------------------------------------------|
| Camshaft position sensor          | Engine speed                                                     | EVAP canister purge flow control | EVAP canister purge volume control solenoid valve |
| Mass air flow sensor              | Amount of intake air                                             |                                  |                                                   |
| Engine coolant temperature sensor | Engine coolant temperature                                       |                                  |                                                   |
| Ignition switch                   | Start signal                                                     |                                  |                                                   |
| Throttle position sensor          | Throttle position                                                |                                  |                                                   |
| Throttle position switch          | Closed throttle position                                         |                                  |                                                   |
| Heated oxygen sensor 1 (front)    | Density of oxygen in exhaust gas (Mixture ratio feedback signal) |                                  |                                                   |
| Fuel tank temperature sensor      | Fuel temperature in fuel tank                                    |                                  |                                                   |
| Vehicle speed sensor              | Vehicle speed                                                    |                                  |                                                   |

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.



### COMPONENT DESCRIPTION

NCEC0531S02

The EVAP canister purge volume control solenoid valve uses an ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

### CONSULT-II Reference Value in Data Monitor Mode

NCEC0532

Specification data are reference values.

| MONITOR ITEM | CONDITION                                                                                       | SPECIFICATION                |
|--------------|-------------------------------------------------------------------------------------------------|------------------------------|
| PURG VOL C/V | ● Engine: After warming up<br>● Air conditioner switch "OFF"<br>● Shift lever: "N"<br>● No-load | Idle (Vehicle stopped)<br>0% |
|              |                                                                                                 | 2,000 rpm<br>—               |

# DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

ECM Terminals and Reference Value

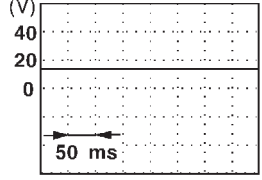
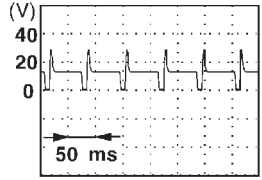
## ECM Terminals and Reference Value

NCEC0646

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                                              | CONDITION                                                                                                                                                  | DATA (DC Voltage)                                                                                                                    |
|----------------------|---------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 14                   | P             | EVAP canister purge volume control solenoid valve | <p>[Engine is running]</p> <ul style="list-style-type: none"> <li>Idle speed</li> </ul>                                                                    | <p>BATTERY VOLTAGE (11 - 14V)</p>  <p>SEF994U</p> |
|                      |               |                                                   | <p>[Engine is running]</p> <ul style="list-style-type: none"> <li>Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)</li> </ul> | <p>BATTERY VOLTAGE (11 - 14V)</p>  <p>SEF995U</p> |

### On Board Diagnosis Logic

NCEC0533

Malfunction is detected when an improper voltage signal is sent to ECM through the valve.

### Possible Cause

NCEC0534

- Harness or connectors (The valve circuit is open or shorted.)
- EVAP canister purge volume control solenoid valve

# DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

DTC Confirmation Procedure

|   |              |         |
|---|--------------|---------|
| 3 | DATA MONITOR |         |
|   | MONITOR      | NO DTC  |
|   | ENG SPEED    | XXX rpm |

SEF058Y

## DTC Confirmation Procedure

NCEC0535

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

### WITH CONSULT-II

NCEC0535S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 13 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-373.

### WITH GST

NCEC0535S02

Follow the procedure "WITH CONSULT-II" above.

GI

MA

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LC

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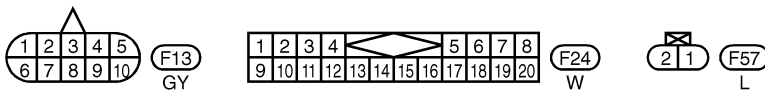
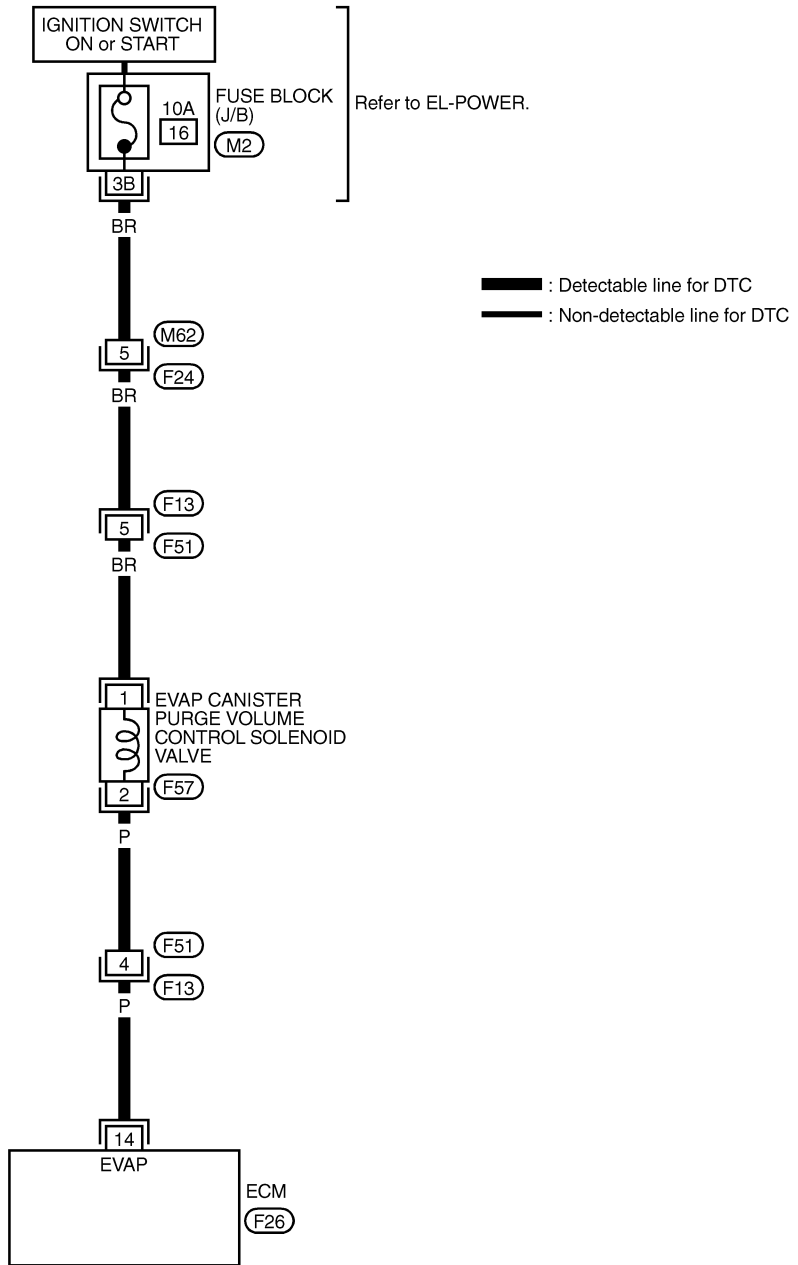
# DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

Wiring Diagram

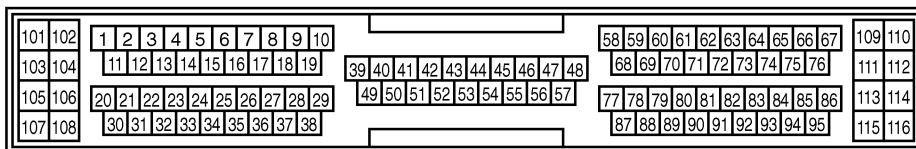
## Wiring Diagram

NCEC0536

EC-PGC/V-01



REFER TO THE FOLLOWING.  
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)



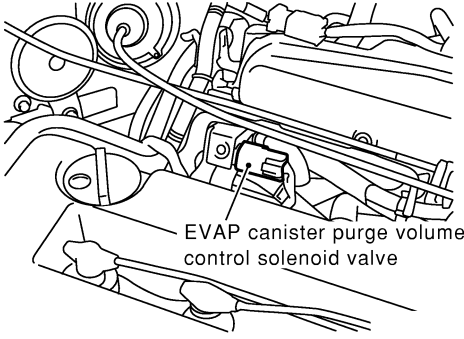
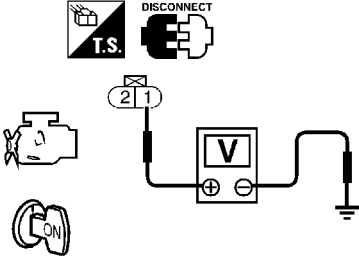
TEC711

# DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0537

|          |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                |
|----------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT</b> | <p>1. Turn ignition switch "OFF".<br/>2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  <p>EVAP canister purge volume control solenoid valve</p> </div> <p style="text-align: right;">SEF851X</p> <p>3. Turn ignition switch "ON".<br/>4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF206W</p> <p><b>Voltage: Battery voltage</b></p> <p style="text-align: center;"><b>OK or NG</b></p> | <p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p><b>EC</b></p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> |
| OK       | ▶                                                                                   | GO TO 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                |
| NG       | ▶                                                                                   | GO TO 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                |

|          |                                   |                                                                                                                                                                                                                                                                                                                         |                                                                        |
|----------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>2</b> | <b>DETECT MALFUNCTIONING PART</b> | <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors F13, F51</li> <li>● Harness connectors F24, M62</li> <li>● Fuse block (J/B) connector M2</li> <li>● 10A fuse</li> <li>● Harness for open or short between EVAP canister purge volume control solenoid valve and fuse</li> </ul> | <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p> |
|          | ▶                                 | Repair harness or connectors.                                                                                                                                                                                                                                                                                           |                                                                        |

# DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

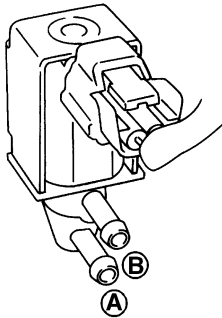
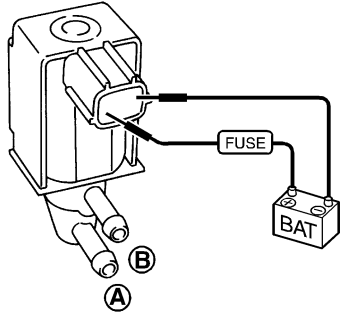
|                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                         |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                            | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |          |
| <p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminal 14 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                                         |          |
| OK (With CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                                | ▶                                                                                                       | GO TO 5. |
| OK (Without CONSULT-II)                                                                                                                                                                                                                                                                                                                                                                             | ▶                                                                                                       | GO TO 6. |
| NG                                                                                                                                                                                                                                                                                                                                                                                                  | ▶                                                                                                       | GO TO 4. |

|                                                                                                                                                                                                                    |                                   |                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                                                           | <b>DETECT MALFUNCTIONING PART</b> |                                                                                     |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors F13, F51</li> <li>● Harness for open or short between EVAP canister purge volume control solenoid valve and ECM</li> </ul> |                                   |                                                                                     |
|                                                                                                                                                                                                                    | ▶                                 | Repair open circuit or short to ground and short to power in harness or connectors. |

| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION</b> |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------|-------------|--|-----------------|-------|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|
| <p>Ⓟ <b>With CONSULT-II</b></p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>                                                                                                                                                                                                                                                                                                                                                          |                                                                          |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> |                                                                          |          | ACTIVE TEST |  | PURG VOL CONT/V | XXX % | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | LEAN | THRTL POS SEN | XXX V |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                          |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| PURG VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | XXX %                                                                    |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | XXX rpm                                                                  |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | XXX %                                                                    |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | LEAN                                                                     |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | XXX V                                                                    |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                          |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                          |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                          |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| SEF801Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                          |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶                                                                        | GO TO 7. |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶                                                                        | GO TO 6. |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |

# DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

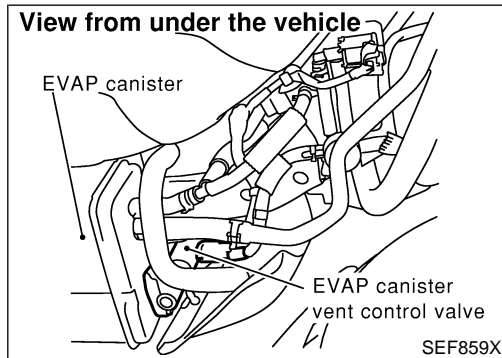
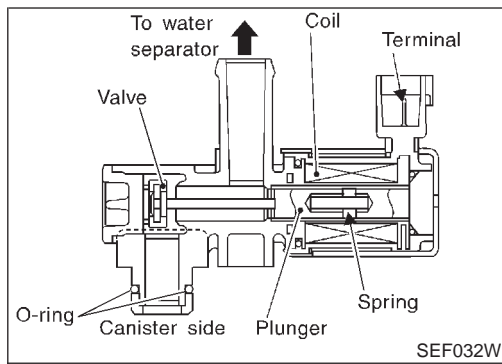
|                                                                                                                                                                           |                                                                |                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------|
| <b>6</b>                                                                                                                                                                  | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE</b> |                                                            |
| <p><b>Ⓟ With CONSULT-II</b><br/>                 Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>    |                                                                |                                                            |
|                                                                                          |                                                                |                                                            |
| SEF334X                                                                                                                                                                   |                                                                |                                                            |
| <p><b>ⓧ Without CONSULT-II</b><br/>                 Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p> |                                                                |                                                            |
|                                                                                         |                                                                |                                                            |
| SEF335X                                                                                                                                                                   |                                                                |                                                            |
| <b>OK or NG</b>                                                                                                                                                           |                                                                |                                                            |
| OK                                                                                                                                                                        | ▶                                                              | GO TO 7.                                                   |
| NG                                                                                                                                                                        | ▶                                                              | Replace EVAP canister purge volume control solenoid valve. |

|                                                                 |                                    |                       |
|-----------------------------------------------------------------|------------------------------------|-----------------------|
| <b>7</b>                                                        | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                       |
| ▶                                                               |                                    | <b>INSPECTION END</b> |

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# DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

## Component Description



## Component Description

NCEC0538

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0539

Specification data are reference values.

| MONITOR ITEM | CONDITION             | SPECIFICATION |
|--------------|-----------------------|---------------|
| VENT CONT/V  | ● Ignition switch: ON | OFF           |

## ECM Terminals and Reference Value

NCEC0647

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TER-MINAL NO. | WIRE COLOR | ITEM                             | CONDITION              | DATA (DC Voltage)          |
|---------------|------------|----------------------------------|------------------------|----------------------------|
| 102           | PU/W       | EVAP canister vent control valve | [Ignition switch "ON"] | BATTERY VOLTAGE (11 - 14V) |

## On Board Diagnosis Logic

NCEC0540

Malfunction is detected when an improper voltage signal is sent to ECM through EVAP canister vent control valve.



# DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Possible Cause

## Possible Cause

NCEC0541

- Harness or connectors (The valve circuit is open or shorted.)
- EVAP canister vent control valve

GI

MA

EM

LC

## DTC Confirmation Procedure

NCEC0542

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

EC

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MT

|   |              |         |
|---|--------------|---------|
| 3 | DATA MONITOR |         |
|   | MONITOR      | NO DTC  |
|   | ENG SPEED    | XXX rpm |

SEF058Y

### WITH CONSULT-II

NCEC0542S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait at least 8 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-379.

AT

AX

### WITH GST

NCEC0542S02

Follow the procedure "WITH CONSULT-II" above.

SU

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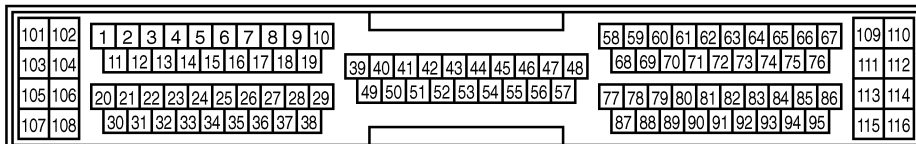
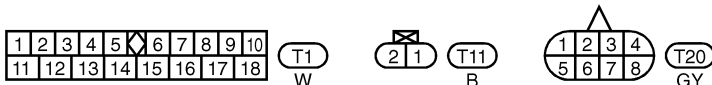
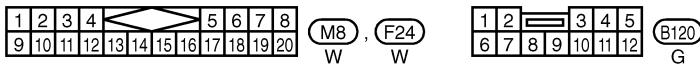
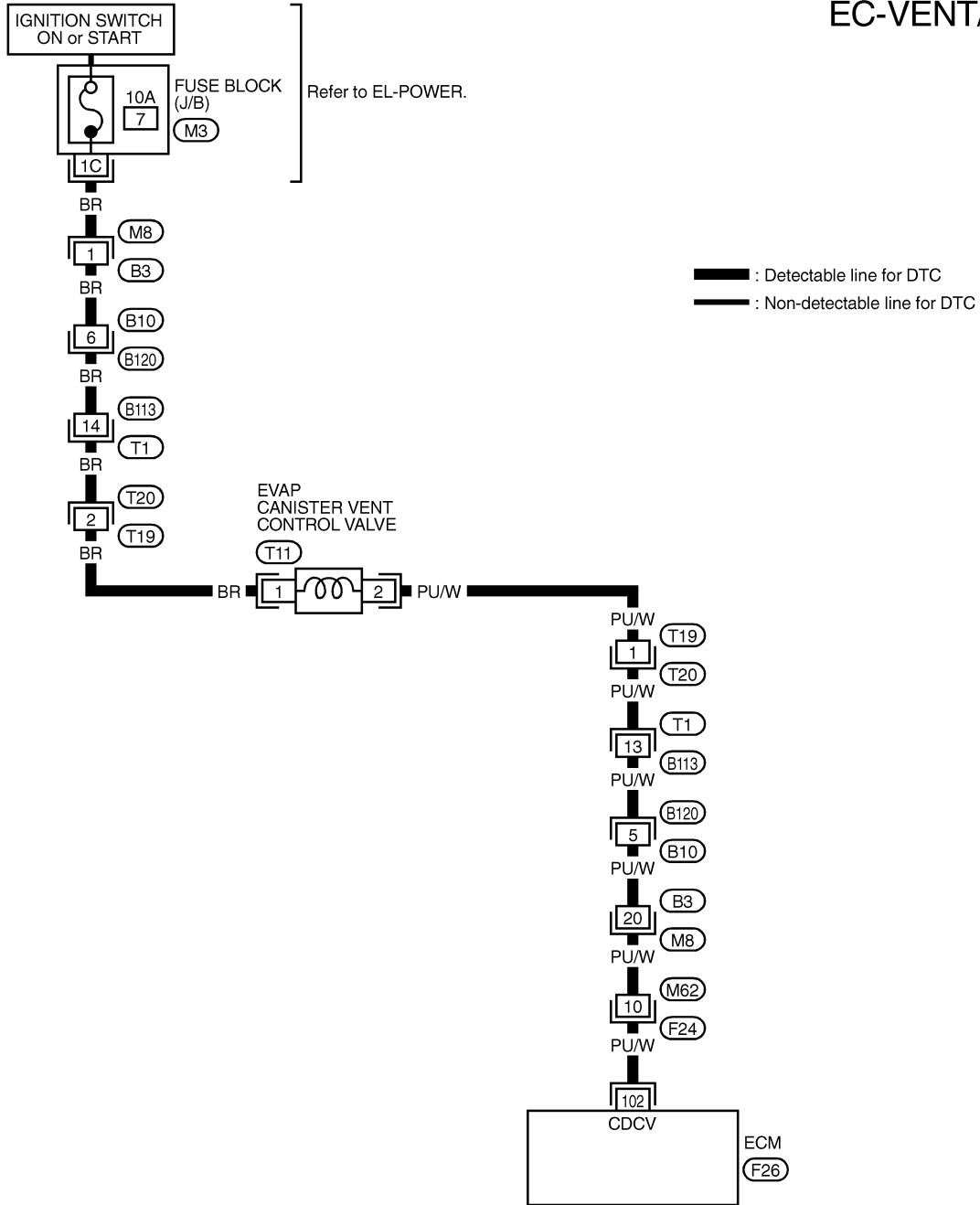
# DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Wiring Diagram

## Wiring Diagram

NCEC0543

EC-VENT/V-01



REFER TO THE FOLLOWING.  
 (M3) - FUSE BLOCK-JUNCTION BOX (J/B)



TEC712

# DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0544

|                            |                         |          |
|----------------------------|-------------------------|----------|
| <b>1</b>                   | <b>INSPECTION START</b> |          |
| 1. Do you have CONSULT-II? |                         |          |
| Yes or No                  |                         |          |
| Yes                        | ▶                       | GO TO 2. |
| No                         | ▶                       | GO TO 3. |

GI

MA

EM

| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT</b> |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------|-------------|--|----------------|-----|---------|--|-----------|---------|--------------|-------|------------|-------|---------------|-------|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <p>1. Turn ignition switch "OFF" and then turn "ON".</p> <p>2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II.</p> <p>3. Touch "ON/OFF" on CONSULT-II screen.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                       |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td style="text-align: center;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 (B1)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table> |                                                       |          | ACTIVE TEST |  | VENT CONTROL/V | OFF | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 (B1) | XXX V | THRTL POS SEN | XXX V |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | OFF                                                   |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                       |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | XXX rpm                                               |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | XXX %                                                 |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| HO2S1 (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | XXX V                                                 |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | XXX V                                                 |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                       |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                       |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                       |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| <p>4. Check for operating sound of the valve.<br/><b>Clicking noise should be heard.</b></p> <p style="text-align: right;">SEF802Y</p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                       |          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶                                                     | GO TO 7. |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶                                                     | GO TO 3. |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |

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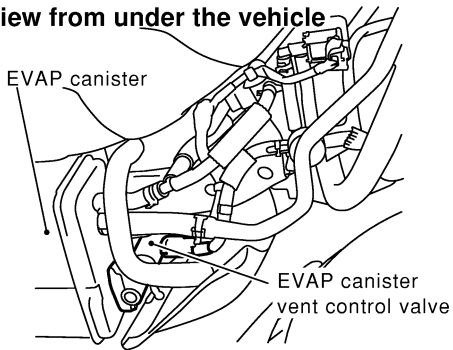
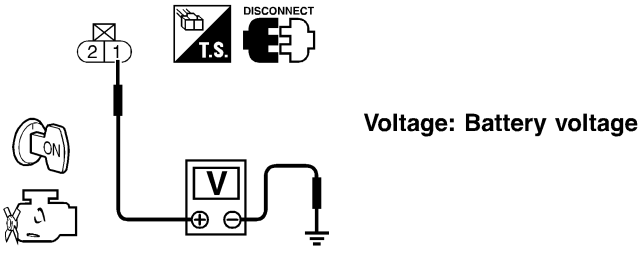
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# DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT</b> |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect EVAP canister vent control valve harness connector.</p> <p style="text-align: center;"><b>View from under the vehicle</b></p>  <p style="text-align: right;">SEF859X</p> <p>3. Turn ignition switch "ON".<br/>                 4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.</p>  <p style="text-align: right;">SEF336X</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                    |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ GO TO 5.                                                         |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ▶ GO TO 4.                                                         |

|                                                                                                                                                                                                                                                                                                                                                                                     |                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                                                            | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors T19, T20</li> <li>● Harness connectors B113, T1</li> <li>● Harness connectors B10, B120</li> <li>● Harness connectors B3, M8</li> <li>● Fuse block (J/B) connector M3</li> <li>● 10A fuse</li> <li>● Harness for open or short between EVAP canister vent control valve and fuse</li> </ul> |                                   |
| ▶                                                                                                                                                                                                                                                                                                                                                                                   | Repair harness or connectors.     |

|                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect ECM harness connector.<br/>                 3. Check harness continuity between ECM terminal 102 and EVAP canister vent control valve terminal 2.<br/>                 Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b></p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                        |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 7.                                                                             |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 6.                                                                             |

# DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

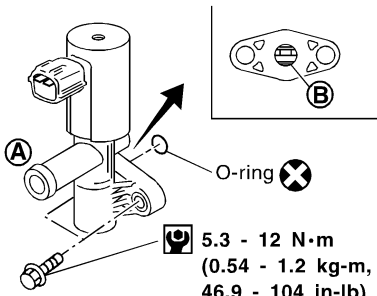
Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                              |                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>6</b>                                                                                                                                                                                                                                                                                                                                                     | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors T19, T20</li> <li>● Harness connectors B113, T1</li> <li>● Harness connectors B10, B120</li> <li>● Harness connectors B3, M8</li> <li>● Harness connectors F24, M62</li> <li>● Harness for open or short between EVAP canister vent control valve and ECM</li> </ul> |                                                                                    |
| ▶                                                                                                                                                                                                                                                                                                                                                            | Repair open circuit or short to ground or short to power in harness or connectors. |

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|                                                                                                                            |                                              |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>7</b>                                                                                                                   | <b>CHECK RUBBER TUBE FOR CLOGGING</b>        |
| <p>1. Disconnect rubber tube connected to EVAP canister vent control valve.<br/>2. Check the rubber tube for clogging.</p> |                                              |
| <b>OK or NG</b>                                                                                                            |                                              |
| OK                                                                                                                         | ▶ GO TO 8.                                   |
| NG                                                                                                                         | ▶ Clean the rubber tube using an air blower. |


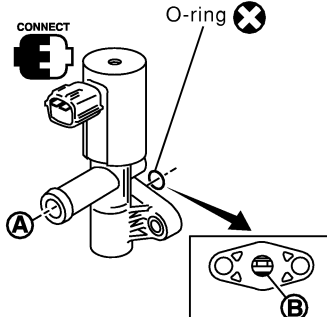
LC  
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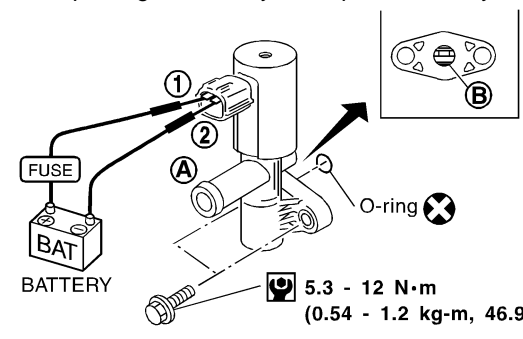
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|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>8</b>                                                                                                                                                  | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-I</b> |
| <p>1. Remove EVAP canister vent control valve from EVAP canister.<br/>2. Check portion <b>B</b> of EVAP canister vent control valve for being rusted.</p> |                                                 |
|                                                                        |                                                 |
| <b>OK or NG</b>                                                                                                                                           |                                                 |
| OK                                                                                                                                                        | ▶ GO TO 9.                                      |
| NG                                                                                                                                                        | ▶ Replace EVAP canister vent control valve.     |

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# DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

| <b>9</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-II</b> |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------|--|----------------|-----|---------|--|-----------|---------|--------------|-------|------------|-------|---------------|-------|--|--|--|--|--|--|-----------------------------|-------------------------------------------|----|----|-----|-----|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Reconnect harness connectors disconnected.</li> <li>2. Turn ignition switch "ON".</li> <li>3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.</li> <li>4. Check air passage continuity and operation delay time.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">  </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 (B1)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition<br/>VENT CONTROL/V</th> <th style="text-align: center;">Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">ON</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p style="text-align: center;"><b>Operation takes less than 1 second.</b></p> </div> </div> |                                                  | ACTIVE TEST |  | VENT CONTROL/V | OFF | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 (B1) | XXX V | THRTL POS SEN | XXX V |  |  |  |  |  |  | Condition<br>VENT CONTROL/V | Air passage continuity<br>between A and B | ON | No | OFF | Yes |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | OFF                                              |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | XXX rpm                                          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | XXX %                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| HO2S1 (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | XXX V                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | XXX V                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| Condition<br>VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Air passage continuity<br>between A and B        |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | No                                               |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Yes                                              |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| SEF803Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |

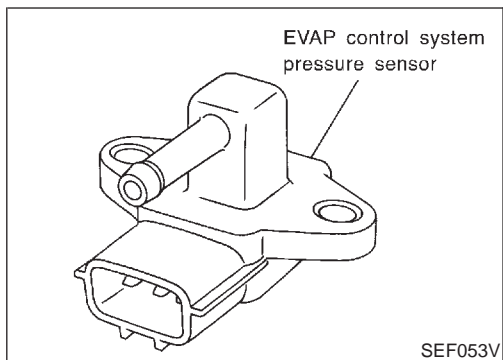
| <p> <b>Without CONSULT-II</b></p> <p>Check air passage continuity and operation delay time under the following conditions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                           |           |                                           |                                                     |    |     |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------|-------------------------------------------|-----------------------------------------------------|----|-----|-----|
| <div style="display: flex; justify-content: space-between;"> <div style="width: 40%;">  </div> <div style="width: 55%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p style="text-align: center;"><b>Operation takes less than 1 second.</b></p> </div> </div> |                                           | Condition | Air passage continuity<br>between A and B | 12V direct current supply between terminals 1 and 2 | No | OFF | Yes |
| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Air passage continuity<br>between A and B |           |                                           |                                                     |    |     |     |
| 12V direct current supply between terminals 1 and 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | No                                        |           |                                           |                                                     |    |     |     |
| OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Yes                                       |           |                                           |                                                     |    |     |     |
| SEF339X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                           |           |                                           |                                                     |    |     |     |
| <b>Make sure new O-ring is installed properly.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                           |           |                                           |                                                     |    |     |     |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                           |           |                                           |                                                     |    |     |     |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                                         | GO TO 11. |                                           |                                                     |    |     |     |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                                         | GO TO 10. |                                           |                                                     |    |     |     |

|                                                                                                                                                                                            |                                                   |                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------|
| <b>10</b>                                                                                                                                                                                  | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-III</b> |                                           |
| <ol style="list-style-type: none"> <li>1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower.</li> <li>2. Perform Test No. 9 again.</li> </ol> |                                                   |                                           |
| <b>OK or NG</b>                                                                                                                                                                            |                                                   |                                           |
| OK                                                                                                                                                                                         | ▶                                                 | GO TO 11.                                 |
| NG                                                                                                                                                                                         | ▶                                                 | Replace EVAP canister vent control valve. |

|                                                                 |                                    |
|-----------------------------------------------------------------|------------------------------------|
| <b>11</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
| ▶ <b>INSPECTION END</b>                                         |                                    |

# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

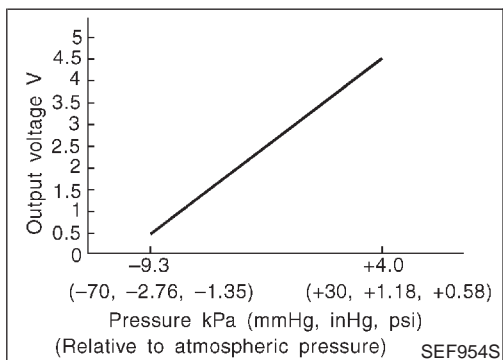
Component Description



## Component Description

NCEC0545

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.



## CONSULT-II Reference Value in Data Monitor Mode

NCEC0546

Specification data are reference values.

| MONITOR ITEM  | CONDITION             | SPECIFICATION |
|---------------|-----------------------|---------------|
| EVAP SYS PRES | ● Ignition switch: ON | Approx. 3.4V  |

## ECM Terminals and Reference Value

NCEC0648

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TER-MINAL NO. | WIRE COLOR | ITEM                                | CONDITION                                                  | DATA (DC Voltage)  |
|---------------|------------|-------------------------------------|------------------------------------------------------------|--------------------|
| 58            | B          | Sensor's ground                     | [Engine is running]<br>● Warm-up condition<br>● Idle speed | Approximately 0V   |
| 84            | W          | EVAP control system pressure sensor | [Ignition switch "ON"]                                     | Approximately 3.4V |
| 111           | P/L        | Sensor's power supply               | [Ignition switch "ON"]                                     | Approximately 5V   |

# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

On Board Diagnosis Logic

## On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal from EVAP control system pressure sensor is sent to ECM. NCEC0547

## Possible Cause

- Harness or connectors  
(The EVAP control system pressure sensor circuit is open or shorted.) NCEC0548
- Rubber hose to EVAP control system pressure sensor is clogged, vent, kinked, disconnected or improper connection.
- EVAP control system pressure sensor
- EVAP canister vent control valve
- EVAP canister purge volume control solenoid valve
- EVAP canister
- Rubber hose from EVAP canister vent control valve to water separator

## DTC Confirmation Procedure

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. NCEC0549

### TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

| 6 | DATA MONITOR  |         |
|---|---------------|---------|
|   | MONITOR       | NO DTC  |
|   | ENG SPEED     | XXX rpm |
|   | COOLAN TEMP/S | XXX °C  |
|   | FUEL T/TMP SE | XXX °C  |

SEF194Y

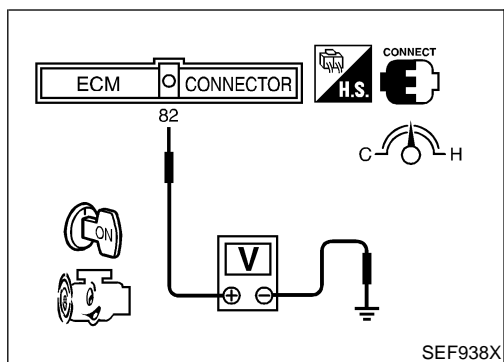
## WITH CONSULT-II

- 1) Start engine and warm it up to normal operating temperature. NCEC0549S01
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
- 6) Start engine and wait at least 20 seconds.
- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-387.



# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

DTC Confirmation Procedure (Cont'd)



## WITH GST

NCEC0549S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check that voltage between ECM terminal 82 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and wait at least 20 seconds.
- 5) Select "MODE 7" with GST.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-387.

GI

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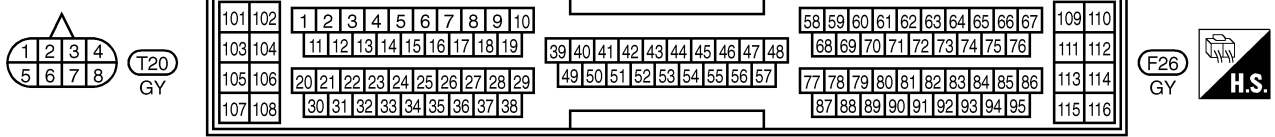
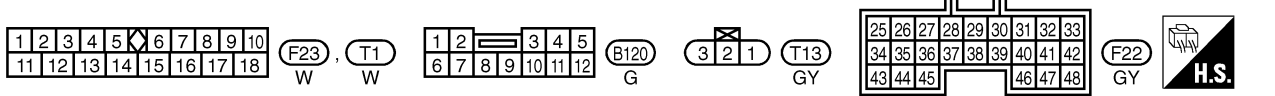
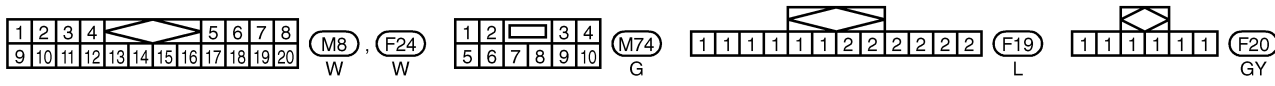
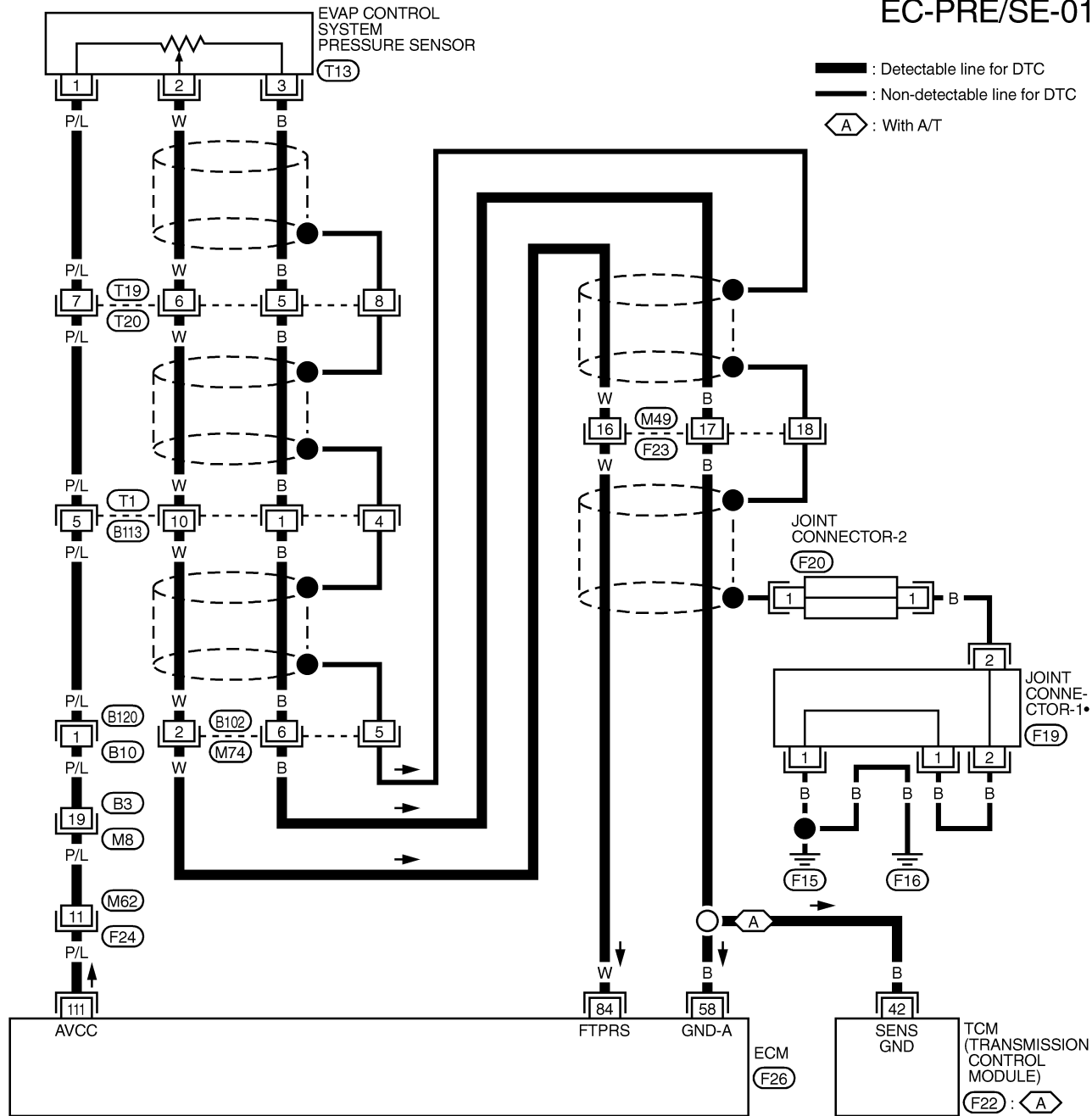
# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Wiring Diagram

## Wiring Diagram

NCEC0550

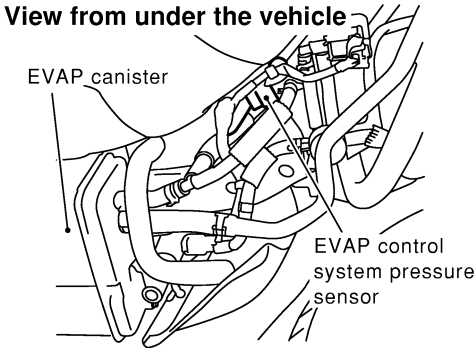
EC-PRE/SE-01



TEC713

## Diagnostic Procedure

NCEC0551

|                                                                                                                                                                                                      |                          |                               |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------|--|
| <b>1</b>                                                                                                                                                                                             | <b>CHECK RUBBER TUBE</b> |                               |  |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Check rubber tube connected to the EVAP control system pressure sensor for clogging, vent, kink, disconnection or improper connection.</p> |                          |                               |  |
| <p><b>View from under the vehicle</b></p>                                                                          |                          |                               |  |
| SEF860X                                                                                                                                                                                              |                          |                               |  |
| <b>OK or NG</b>                                                                                                                                                                                      |                          |                               |  |
| OK                                                                                                                                                                                                   | ▶                        | GO TO 2.                      |  |
| NG                                                                                                                                                                                                   | ▶                        | Reconnect, repair or replace. |  |

GI

MA

EM

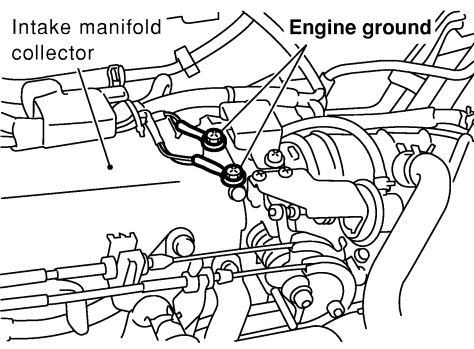
LC

**EC**

FE

CL

MT

|                                                                                     |                                |          |  |
|-------------------------------------------------------------------------------------|--------------------------------|----------|--|
| <b>2</b>                                                                            | <b>RETIGHTEN GROUND SCREWS</b> |          |  |
| <p>Loosen and retighten engine ground screws.</p>                                   |                                |          |  |
|  |                                |          |  |
| SEF839X                                                                             |                                |          |  |
| ▶                                                                                   |                                | GO TO 3. |  |

AT

AX

SU

BR

ST

RS

|                                                                                                                                                                                   |                        |                                      |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------|--|
| <b>3</b>                                                                                                                                                                          | <b>CHECK CONNECTOR</b> |                                      |  |
| <p>1. Disconnect EVAP control system pressure sensor harness connector.<br/>                 2. Check sensor harness connector for water.<br/> <b>Water should not exist.</b></p> |                        |                                      |  |
| <b>OK or NG</b>                                                                                                                                                                   |                        |                                      |  |
| OK                                                                                                                                                                                | ▶                      | GO TO 4.                             |  |
| NG                                                                                                                                                                                | ▶                      | Repair or replace harness connector. |  |

BT

HA

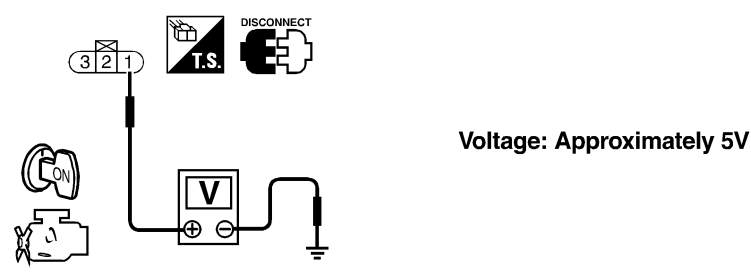
SC

EL

IDX

# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                         |                                                                       |          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------|
| <b>4</b>                                                                                                                                                                | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT</b> |          |
| <p>1. Turn ignition switch "ON".<br/>                 2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.</p> |                                                                       |          |
|  <p style="text-align: right;">Voltage: Approximately 5V</p>                          |                                                                       |          |
| SEF341X                                                                                                                                                                 |                                                                       |          |
| <b>OK or NG</b>                                                                                                                                                         |                                                                       |          |
| OK                                                                                                                                                                      | ▶                                                                     | GO TO 6. |
| NG                                                                                                                                                                      | ▶                                                                     | GO TO 5. |

|                                                                                                                                                                                                                                                                                                                                                                 |                                   |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--|
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                        | <b>DETECT MALFUNCTIONING PART</b> |  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors T19, T20</li> <li>● Harness connectors B113, T1</li> <li>● Harness connectors B10, B120</li> <li>● Harness connectors B3, M8</li> <li>● Harness connectors F24, M62</li> <li>● Harness for open or short between EVAP control system pressure sensor and ECM</li> </ul> |                                   |  |
| ▶ Repair harness or connectors.                                                                                                                                                                                                                                                                                                                                 |                                   |  |

|                                                                                                                                                                                                                                                                                                                    |                                                                                    |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------|
| <b>6</b>                                                                                                                                                                                                                                                                                                           | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT</b> |          |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground.<br/>                 Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b><br/>                 3. Also check harness for short to power.</p> |                                                                                    |          |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                    |                                                                                    |          |
| OK                                                                                                                                                                                                                                                                                                                 | ▶                                                                                  | GO TO 8. |
| NG                                                                                                                                                                                                                                                                                                                 | ▶                                                                                  | GO TO 7. |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                   |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--|
| <b>7</b>                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>DETECT MALFUNCTIONING PART</b> |  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors T19, T20</li> <li>● Harness connectors B113, T1</li> <li>● Harness connectors B102, M74</li> <li>● Harness connectors F23, M49</li> <li>● Harness for open or short between EVAP control system pressure sensor and ECM</li> <li>● Harness for open or short between EVAP control system pressure sensor and TCM (Transmission Control Module)</li> </ul> |                                   |  |
| ▶ Repair open circuit or short to power in harness or connectors.                                                                                                                                                                                                                                                                                                                                                                                 |                                   |  |

# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                 |                                                                                          |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------|
| <b>8</b>                                                                                                                                                                                                                                                                                                                                        | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |           |
| <p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 84 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                          |           |
| OK (With CONSULT-II)                                                                                                                                                                                                                                                                                                                            | ▶                                                                                        | GO TO 10. |
| OK (Without CONSULT-II)                                                                                                                                                                                                                                                                                                                         | ▶                                                                                        | GO TO 11. |
| NG                                                                                                                                                                                                                                                                                                                                              | ▶                                                                                        | GO TO 9.  |

GI  
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**EC**

|                                                                                                                                                                                                                                                                                                                            |                                   |                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------|
| <b>9</b>                                                                                                                                                                                                                                                                                                                   | <b>DETECT MALFUNCTIONING PART</b> |                                                                                    |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors T19, T20</li> <li>● Harness connectors B113, T1</li> <li>● Harness connectors B102, M74</li> <li>● Harness connectors F23, M49</li> <li>● Harness for open or short between ECM and EVAP control system pressure sensor</li> </ul> |                                   |                                                                                    |
| ▶                                                                                                                                                                                                                                                                                                                          |                                   | Repair open circuit or short to ground or short to power in harness or connectors. |

FE  
CL  
MT

| <b>10</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE</b> |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------|-------------|--|-----------------|-------|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>                                                                                                                                                                                                                                                                                                                         |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table> |                                                                |           | ACTIVE TEST |  | PURG VOL CONT/V | XXX % | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | LEAN | THRTL POS SEN | XXX V |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| PURG VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | XXX %                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | XXX rpm                                                        |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | XXX %                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | LEAN                                                           |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | XXX V                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶                                                              | GO TO 12. |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶                                                              | GO TO 11. |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |

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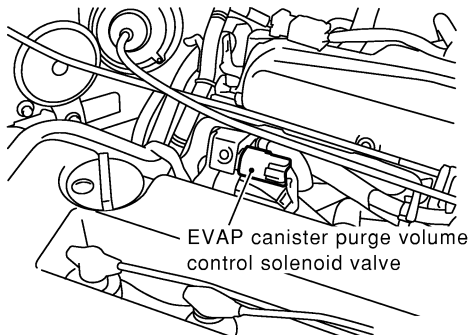
# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

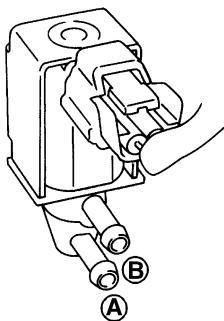
## 11 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

### With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X

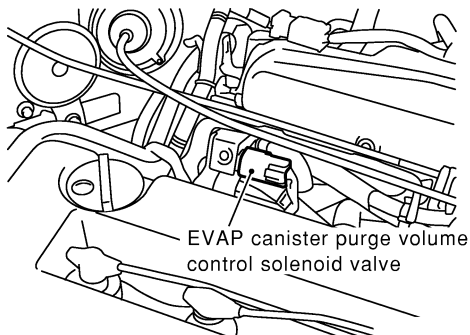


| Condition<br>PURG VOL CONT/V value | Air passage continuity<br>between A and B |
|------------------------------------|-------------------------------------------|
| 100.0%                             | Yes                                       |
| 0.0%                               | No                                        |

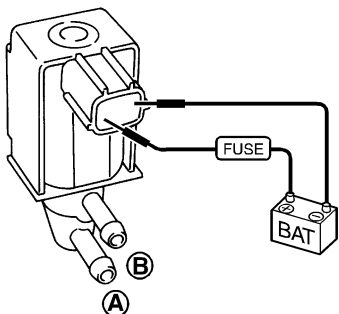
SEF334X

### Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X



| Condition                                              | Air passage continuity<br>between A and B |
|--------------------------------------------------------|-------------------------------------------|
| 12V direct current supply between<br>terminals 1 and 2 | Yes                                       |
| No supply                                              | No                                        |

SEF335X

OK or NG

OK



GO TO 12.

NG



Replace EVAP canister purge volume control solenoid valve.

# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)


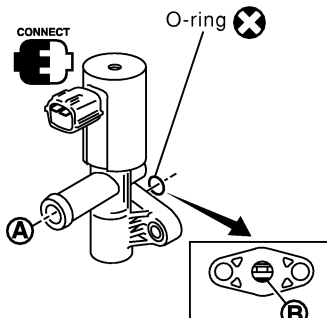
|           |                                                                                                                    |                                            |
|-----------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>12</b> | <b>CHECK RUBBER TUBE FOR CLOGGING</b>                                                                              |                                            |
|           | 1. Disconnect rubber tube connected to EVAP canister vent control valve.<br>2. Check the rubber tube for clogging. |                                            |
|           | <b>OK or NG</b>                                                                                                    |                                            |
| OK        | ▶                                                                                                                  | GO TO 13.                                  |
| NG        | ▶                                                                                                                  | Clean the rubber tube using an air blower. |


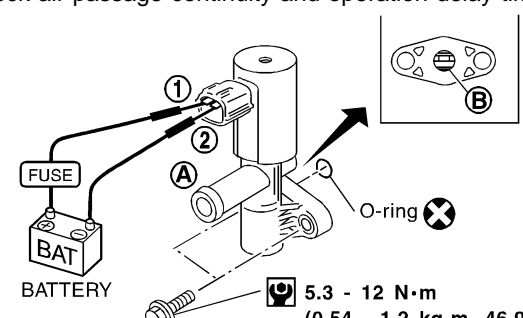
|           |                                                                                                                                                   |                                           |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>13</b> | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-I</b>                                                                                                   |                                           |
|           | 1. Remove EVAP canister vent control valve from EVAP canister.<br>2. Check portion <b>B</b> of EVAP canister vent control valve for being rusted. |                                           |
|           | <p style="text-align: center;"> <b>5.3 - 12 N·m</b><br/> <b>(0.54 - 1.2 kg-m,</b><br/> <b>46.9 - 104 in-lb)</b> </p>                              |                                           |
|           | SEF337X                                                                                                                                           |                                           |
|           | <b>OK or NG</b>                                                                                                                                   |                                           |
| OK        | ▶                                                                                                                                                 | GO TO 14.                                 |
| NG        | ▶                                                                                                                                                 | Replace EVAP canister vent control valve. |

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# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

| <b>14</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>CHECK EVAP CANISTER VENT CONTROL VALVE</b> |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------|--|----------------|-----|---------|--|-----------|---------|--------------|-------|------------|-------|---------------|-------|--|--|--|--|-----------------------------|-------------------------------------------|----|----|-----|-----|
| <p> <b>With CONSULT-II</b></p> <p>1. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.</p> <p>2. Check air passage continuity and operation delay time under the following conditions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                               |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
| <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">  </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 (B1)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <div style="width: 35%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition<br/>VENT CONTROL/V</th> <th style="text-align: center;">Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">ON</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p><b>Operation takes less than 1 second.</b></p> </div> </div> |                                               | ACTIVE TEST |  | VENT CONTROL/V | OFF | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 (B1) | XXX V | THRTL POS SEN | XXX V |  |  |  |  | Condition<br>VENT CONTROL/V | Air passage continuity<br>between A and B | ON | No | OFF | Yes |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                               |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
| VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | OFF                                           |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                               |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | XXX rpm                                       |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | XXX %                                         |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
| HO2S1 (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | XXX V                                         |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | XXX V                                         |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                               |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                               |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
| Condition<br>VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Air passage continuity<br>between A and B     |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
| ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | No                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
| OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Yes                                           |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |
| SEF803Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                               |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |                             |                                           |    |    |     |     |

| <p> <b>Without CONSULT-II</b></p> <p>Check air passage continuity and operation delay time under the following conditions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                           |           |                                           |                                                     |    |     |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------|-------------------------------------------|-----------------------------------------------------|----|-----|-----|
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| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Air passage continuity<br>between A and B |           |                                           |                                                     |    |     |     |
| 12V direct current supply between terminals 1 and 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | No                                        |           |                                           |                                                     |    |     |     |
| OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                                       |           |                                           |                                                     |    |     |     |
| SEF339X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                           |           |                                           |                                                     |    |     |     |
| <b>Make sure new O-ring is installed properly.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |           |                                           |                                                     |    |     |     |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                           |           |                                           |                                                     |    |     |     |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                         | GO TO 16. |                                           |                                                     |    |     |     |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                         | GO TO 15. |                                           |                                                     |    |     |     |

|                                                                                                                                                |                                                   |                                           |
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| <b>15</b>                                                                                                                                      | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-III</b> |                                           |
| <p>1. Clean the air passage (portion A to B) of EVAP canister vent control valve using an air blower.</p> <p>2. Perform Test No. 14 again.</p> |                                                   |                                           |
| <b>OK or NG</b>                                                                                                                                |                                                   |                                           |
| OK                                                                                                                                             | ▶                                                 | GO TO 16.                                 |
| NG                                                                                                                                             | ▶                                                 | Replace EVAP canister vent control valve. |



# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

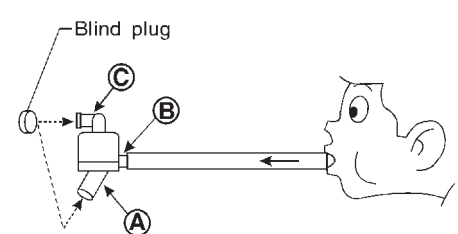
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |
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| <b>16</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR</b> |
| <p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p><b>CAUTION:</b></p> <ul style="list-style-type: none"> <li>● Never apply force to the air hole protector of the sensor if equipped.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |
| SEF799W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
| <p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p><b>CAUTION:</b></p> <ul style="list-style-type: none"> <li>● Always calibrate the vacuum pump gauge when using it.</li> <li>● Do not apply below <math>-20\text{ kPa}</math> (<math>-150\text{ mmHg}</math>, <math>-5.91\text{ inHg}</math>) or over <math>20\text{ kPa}</math> (<math>150\text{ mmHg}</math>, <math>5.91\text{ inHg}</math>) of pressure.</li> </ul> <p>5. Check input voltage between ECM terminal 84 and ground.</p> |                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |
| SEF342X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
| <p><b>CAUTION:</b></p> <ul style="list-style-type: none"> <li>● Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.</li> </ul> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                                                                                                                                                                               |                                                  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶ GO TO 17.                                      |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶ Replace EVAP control system pressure sensor.   |

|                                                                                                                                       |                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>17</b>                                                                                                                             | <b>CHECK RUBBER TUBE</b>                                                |
| <p>Check obstructed rubber tube connected to EVAP canister vent control valve.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                         |
| OK                                                                                                                                    | ▶ GO TO 18.                                                             |
| NG                                                                                                                                    | ▶ Clean rubber tube using an air blower, repair or replace rubber tube. |

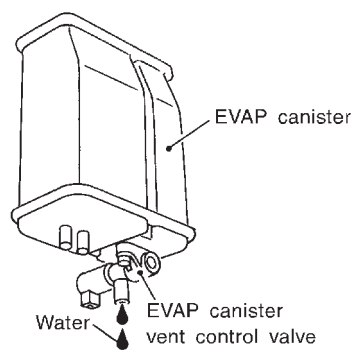
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# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                          |                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>18</b>                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK WATER SEPARATOR</b> |
| <ol style="list-style-type: none"> <li>1. Check visually for insect nests in the water separator air inlet.</li> <li>2. Check visually for cracks or flaws in the appearance.</li> <li>3. Check visually for cracks or flaws in the hose.</li> <li>4. Check that <b>A</b> and <b>C</b> are not clogged by blowing air into <b>B</b> with <b>A</b>, and then <b>C</b> plugged.</li> </ol> |                              |
|  <p>* <b>A</b> : Bottom hole (To atmosphere)<br/> <b>B</b> : Emergency tube (From EVAP canister)<br/> <b>C</b> : Inlet port (To member)</p>                                                                                                                                                            |                              |
| <p>5. In case of NG in items 2 - 4, replace the parts.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Do not disassemble water separator.</li> </ul>                                                                                                                                                                                                                   |                              |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                          |                              |
| OK                                                                                                                                                                                                                                                                                                                                                                                       | ▶ GO TO 19.                  |
| NG                                                                                                                                                                                                                                                                                                                                                                                       | ▶ Replace water separator.   |

SEF829T

|                                                                                                                                                                                         |                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <b>19</b>                                                                                                                                                                               | <b>CHECK IF EVAP CANISTER SATURATED WITH WATER</b> |
| <ol style="list-style-type: none"> <li>1. Remove EVAP canister with EVAP canister vent control valve attached.</li> <li>2. Check if water will drain from the EVAP canister.</li> </ol> |                                                    |
|                                                                                                     |                                                    |
| <b>Yes or No</b>                                                                                                                                                                        |                                                    |
| Yes                                                                                                                                                                                     | ▶ GO TO 20.                                        |
| No                                                                                                                                                                                      | ▶ GO TO 22.                                        |

SEF596U

|                                                                                                                                                |                            |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <b>20</b>                                                                                                                                      | <b>CHECK EVAP CANISTER</b> |
| <p>Weigh the EVAP canister with the EVAP canister vent control valve attached.<br/> <b>The weight should be less than 1.8 kg (4.0 lb).</b></p> |                            |
| <b>OK or NG</b>                                                                                                                                |                            |
| OK                                                                                                                                             | ▶ GO TO 18.                |
| NG                                                                                                                                             | ▶ GO TO 17.                |

# DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                  |                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>21</b>                                                                                                                                                                                        | <b>DETECT MALFUNCTIONING PART</b>       |
| Check the following. <ul style="list-style-type: none"> <li>● EVAP canister for damage</li> <li>● EVAP hose between EVAP canister and water separator for clogging or poor connection</li> </ul> |                                         |
|                                                                                                                                                                                                  | ▶ Repair hose or replace EVAP canister. |

GI

MA

|                                                                                                                                                                                                                                                                                                    |                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>22</b>                                                                                                                                                                                                                                                                                          | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT</b> |
| 1. Reconnect harness connectors disconnected.<br>2. Disconnect harness connectors T19, T20.<br>3. Check harness continuity between harness connector T20 terminal 8 and engine ground.<br>Refer to Wiring Diagram.<br><b>Continuity should exist.</b><br>4. Also check harness for short to power. |                                                                                    |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                    |                                                                                    |
| OK                                                                                                                                                                                                                                                                                                 | ▶ GO TO 24.                                                                        |
| NG                                                                                                                                                                                                                                                                                                 | ▶ GO TO 23.                                                                        |

EM

LC

**EC**

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|                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>23</b>                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>DETECT MALFUNCTIONING PART</b>                                 |
| Check the following. <ul style="list-style-type: none"> <li>● Harness connectors T19, T20</li> <li>● Harness connectors B113, T1</li> <li>● Harness connectors B102, M74</li> <li>● Harness connectors F23, M49</li> <li>● Joint connector-1 and -2</li> </ul> Refer to EL-314, "HARNES LAYOUT". <ul style="list-style-type: none"> <li>● Harness for open or short between harness connector T20 and engine ground</li> </ul> |                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶ Repair open circuit or short to power in harness or connectors. |

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AT

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|                                                                 |                                    |
|-----------------------------------------------------------------|------------------------------------|
| <b>24</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
|                                                                 | ▶ <b>INSPECTION END</b>            |

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# DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

On Board Diagnosis Logic

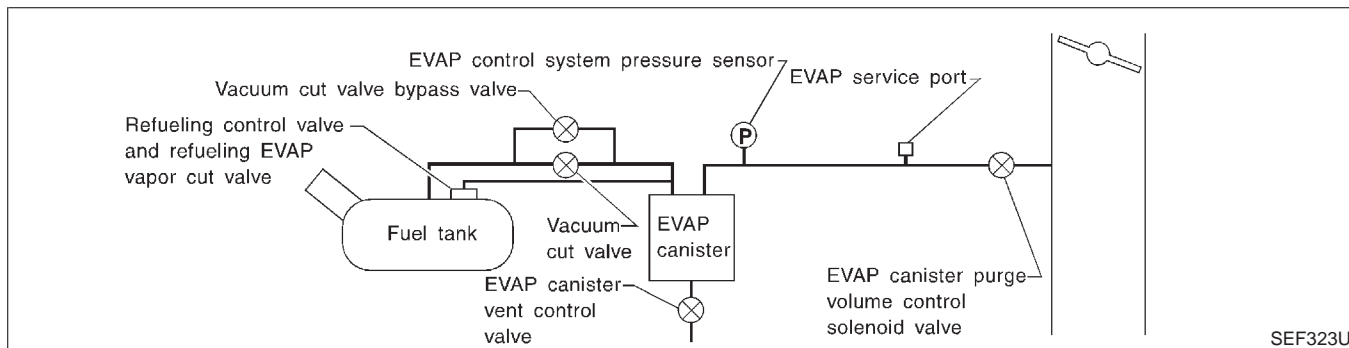
## On Board Diagnosis Logic

NCEC0649

### NOTE:

If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-525.)

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in the EVAP system between the fuel tank and the EVAP canister purge volume control solenoid valve.



Malfunction is detected when EVAP control system has very large leaks such as when fuel filler cap has fallen off, EVAP control system does not operate properly.

### CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

## Possible Cause

NCEC0650

- Fuel filler cap remains open or fails to close.
- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks
- EVAP purge line rubber tube bent.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- EVAP control system pressure sensor

# DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

DTC Confirmation Procedure

NCEC0651

6 EVAP SML LEAK P0440/P1440

1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.  
 -FUEL LEVEL: 1/4-3/4  
 -AMBIENT TEMP: 0-30 C(32-86F)  
 -OPEN ENGINE HOOD.  
 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.  
 3)TOUCH START.

SEF565X

6 EVAP SML LEAK P0440/P1440

WAIT  
 2 TO 10 MINUTES.  
 KEEP ENGINE RUNNING AT IDLE SPEED.

SEF566X

6 EVAP SML LEAK P0440/P1440

MAINTAIN  
 1600 - 2100 RPM UNTIL FINAL RESULT APPEARS.  
 (APPROX. 3 MINUTES)

1600 rpm 1850 rpm 2100 rpm

SEF874X

6 EVAP SML LEAK P0440/P1440

OK

SELF-DIAG RESULTS

NO DTC DETECTED.  
 FURTHER TESTING MAY BE REQUIRED.

SEF567X

## DTC Confirmation Procedure

### CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

### NOTE:

- If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-525.)
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedure.

### Ⓜ WITH CONSULT-II

NCEC0651S01

- 1) Tighten fuel filler cap securely until ratcheting sound is heard.
- 2) Turn ignition switch “ON”.
- 3) Turn ignition switch “OFF” and wait at least 10 seconds.
- 4) Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
- 5) Make sure that the following conditions are met.  
**COOLAN TEMP/S: 0 - 70°C (32 - 158°F)**  
**INT/A TEMP SE: 0 - 60°C (32 - 140°F)**
- 6) Select “EVAP SML LEAK P0440/P1440” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.  
 Follow the instruction displayed.

### NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to “Basic Inspection”, EC-107.

- 7) Make sure that “OK” is displayed.  
 If “NG” is displayed, select “SELF-DIAG RESULTS” mode with CONSULT-II and make sure that “EVAP GROSS LEAK [P0455]” is displayed. If it is displayed, refer to “Diagnostic Procedure”, EC-398.  
 If P0440 is displayed, perform “Diagnostic Procedure” for DTC P0440.

### Ⓜ WITH GST

NCEC0651S02

### NOTE:

Be sure to read the explanation of “Driving Pattern” on EC-74 before driving vehicle.

- 1) Start engine.
- 2) Drive vehicle according to “Driving Pattern”, EC-74.
- 3) Stop vehicle.
- 4) Select “MODE 1” with GST.
- If SRT of EVAP system is not set yet, go to the following step.
- If SRT of EVAP system is set, the result will be OK.
- 5) Turn ignition switch “OFF” and wait at least 10 seconds.
- 6) Start engine.

**It is not necessary to cool engine down before driving.**

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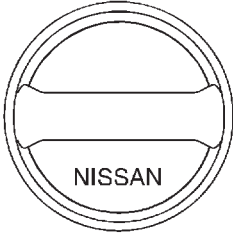
# DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

DTC Confirmation Procedure (Cont'd)

- 7) Drive vehicle again according to the "Driving Pattern", EC-74.
- 8) Stop vehicle.
- 9) Select "MODE 3" with GST.
  - If P0455 is displayed on the screen, go to "Diagnostic Procedure", EC-398.
  - If P0440 or P1440 is displayed on the screen, go to "Diagnostic Procedure", for DTC P0440, EC-357.
  - If P1447 is displayed on the screen, go to "Diagnostic Procedure" for DTC P1447, EC-516.
  - If P0440, P0455, P1440 and P1447 are not displayed on the screen, go to the following step.
- 10) Select "MODE 1" with GST.
  - If SRT of EVAP system is set, the result will be OK.
  - If SRT of EVAP system is not set, go to step 6.

## Diagnostic Procedure

NCEC0652

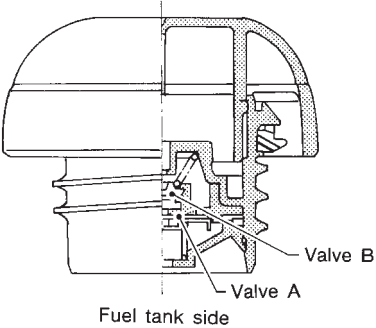
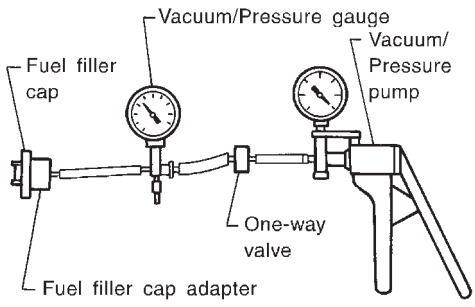
|                                                                                                                                                                                                                                                                                                                         |                                     |                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                | <b>CHECK FUEL FILLER CAP DESIGN</b> |                                              |
| <p>1. Turn ignition switch "OFF".<br/>2. Check for genuine NISSAN fuel filler cap design.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF915U</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                     |                                              |
| OK                                                                                                                                                                                                                                                                                                                      | ▶                                   | GO TO 2.                                     |
| NG                                                                                                                                                                                                                                                                                                                      | ▶                                   | Replace with genuine NISSAN fuel filler cap. |

|                                                                                                                                   |                                           |                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>2</b>                                                                                                                          | <b>CHECK FUEL FILLER CAP INSTALLATION</b> |                                                                                                                                                                                               |
| <p>Check that the cap is tightened properly by rotating the cap clockwise.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                           |                                                                                                                                                                                               |
| OK                                                                                                                                | ▶                                         | GO TO 3.                                                                                                                                                                                      |
| NG                                                                                                                                | ▶                                         | <ul style="list-style-type: none"> <li>● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.</li> <li>● Retighten until ratcheting sound is heard.</li> </ul> |

# DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

|                                                                  |                                       |
|------------------------------------------------------------------|---------------------------------------|
| <b>3</b>                                                         | <b>CHECK FUEL FILLER CAP FUNCTION</b> |
| Check for air releasing sound while opening the fuel filler cap. |                                       |
| <b>OK or NG</b>                                                  |                                       |
| OK                                                               | ▶ GO TO 5.                            |
| NG                                                               | ▶ GO TO 4.                            |

|                                                                                                                                                                                                                                                                                                                                                  |                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                         | <b>CHECK FUEL TANK VACUUM RELIEF VALVE</b>    |
| <ol style="list-style-type: none"> <li>1. Wipe clean valve housing.</li> <li>2. Check valve opening pressure and vacuum.</li> </ol>                                                                                                                                                                                                              |                                               |
|  <p style="text-align: center;">Fuel tank side</p>                                                                                                                                                                                                              |                                               |
| SEF427N                                                                                                                                                                                                                                                                                                                                          |                                               |
|                                                                                                                                                                                                                                                               |                                               |
| SEF943S                                                                                                                                                                                                                                                                                                                                          |                                               |
| <p><b>Pressure:</b><br/>15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)</p> <p><b>Vacuum:</b><br/>-6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm<sup>2</sup>, -0.87 to -0.49 psi)</p> <p><b>CAUTION:</b><br/>Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p> |                                               |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                  |                                               |
| OK                                                                                                                                                                                                                                                                                                                                               | ▶ GO TO 5.                                    |
| NG                                                                                                                                                                                                                                                                                                                                               | ▶ Replace fuel filler cap with a genuine one. |

|                                                                                                                                                                         |                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| <b>5</b>                                                                                                                                                                | <b>CHECK EVAP PURGE LINE</b>    |
| Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection. Refer to "Evaporative Emission System", EC-33. |                                 |
| <b>OK or NG</b>                                                                                                                                                         |                                 |
| OK                                                                                                                                                                      | ▶ GO TO 6.                      |
| NG                                                                                                                                                                      | ▶ Repair or reconnect the hose. |

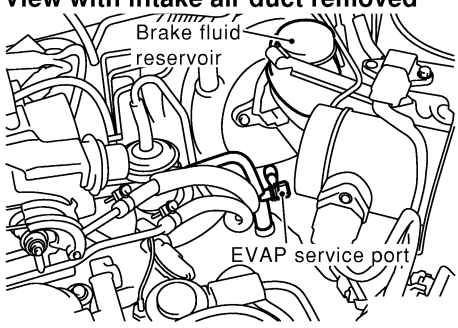
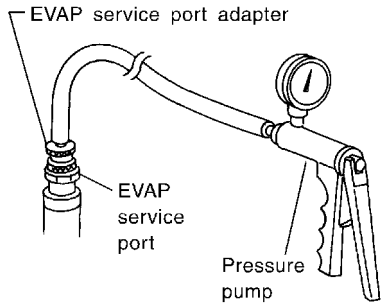
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# DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

|                                                                |                              |
|----------------------------------------------------------------|------------------------------|
| <b>6</b>                                                       | <b>CLEAN EVAP PURGE LINE</b> |
| Clean EVAP purge line (pipe and rubber tube) using air blower. |                              |
| ▶                                                              | GO TO 7.                     |

|                                                |                                                                                       |
|------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>7</b>                                       | <b>CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT</b>                     |
| Refer to "DTC Confirmation Procedure", EC-377. |                                                                                       |
| <b>OK or NG</b>                                |                                                                                       |
| OK                                             | ▶ GO TO 8.                                                                            |
| NG                                             | ▶ Repair or replace EVAP canister vent control valve and O-ring or harness/connector. |

|                                                                                                                                    |                                  |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>8</b>                                                                                                                           | <b>INSTALL THE PRESSURE PUMP</b> |
| To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.                        |                                  |
| <p><b>View with intake air duct removed</b></p>  |                                  |
| SEF850X                                                                                                                            |                                  |
|                                                 |                                  |
| SEF916U                                                                                                                            |                                  |
| <b>NOTE:</b>                                                                                                                       |                                  |
| <b>Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.</b>                          |                                  |
| Models with CONSULT-II                                                                                                             | ▶ GO TO 9.                       |
| Models without CON-SULT-II                                                                                                         | ▶ GO TO 10.                      |



# DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

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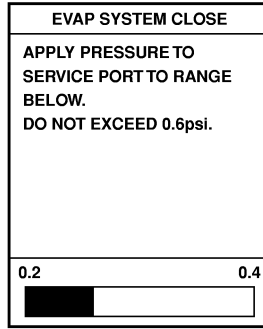
## 9 CHECK FOR EVAP LEAK

### Ⓟ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

#### NOTE:

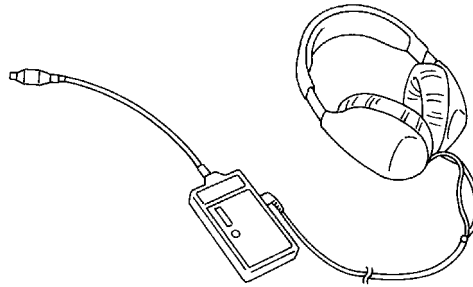
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.

Leak detector



SEF200U

OK or NG

|                         |   |                    |
|-------------------------|---|--------------------|
| OK (With CONSULT-II)    | ▶ | GO TO 11.          |
| OK (Without CONSULT-II) | ▶ | GO TO 12.          |
| NG                      | ▶ | Repair or replace. |

# DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

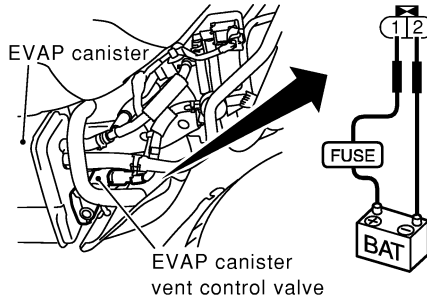
Diagnostic Procedure (Cont'd)

## 10 CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

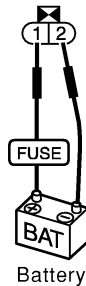
1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)

View from under the vehicle

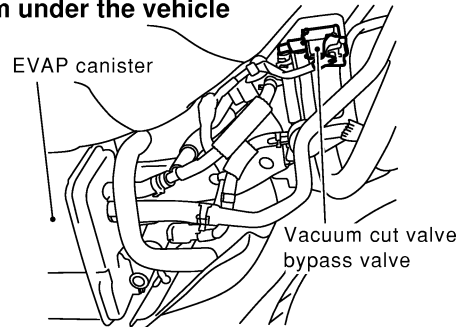


SEF323Z

3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



View from under the vehicle



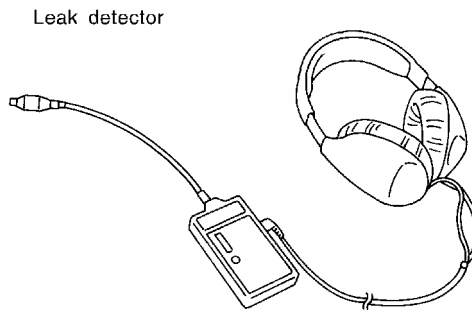
SEF869X

4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

**NOTE:**

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.



SEF200U

OK or NG


OK (With CONSULT-II) ► GO TO 11.

OK (Without CONSULT-II) ► GO TO 12.


NG ► Repair or replace.

# DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

| <b>11</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION</b> |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------|-------------|--|-----------------|-------|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.</li> <li>2. Start engine.</li> <li>3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.</li> <li>4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.</li> <li>5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.</li> </ol> |                                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <table border="1" style="margin: auto;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>                                                                        |                                                                          |           | ACTIVE TEST |  | PURG VOL CONT/V | XXX % | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | LEAN | THRTL POS SEN | XXX V |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| PURG VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | XXX %                                                                    |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | XXX rpm                                                                  |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | XXX %                                                                    |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | LEAN                                                                     |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | XXX V                                                                    |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <b>Vacuum should exist.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| SEF595Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶                                                                        | GO TO 14. |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶                                                                        | GO TO 13. |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |


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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------|
| <b>12</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION</b> |           |
| <p> <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Start engine and warm it up to normal operating temperature.</li> <li>2. Stop engine.</li> <li>3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.</li> <li>4. Start engine and let it idle for at least 80 seconds.</li> <li>5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.</li> </ol> <p style="color: blue;"><b>Vacuum should exist.</b></p> |                                                                          |           |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                          |           |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶                                                                        | GO TO 15. |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶                                                                        | GO TO 13. |

|                                                                                                 |                          |                               |
|-------------------------------------------------------------------------------------------------|--------------------------|-------------------------------|
| <b>13</b>                                                                                       | <b>CHECK VACUUM HOSE</b> |                               |
| <p>Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-27.</p> |                          |                               |
| <b>OK or NG</b>                                                                                 |                          |                               |
| OK (With CONSULT-II)                                                                            | ▶                        | GO TO 14.                     |
| OK (Without CONSULT-II)                                                                         | ▶                        | GO TO 15.                     |
| NG                                                                                              | ▶                        | Repair or reconnect the hose. |

# DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

| <b>14</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE</b> |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------|-------------|--|-----------------|-------|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|
| <p>  <b>With CONSULT-II</b><br/>                     1. Start engine.<br/>                     2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.                 </p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td style="text-align: center;">PURG VOL CONT/V</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B1)</td> <td style="text-align: center;">LEAN</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table> |                                                                |           | ACTIVE TEST |  | PURG VOL CONT/V | XXX % | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | LEAN | THRTL POS SEN | XXX V |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| PURG VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | XXX %                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | XXX rpm                                                        |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | XXX %                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | LEAN                                                           |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | XXX V                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| SEF801Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                                                              | GO TO 16. |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                                                              | GO TO 15. |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |

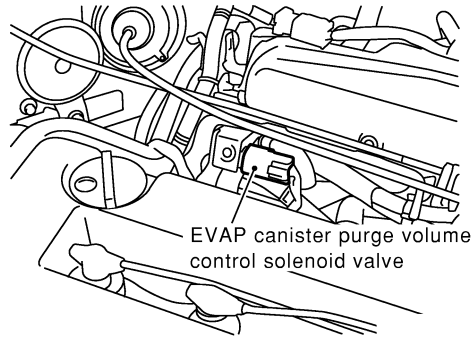
# DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

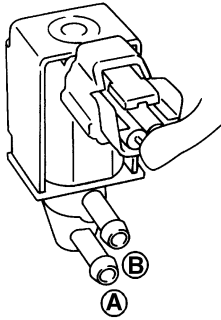
## 15 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

### Ⓟ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X

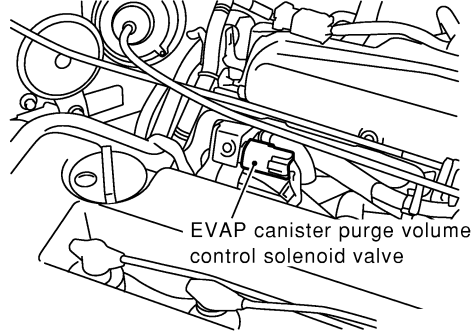


| Condition<br>PURG VOL CONT/V value | Air passage continuity<br>between A and B |
|------------------------------------|-------------------------------------------|
| 100.0%                             | Yes                                       |
| 0.0%                               | No                                        |

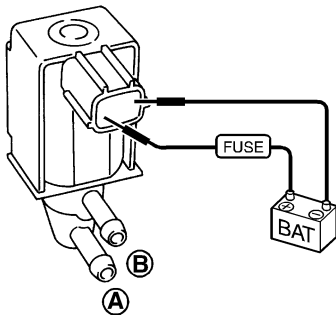
SEF334X

### ⓧ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X



| Condition                                              | Air passage continuity<br>between A and B |
|--------------------------------------------------------|-------------------------------------------|
| 12V direct current supply between<br>terminals 1 and 2 | Yes                                       |
| No supply                                              | No                                        |

SEF335X

**OK or NG**

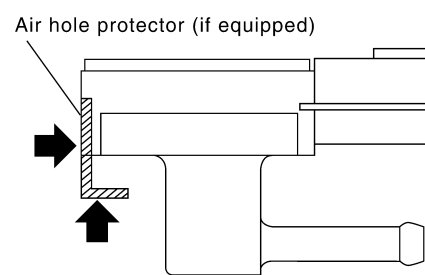
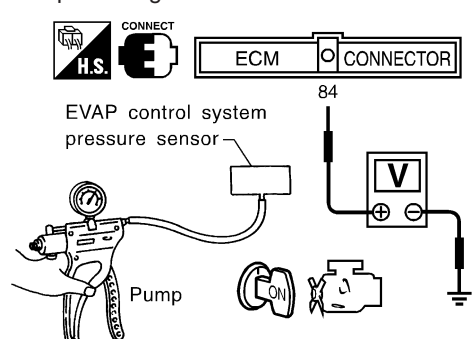
|    |   |                                                            |
|----|---|------------------------------------------------------------|
| OK | ▶ | GO TO 16.                                                  |
| NG | ▶ | Replace EVAP canister purge volume control solenoid valve. |

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# DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

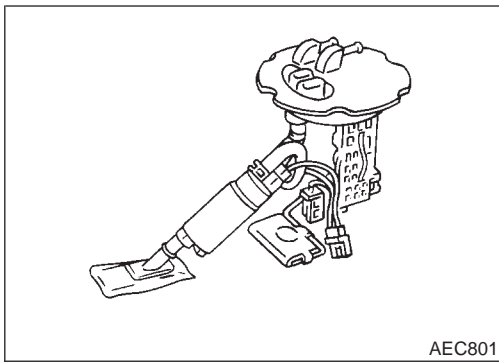
|                                                                                                                         |                                           |                                 |
|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------|
| <b>16</b>                                                                                                               | <b>CHECK FUEL TANK TEMPERATURE SENSOR</b> |                                 |
| 1. Remove fuel level sensor unit.<br>2. Check fuel tank temperature sensor.<br>Refer to EC-290, "Component Inspection". |                                           |                                 |
| <b>OK or NG</b>                                                                                                         |                                           |                                 |
| OK                                                                                                                      | ▶                                         | GO TO 17.                       |
| NG                                                                                                                      | ▶                                         | Replace fuel level sensor unit. |

|                                                                                                                                                                                                                                                                                                                            |                                                  |                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------|
| <b>17</b>                                                                                                                                                                                                                                                                                                                  | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR</b> |                                              |
| 1. Remove EVAP control system pressure sensor with its harness connector connected.<br><b>CAUTION:</b><br><ul style="list-style-type: none"> <li>● Never apply force to the air hole protector of the sensor if equipped.</li> </ul>                                                                                       |                                                  |                                              |
|                                                                                                                                                                                                                                          |                                                  |                                              |
| SEF799W                                                                                                                                                                                                                                                                                                                    |                                                  |                                              |
| 2. Remove hose from EVAP control system pressure sensor.<br>3. Turn ignition switch "ON".<br>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.                                                                                                                           |                                                  |                                              |
| <b>CAUTION:</b><br><ul style="list-style-type: none"> <li>● Always calibrate the vacuum pump gauge when using it.</li> <li>● Do not apply below <math>-20</math> kPa (<math>-150</math> mmHg, <math>-5.91</math> inHg) or over <math>20</math> kPa (<math>150</math> mmHg, <math>5.91</math> inHg) of pressure.</li> </ul> |                                                  |                                              |
| 5. Check input voltage between ECM terminal 84 and ground.                                                                                                                                                                                                                                                                 |                                                  |                                              |
|                                                                                                                                                                                                                                         |                                                  |                                              |
| SEF342X                                                                                                                                                                                                                                                                                                                    |                                                  |                                              |
| <b>CAUTION:</b><br><ul style="list-style-type: none"> <li>● Discard and EVAP control system pressure sensor which has been dropped from a height of more than <math>0.5</math> m (<math>19.7</math> in) onto a hard surface such as a concrete floor; use a new one.</li> </ul>                                            |                                                  |                                              |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                            |                                                  |                                              |
| OK                                                                                                                                                                                                                                                                                                                         | ▶                                                | GO TO 18.                                    |
| NG                                                                                                                                                                                                                                                                                                                         | ▶                                                | Replace EVAP control system pressure sensor. |

|                                                                 |                                    |                         |
|-----------------------------------------------------------------|------------------------------------|-------------------------|
| <b>18</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |                         |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                         |
|                                                                 |                                    | <b>▶ INSPECTION END</b> |

# DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

Component Description



## Component Description

NCEC0552

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

GI

MA

EM

LC

## ECM Terminals and Reference Value

NCEC0653

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

EC

FE

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                     | CONDITION                           | DATA (DC Voltage)                                                |
|----------------------|---------------|--------------------------|-------------------------------------|------------------------------------------------------------------|
| 83                   | G/R           | Fuel level sensor        | [Ignition switch "ON"]              | Approximately 0 - 4.8V<br>Output voltage varies with fuel level. |
| 90                   | B             | Fuel level sensor ground | [Engine is running]<br>● Idle speed | Approximately 0V                                                 |

CL

MT

AT

AX

SU

BR

## On Board Diagnostic Logic

NCEC0553

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

Malfunction is detected when even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.

ST

RS

BT

HA

## Possible Cause

NCEC0554

- Fuel level sensor circuit  
(The fuel level sensor circuit is open or shorted.)
- Fuel level sensor

SC

EL

IDX

# DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

## DTC Confirmation Procedure

| DATA MONITOR  |        |
|---------------|--------|
| MONITOR       | NO DTC |
| FUEL T/TMP SE | XXX °C |
| FUEL LEVEL SE | XXX V  |

SEF195Y

## DTC Confirmation Procedure

NCEC0555

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### WITH CONSULT-II

NCEC0555S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait maximum of 2 consecutive minutes.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-410.

### WITH GST

NCEC0555S02

Follow the procedure "WITH CONSULT-II" above.



# DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

Wiring Diagram

## Wiring Diagram

NCEC0556

EC-FLS1-01

GI

MA

EM

LC

EC

FE

CL

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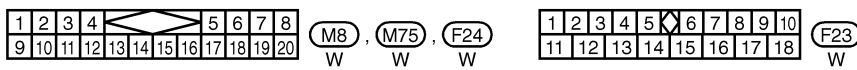
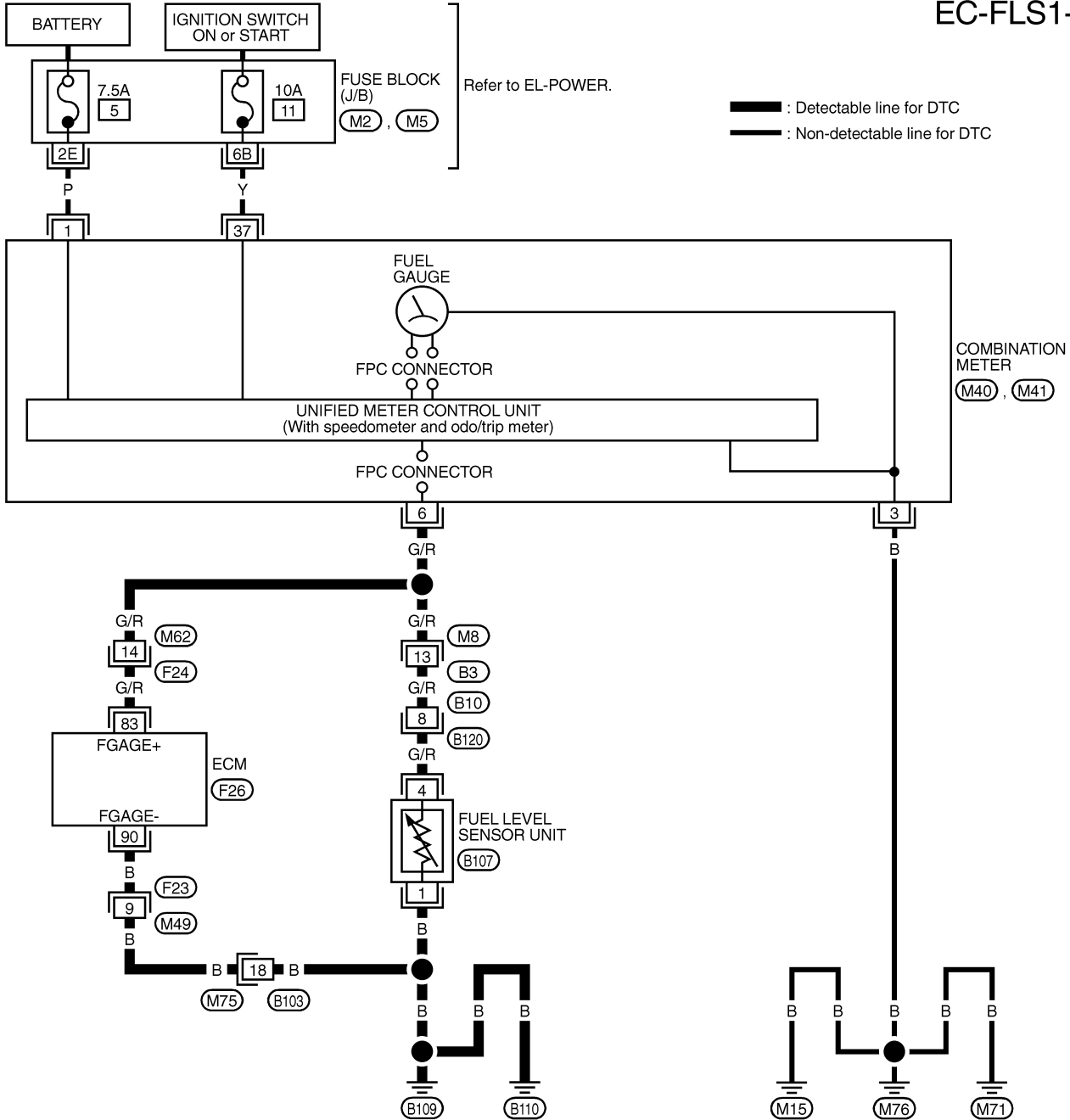
BT

HA

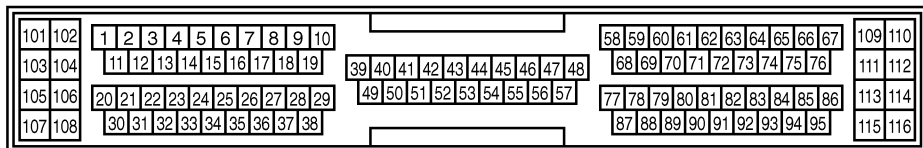
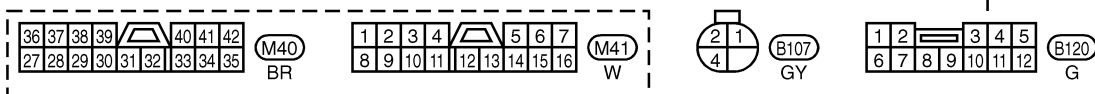
SC

EL

IDX



REFER TO THE FOLLOWING.  
M2, M5 - FUSE BLOCK-JUNCTION BOX (J/B)



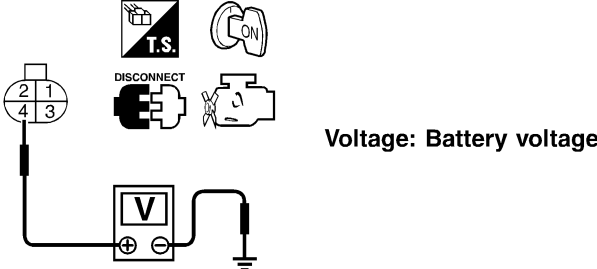
TEC752

# DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

Diagnostic Procedure

## Diagnostic Procedure

=NCEC0557

|                                                                                                                                                                                                                                                                                                                                                                     |                                                                        |                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                            | <b>CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT</b>                    |                                                                 |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect fuel level sensor until and fuel pump harness connector.<br/>                 3. Turn ignition switch "ON".<br/>                 4. Check voltage between fuel level sensor unit terminal 4 and ground with CONSULT-II or a tester.</p>                                                        |                                                                        |                                                                 |
|                                                                                                                                                                                                                                                                                   |                                                                        |                                                                 |
| SEF939XA                                                                                                                                                                                                                                                                                                                                                            |                                                                        |                                                                 |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                     |                                                                        |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                  | ▶                                                                      | GO TO 3.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                                  | ▶                                                                      | GO TO 2.                                                        |
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                            | <b>DETECT MALFUNCTIONING PART</b>                                      |                                                                 |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M8, B3</li> <li>● Harness connectors B10, B120</li> <li>● Harness for open or short between combination meter and fuel level sensor unit</li> </ul>                                                                                                                         |                                                                        |                                                                 |
| ▶ Repair or replace harness or connectors.                                                                                                                                                                                                                                                                                                                          |                                                                        |                                                                 |
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                            | <b>CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT</b>       |                                                                 |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Check harness continuity between fuel level sensor unit terminal 1 and body ground. Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b><br/>                 3. Also check harness for short to power.</p>                                                                                      |                                                                        |                                                                 |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                     |                                                                        |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                  | ▶                                                                      | GO TO 4.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                                  | ▶                                                                      | Repair open circuit or short to power in harness or connectors. |
| <b>4</b>                                                                                                                                                                                                                                                                                                                                                            | <b>CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |                                                                 |
| <p>1. Disconnect ECM harness connector.<br/>                 2. Check harness continuity between ECM terminal 83 and fuel level sensor unit terminal 4, ECM terminal 90 and fuel level sensor unit terminal 1. Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b><br/>                 3. Also check harness for short to ground and short to power.</p> |                                                                        |                                                                 |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                     |                                                                        |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                  | ▶                                                                      | GO TO 6.                                                        |
| NG                                                                                                                                                                                                                                                                                                                                                                  | ▶                                                                      | GO TO 5.                                                        |

# DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

Diagnostic Procedure (Cont'd)

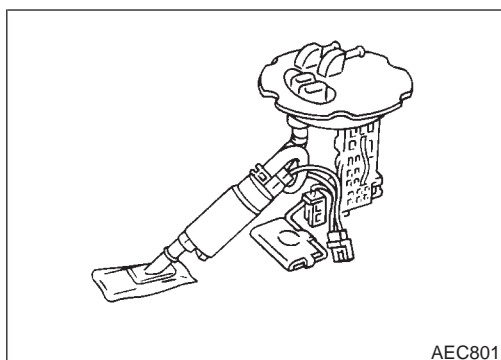
|          |                                   |                                                                                                                                                                                                                                                                                                                                         |                        |
|----------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <b>5</b> | <b>DETECT MALFUNCTIONING PART</b> |                                                                                                                                                                                                                                                                                                                                         |                        |
|          |                                   | Check the following. <ul style="list-style-type: none"> <li>● Harness connectors B103, M75</li> <li>● Harness connectors F23, M49</li> <li>● Harness connectors M8, B3</li> <li>● Harness connectors B10, B120</li> <li>● Harness connectors M62, F24</li> <li>● Harness for open or short between ECM and fuel level sensor</li> </ul> | GI<br><br>MA<br><br>EM |
|          | ▶                                 | Repair open circuit or short to ground or short to power in harness or connectors.                                                                                                                                                                                                                                                      |                        |

|          |                                |                                                 |                                 |
|----------|--------------------------------|-------------------------------------------------|---------------------------------|
| <b>6</b> | <b>CHECK FUEL LEVEL SENSOR</b> |                                                 |                                 |
|          |                                | Refer to EL-96, "Fuel Level Sensor Unit Check". |                                 |
|          |                                | <b>OK or NG</b>                                 | <b>EC</b>                       |
|          | OK                             | ▶                                               | GO TO 7.                        |
|          | NG                             | ▶                                               | Replace fuel level sensor unit. |

|          |                                    |                                                                 |                                                                                                                             |
|----------|------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>7</b> | <b>CHECK INTERMITTENT INCIDENT</b> |                                                                 |                                                                                                                             |
|          |                                    | Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                                                                                                             |
|          | ▶                                  | <b>INSPECTION END</b>                                           | CL<br><br>MT<br><br>AT<br><br>AX<br><br>SU<br><br>BR<br><br>ST<br><br>RS<br><br>BT<br><br>HA<br><br>SC<br><br>EL<br><br>IDX |

# DTC P0461 FUEL LEVEL SENSOR FUNCTION

## Component Description



## Component Description

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM. =NCEC0558

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

## On Board Diagnostic Logic

Driving long distances naturally affect fuel gauge level. NCEC0559

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

Malfunction is detected when the output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.

## Possible Cause

- Harness or connectors  
(The level sensor circuit is open or shorted.)
  - Fuel level sensor
- NCEC0560

## Overall Function Check

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed. NCEC0561

### WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to FE-5, "FUEL SYSTEM".

### TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

| DATA MONITOR  |        |
|---------------|--------|
| MONITOR       | NO DTC |
| FUEL T/TMP SE | XXX °C |
| FUEL LEVEL SE | XXX V  |

SEF195Y

## Ⓜ WITH CONSULT-II

### NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance. NCEC0561S01

- 1) Prepare a fuel container and a spare hose.
- 2) Release fuel pressure from fuel line, refer to "Fuel Pressure Release", EC-50.
- 3) Remove the fuel feed hose on the fuel level sensor unit.
- 4) Connect a spare fuel hose where the fuel feed hose was removed.

# DTC P0461 FUEL LEVEL SENSOR FUNCTION

Overall Function Check (Cont'd)

- 5) Turn ignition switch "OFF" and wait at least 10 seconds then turn "ON".
- 6) Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT-II. GI
- 7) Check "FUEL LEVEL SE" output voltage and note it.
- 8) Select "FUEL PUMP" in "ACTIVE TEST" mode with CONSULT-II. MA
- 9) Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it. EM
- 10) Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
- 11) Check "FUEL LEVEL SE" output voltage and note it. LC
- 12) Check "FUEL LEVEL SE" output voltage and confirm whether the voltage changes more than 0.03V during step 7 to 11. EC  
If NG, check the fuel level sensor, refer to EL-96, "FUEL LEVEL SENSOR UNIT CHECK".

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

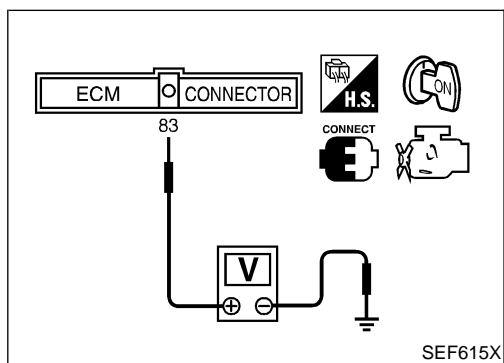
BT

HA

SC

EL

IDX



## WITH GST

NCEC0561S02

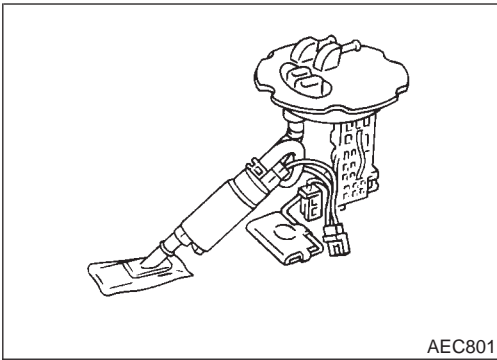
### NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

- 1) Prepare a fuel container and a spare hose.
- 2) Release fuel pressure from fuel line, refer to "Fuel Pressure Release", EC-50.
- 3) Remove the fuel feed hose on the fuel level sensor unit.
- 4) Connect a spare fuel hose where the fuel feed hose was removed.
- 5) Turn ignition switch "OFF".
- 6) Set voltmeters probe between ECM terminal 83 (fuel level sensor signal) and ground. ST
- 7) Turn ignition switch "ON". RS
- 8) Check voltage between ECM terminal 83 and ground and note it.
- 9) Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment. BT
- 10) Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
- 11) Confirm that the voltage between ECM terminal 83 and ground changes more than 0.03V during step 8 - 10. HA  
If NG, check component of fuel level sensor, refer to EL-96, "FUEL LEVEL SENSOR UNIT CHECK". SC

# DTC P0464 FUEL LEVEL SENSOR CIRCUIT

## Component Description



## Component Description

NCEC0562

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

## ECM Terminals and Reference Value

NCEC0654

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                     | CONDITION                           | DATA (DC Voltage)                                                |
|----------------------|---------------|--------------------------|-------------------------------------|------------------------------------------------------------------|
| 83                   | G/R           | Fuel level sensor        | [Ignition switch "ON"]              | Approximately 0 - 4.8V<br>Output voltage varies with fuel level. |
| 90                   | B             | Fuel level sensor ground | [Engine is running]<br>● Idle speed | Approximately 0V                                                 |

## On Board Diagnostic Logic

NCEC0563

ECM receives two signals from the fuel level sensor circuit.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the former, to detect open or short circuit malfunction.

Malfunction is detected when an excessively low or high voltage is sent from the sensor is sent to ECM.

## Possible Cause

NCEC0564

- Fuel level sensor circuit  
(The fuel level sensor circuit is open or shorted.)
- Fuel level sensor

# DTC P0464 FUEL LEVEL SENSOR CIRCUIT

DTC Confirmation Procedure

## DTC Confirmation Procedure

NCEC0565

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch "ON".

| DATA MONITOR  |        |
|---------------|--------|
| MONITOR       | NO DTC |
| FUEL T/TMP SE | XXX °C |
| FUEL LEVEL SE | XXX V  |

SEF195Y

### WITH CONSULT-II

NCEC0565S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-417.

### WITH GST

NCEC0565S02

Follow the procedure "WITH CONSULT-II" above.

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

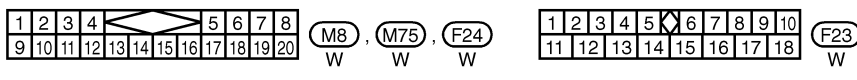
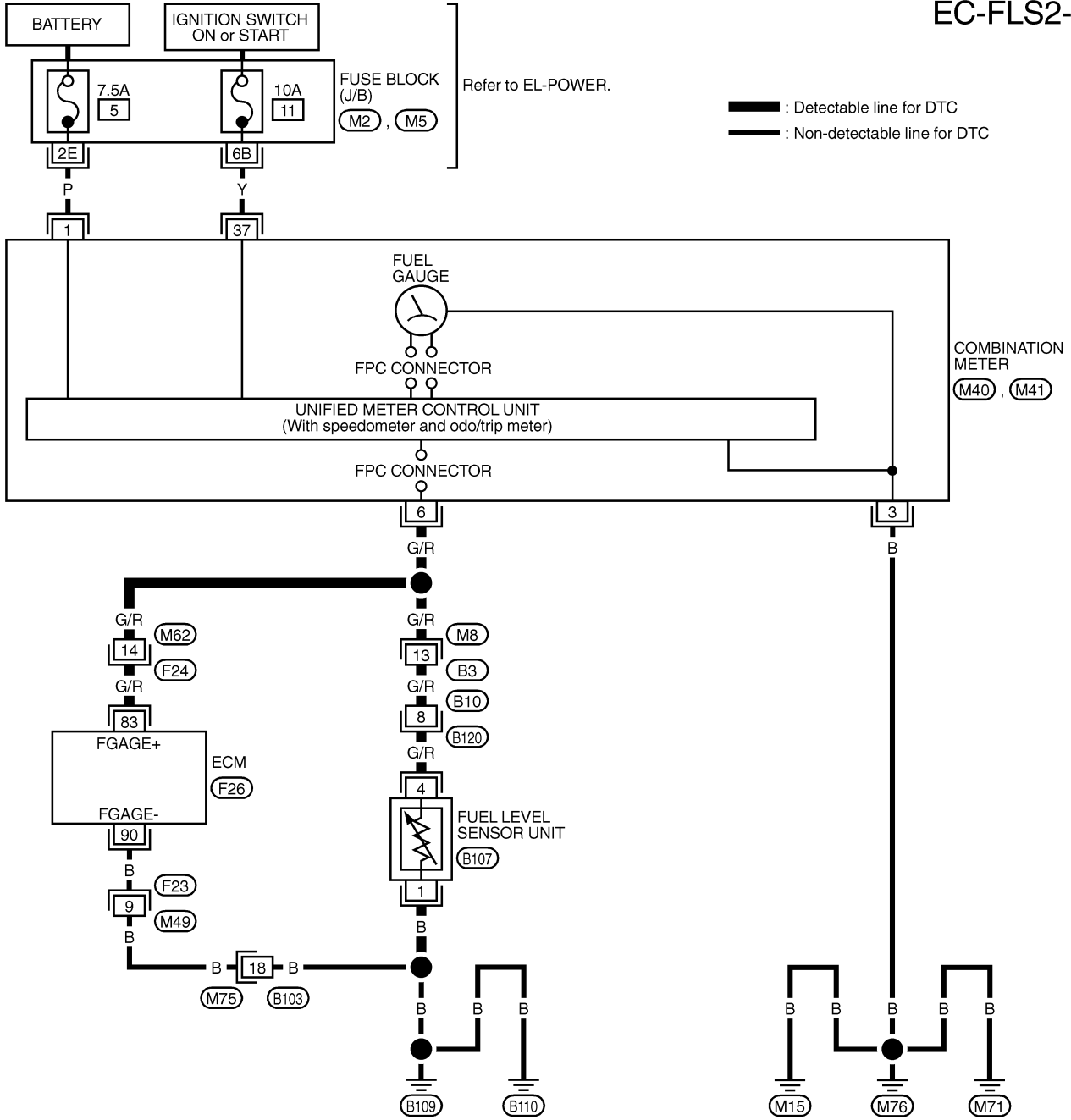
# DTC P0464 FUEL LEVEL SENSOR CIRCUIT

Wiring Diagram

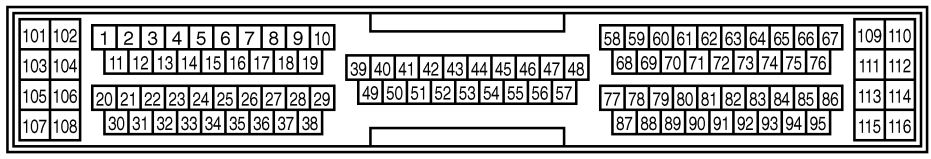
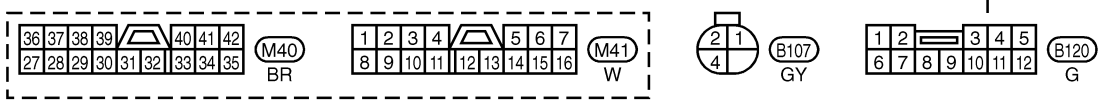
## Wiring Diagram

NCEC0566

EC-FLS2-01



REFER TO THE FOLLOWING.  
 (M2), (M5) - FUSE BLOCK-JUNCTION BOX (J/B)

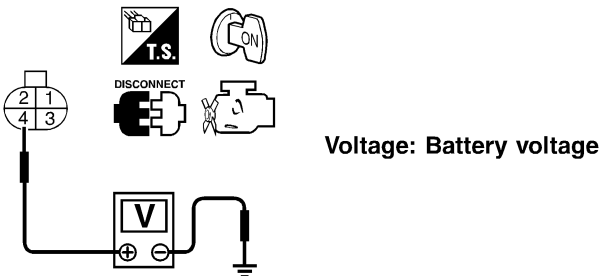


TEC753



## Diagnostic Procedure

=NCEC0567

|                                                                                                                                                                                                                                                                                                            |                                                     |          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----------|
| <b>1</b>                                                                                                                                                                                                                                                                                                   | <b>CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT</b> |          |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect fuel level sensor until and fuel pump harness connector.<br/>                 3. Turn ignition switch "ON".<br/>                 4. Check voltage between fuel level sensor unit terminal 4 and ground with CONSULT-II or tester.</p> |                                                     |          |
|                                                                                                                                                                                                                          |                                                     |          |
| SEF939XA                                                                                                                                                                                                                                                                                                   |                                                     |          |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                            |                                                     |          |
| OK                                                                                                                                                                                                                                                                                                         | ▶                                                   | GO TO 3. |
| NG                                                                                                                                                                                                                                                                                                         | ▶                                                   | GO TO 2. |

|                                                                                                                                                                                                                                             |                                   |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--|
| <b>2</b>                                                                                                                                                                                                                                    | <b>DETECT MALFUNCTIONING PART</b> |  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M8, B3</li> <li>● Harness connectors B10, B120</li> <li>● Harness for open or short between combination meter and fuel level sensor unit</li> </ul> |                                   |  |
| ▶ Repair or replace harness or connectors.                                                                                                                                                                                                  |                                   |  |

|                                                                                                                                                                                                                                                                                |                                                                  |                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>3</b>                                                                                                                                                                                                                                                                       | <b>CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT</b> |                                                                 |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Check harness continuity between fuel level sensor unit terminal 1 and body ground. Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b><br/>                 3. Also check harness for short to power.</p> |                                                                  |                                                                 |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                |                                                                  |                                                                 |
| OK                                                                                                                                                                                                                                                                             | ▶                                                                | GO TO 4.                                                        |
| NG                                                                                                                                                                                                                                                                             | ▶                                                                | Repair open circuit or short to power in harness or connectors. |

|                                                                                                                                                                                                                                                                                                              |                                                                        |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------|
| <b>4</b>                                                                                                                                                                                                                                                                                                     | <b>CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |          |
| <p>1. Disconnect ECM harness connector.<br/>                 2. Check harness continuity between ECM terminal 83 and fuel level sensor unit terminal 4. Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b><br/>                 3. Also check harness for short to ground and short to power.</p> |                                                                        |          |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                              |                                                                        |          |
| OK                                                                                                                                                                                                                                                                                                           | ▶                                                                      | GO TO 6. |
| NG                                                                                                                                                                                                                                                                                                           | ▶                                                                      | GO TO 5. |

GI  
 MA  
 EM  
 LC  
 EC  
 FE  
 CL  
 MT  
 AT  
 AX  
 SU  
 BR  
 ST  
 RS  
 BT  
 HA  
 SC  
 EL  
 IDX

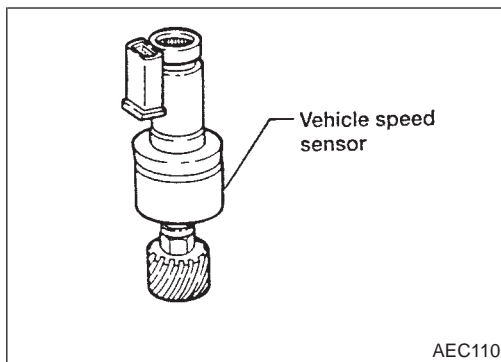
# DTC P0464 FUEL LEVEL SENSOR CIRCUIT

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                     |                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                                            | <b>DETECT MALFUNCTIONING PART</b>                                                    |
| Check the following. <ul style="list-style-type: none"><li>● Harness connectors M62, F24</li><li>● Harness connectors M8, B3</li><li>● Harness connectors B10, B120</li><li>● Harness for open or short between ECM and fuel level sensor</li></ul> |                                                                                      |
|                                                                                                                                                                                                                                                     | ▶ Repair open circuit or short to ground or short to power in harness on connectors. |
| <b>6</b>                                                                                                                                                                                                                                            | <b>CHECK FUEL LEVEL SENSOR</b>                                                       |
| Refer to EL-96, "Fuel Level Sensor Unit Check".                                                                                                                                                                                                     |                                                                                      |
| <b>OK or NG</b>                                                                                                                                                                                                                                     |                                                                                      |
| OK                                                                                                                                                                                                                                                  | ▶ GO TO 7.                                                                           |
| NG                                                                                                                                                                                                                                                  | ▶ Replace fuel level sensor unit.                                                    |
| <b>7</b>                                                                                                                                                                                                                                            | <b>CHECK INTERMITTENT INCIDENT</b>                                                   |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.                                                                                                                                                                                     |                                                                                      |
|                                                                                                                                                                                                                                                     | ▶ <b>INSPECTION END</b>                                                              |

# DTC P0500 VEHICLE SPEED SENSOR (VSS)

Component Description



## Component Description

NCEC0272

The vehicle speed sensor is installed in the transaxle. It contains a pulse generator which provides a vehicle speed signal to the speedometer. The speedometer then sends a signal to the ECM.

GI  
MA  
EM  
LC

## ECM Terminals and Reference Value

NCEC0273

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

EC  
FE

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                 | CONDITION                                                                                                                                                                 | DATA (DC Voltage)                            |
|----------------------|---------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 86                   | Y/G           | Vehicle speed sensor | <p>[Engine is running]</p> <ul style="list-style-type: none"> <li>Lift up the vehicle</li> <li>In 2nd gear position</li> <li>Vehicle speed is 40 km/h (25 MPH)</li> </ul> | <p>0 - Approximately 4.2V</p> <p>SEF003W</p> |

CL  
MT  
AT  
AX  
SU

## On Board Diagnosis Logic

NCEC0274

| DTC No. | Malfunction is detected when ...                                                                                                                               | Check Items (Possible Cause)                                                                                                                                |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0500   | <ul style="list-style-type: none"> <li>The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connector (The vehicle speed sensor circuit is open or shorted.)</li> <li>Vehicle speed sensor</li> </ul> |

BR  
ST  
RS

## DTC Confirmation Procedure

NCEC0275

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

BT  
HA  
SC  
EL  
IDX

# DTC P0500 VEHICLE SPEED SENSOR (VSS)

DTC Confirmation Procedure (Cont'd)

| 6 | DATA MONITOR  |          |
|---|---------------|----------|
|   | MONITOR       | NO DTC   |
|   | ENG SPEED     | XXX rpm  |
|   | COOLAN TEMP/S | XXX °C   |
|   | B/FUEL SCHDL  | XXX msec |
|   | PW/ST SIGNAL  | OFF      |
|   | VHCL SPEED SE | XXX km/h |

SEF196Y

## With CONSULT-II

- 1) Start engine
- 2) Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
- 3) If NG, go to "Diagnostic Procedure", EC-422.  
If OK, go to following step.
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Warm engine up to normal operating temperature.
- 6) Maintain the following conditions for at least 10 consecutive seconds.

|                |                                                    |
|----------------|----------------------------------------------------|
| ENG SPEED      | 1,650 - 3,000 rpm (A/T)<br>1,900 - 3,900 rpm (M/T) |
| COOLAN TEMP/S  | More than 70°C (158°F)                             |
| B/FUEL SCHDL   | 4.8 - 12.0 msec (A/T)<br>4.5 - 10.5 msec (M/T)     |
| Selector lever | Suitable position                                  |
| PW/ST SIGNAL   | OFF                                                |

- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-422.

## Overall Function Check

Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a 1st trip DTC might not be confirmed.

NCEC0276

## With GST

- 1) Lift up drive wheels.
- 2) Start engine.
- 3) Read vehicle speed sensor signal in "MODE 1" with GST.  
The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
- 4) If NG, go to "Diagnostic Procedure", EC-422.

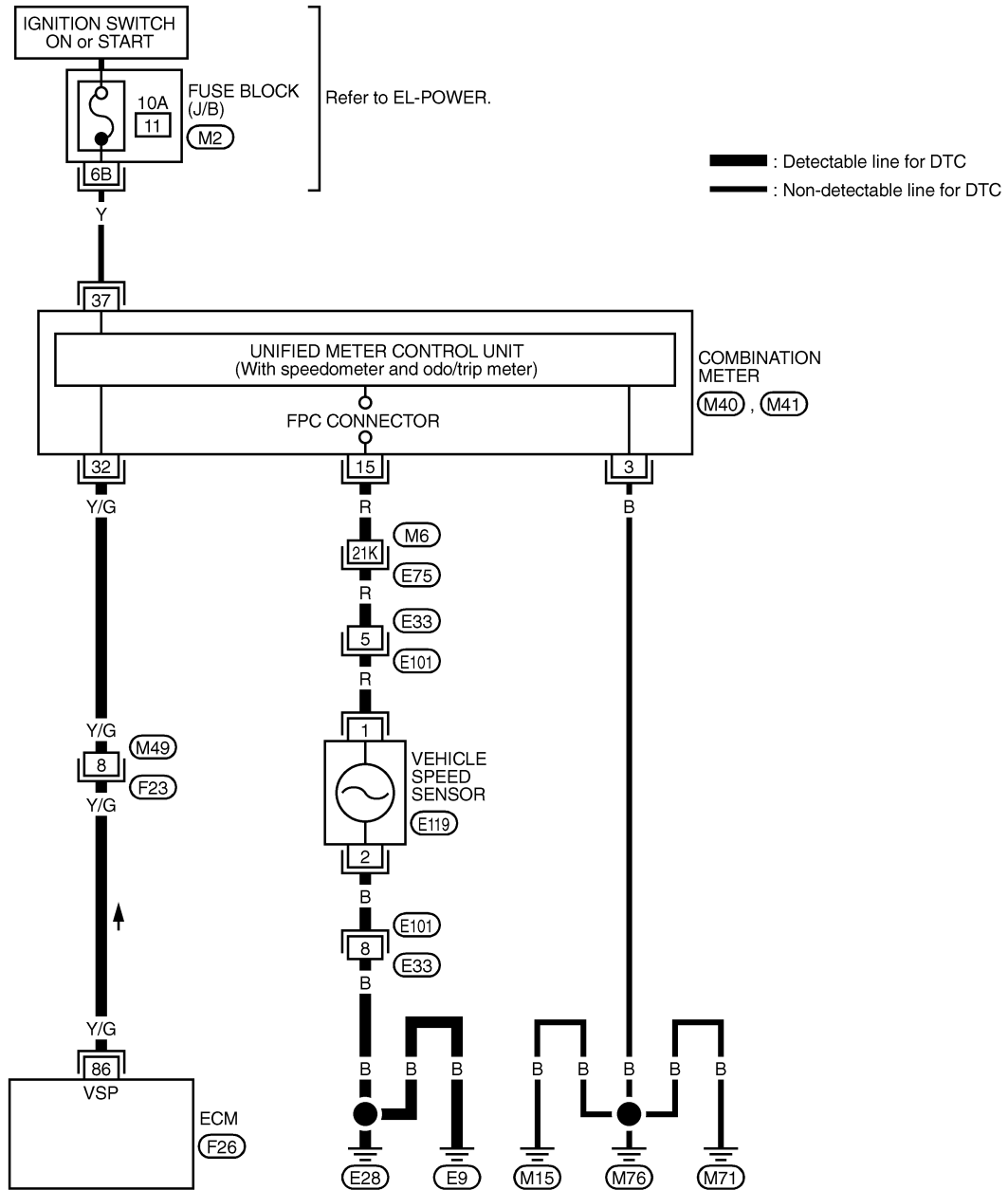
# DTC P0500 VEHICLE SPEED SENSOR (VSS)

Wiring Diagram

## Wiring Diagram

NCEC0277

EC-VSS-01



GI

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

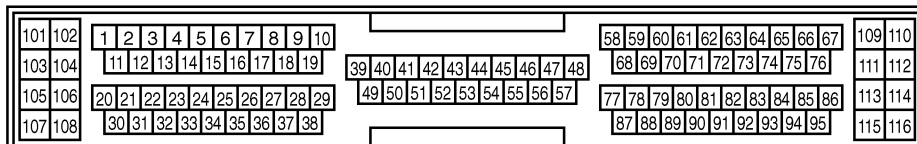
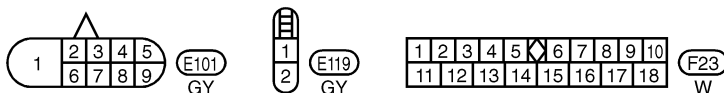
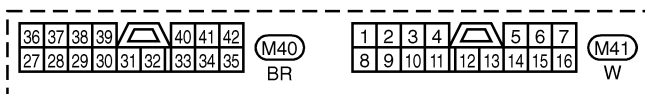
BT

HA

SC

EL

IDX



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(M2) -FUSE BLOCK-JUNCTION BOX (J/B)

TEC714

# DTC P0500 VEHICLE SPEED SENSOR (VSS)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0278

|                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                       | <b>CHECK INPUT SIGNAL CIRCUIT</b>                                                        |
| 1. Turn ignition switch "OFF".<br>2. Disconnect ECM harness connector and combination meter harness connector.<br>3. Check harness continuity between ECM terminal 86 and combination meter terminal 32.<br>Refer to Wiring Diagram.<br><b>Continuity should exist.</b><br>4. Also check harness for short to ground and short to power.<br><p style="text-align: center;"><b>OK or NG</b></p> |                                                                                          |
| OK                                                                                                                                                                                                                                                                                                                                                                                             | ▶ GO TO 3.                                                                               |
| NG                                                                                                                                                                                                                                                                                                                                                                                             | ▶ GO TO 2.                                                                               |
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                       | <b>DETECT MALFUNCTIONING PART</b>                                                        |
| Check the following. <ul style="list-style-type: none"><li>● Harness connectors F23, M49</li><li>● Harness for open or short between ECM and combination meter</li></ul>                                                                                                                                                                                                                       |                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                | ▶ Repair open circuit or short to ground or short to power in harness or connectors.     |
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                       | <b>CHECK SPEEDOMETER FUNCTION</b>                                                        |
| Make sure that speedometer functions properly.<br><p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                                                                                                                           |                                                                                          |
| OK                                                                                                                                                                                                                                                                                                                                                                                             | ▶ GO TO 5.                                                                               |
| NG                                                                                                                                                                                                                                                                                                                                                                                             | ▶ GO TO 4.                                                                               |
| <b>4</b>                                                                                                                                                                                                                                                                                                                                                                                       | <b>CHECK SPEEDOMETER CIRCUIT FOR OPEN AND SHORT</b>                                      |
| Check the following. <ul style="list-style-type: none"><li>● Harness connectors M6, E75</li><li>● Harness connectors E33, E101</li><li>● Harness for open or short between combination meter and vehicle speed sensor</li></ul> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                             |                                                                                          |
| OK                                                                                                                                                                                                                                                                                                                                                                                             | ▶ Check combination meter and vehicle speed sensor. Refer to EL-83, "METERS AND GAUGES". |
| NG                                                                                                                                                                                                                                                                                                                                                                                             | ▶ Repair open circuit or short to ground or short to power in harness or connectors.     |
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                       | <b>CHECK INTERMITTENT INCIDENT</b>                                                       |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.                                                                                                                                                                                                                                                                                                                                 |                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                | ▶ <b>INSPECTION END</b>                                                                  |

# DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

Description

## Description SYSTEM DESCRIPTION

NCEC0279

NCEC0279S01

| Sensor                             | Input Signal to ECM        | ECM function     | Actuator       |
|------------------------------------|----------------------------|------------------|----------------|
| Camshaft position sensor           | Engine speed               | Idle air control | IACV-AAC valve |
| Mass air flow sensor               | Amount of intake air       |                  |                |
| Engine coolant temperature sensor  | Engine coolant temperature |                  |                |
| Ignition switch                    | Start signal               |                  |                |
| Throttle position sensor           | Throttle position          |                  |                |
| Park/neutral position (PNP) switch | Park/neutral position      |                  |                |
| Air conditioner switch             | Air conditioner operation  |                  |                |
| Power steering oil pressure switch | Power steering load signal |                  |                |
| Battery                            | Battery voltage            |                  |                |
| Vehicle speed sensor               | Vehicle speed              |                  |                |
| Intake air temperature sensor      | Intake air temperature     |                  |                |

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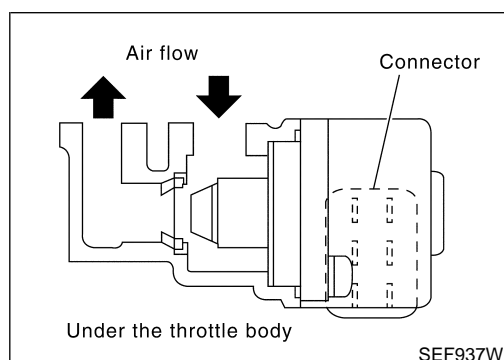
HA

SC

EL

IDX

This system automatically controls engine idle speed to a specified level. Idle speed is controlled through fine adjustment of the amount of air which by-passes the throttle valve via IACV-AAC valve. The IACV-AAC valve changes the opening of the air by-pass passage to control the amount of auxiliary air. This valve is actuated by a step motor built into the valve, which moves the valve in the axial direction in steps corresponding to the ECM output signals. One step of IACV-AAC valve movement causes the respective opening of the air by-pass passage. (i.e. when the step advances, the opening is enlarged.) The opening of the valve is varied to allow for optimum control of the engine idling speed. The camshaft position sensor detects the actual engine speed and sends a signal to the ECM. The ECM then controls the step position of the IACV-AAC valve so that engine speed coincides with the target value memorized in ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warm up, deceleration, and engine load (air conditioner, power steering and cooling fan operation).



## COMPONENT DESCRIPTION

### IACV-AAC Valve

NCEC0279S02

NCEC0279S0202

The IACV-AAC valve is operated by a step motor for centralized control of auxiliary air supply. This motor has four winding phases and is actuated by the output signals of ECM which turns ON and OFF two windings each in sequence. Each time the IACV-AAC valve opens or closes to change the auxiliary air quantity, the ECM sends a pulse signal to the step motor. When no change in the auxiliary air quantity is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

# DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

CONSULT-II Reference Value in Data Monitor Mode

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0280

| MONITOR ITEM | CONDITION                                                                                                                                                          |           | SPECIFICATION |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------|
| IACV-AAC/V   | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: "N"</li> <li>● No-load</li> </ul> | Idle      | 5 - 20 steps  |
|              |                                                                                                                                                                    | 2,000 rpm | —             |

## ECM Terminals and Reference Value

NCEC0281

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-NAL NO.      | WIRE COLOR        | ITEM           | CONDITION                                                                                 | DATA (DC Voltage) |
|--------------------|-------------------|----------------|-------------------------------------------------------------------------------------------|-------------------|
| 6<br>7<br>15<br>16 | BR<br>L<br>R<br>G | IACV-AAC valve | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul> | 0.1 - 14V         |

## On Board Diagnosis Logic

NCEC0282

| DTC No. | Malfunction is detected when ... |                                               | Check Items (Possible Cause)                                                                                                                                                               |
|---------|----------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0505   | A)                               | The IACV-AAC valve does not operate properly. | <ul style="list-style-type: none"> <li>● Harness or connectors (The IACV-AAC valve circuit is open.)</li> <li>● IACV-AAC valve</li> </ul>                                                  |
|         | B)                               | The IACV-AAC valve does not operate properly. | <ul style="list-style-type: none"> <li>● Harness or connectors (The IACV-AAC valve circuit is shorted.)</li> <li>● Air control valve (Power steering)</li> <li>● IACV-AAC valve</li> </ul> |

## DTC Confirmation Procedure

NCEC0283

### NOTE:

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- Perform "Procedure for malfunction A" first. If 1st trip DTC cannot be confirmed, perform "Procedure for malfunction B".
- If the target idle speed is out of the specified value, perform "Idle Air Volume Learning", EC-65, before conducting "DTC Confirmation Procedure". For the target idle speed, refer to the "Service Data and Specifications (SDS)", EC-610.



# DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

DTC Confirmation Procedure (Cont'd)

|   |              |         |
|---|--------------|---------|
| 3 | DATA MONITOR |         |
|   | MONITOR      | NO DTC  |
|   | ENG SPEED    | XXX rpm |

SEF058Y

## PROCEDURE FOR MALFUNCTION A

NCEC0283S01

### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch "ON".

#### With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle.
- 4) Keep engine speed at 2,500 rpm for three seconds, then let it idle for three seconds.
- 5) Perform step 4 once more.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-427.

#### With GST

Follow the procedure "With CONSULT-II" above.

|   |               |         |
|---|---------------|---------|
| 4 | DATA MONITOR  |         |
|   | MONITOR       | NO DTC  |
|   | ENG SPEED     | XXX rpm |
|   | COOLAN TEMP/S | XXX °C  |

SEF174Y

## PROCEDURE FOR MALFUNCTION B

NCEC0283S02

### TESTING CONDITION:

- Before performing the following procedure, make sure battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

#### With CONSULT-II

- 1) Open engine hood.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Turn ignition switch "ON" again and select "DATA MONITOR" mode with CONSULT-II.
- 5) Start engine and run it for at least 1 minute at idle speed.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-427.

#### With GST

Follow the procedure "With CONSULT-II" above.

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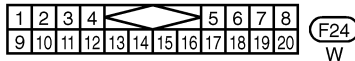
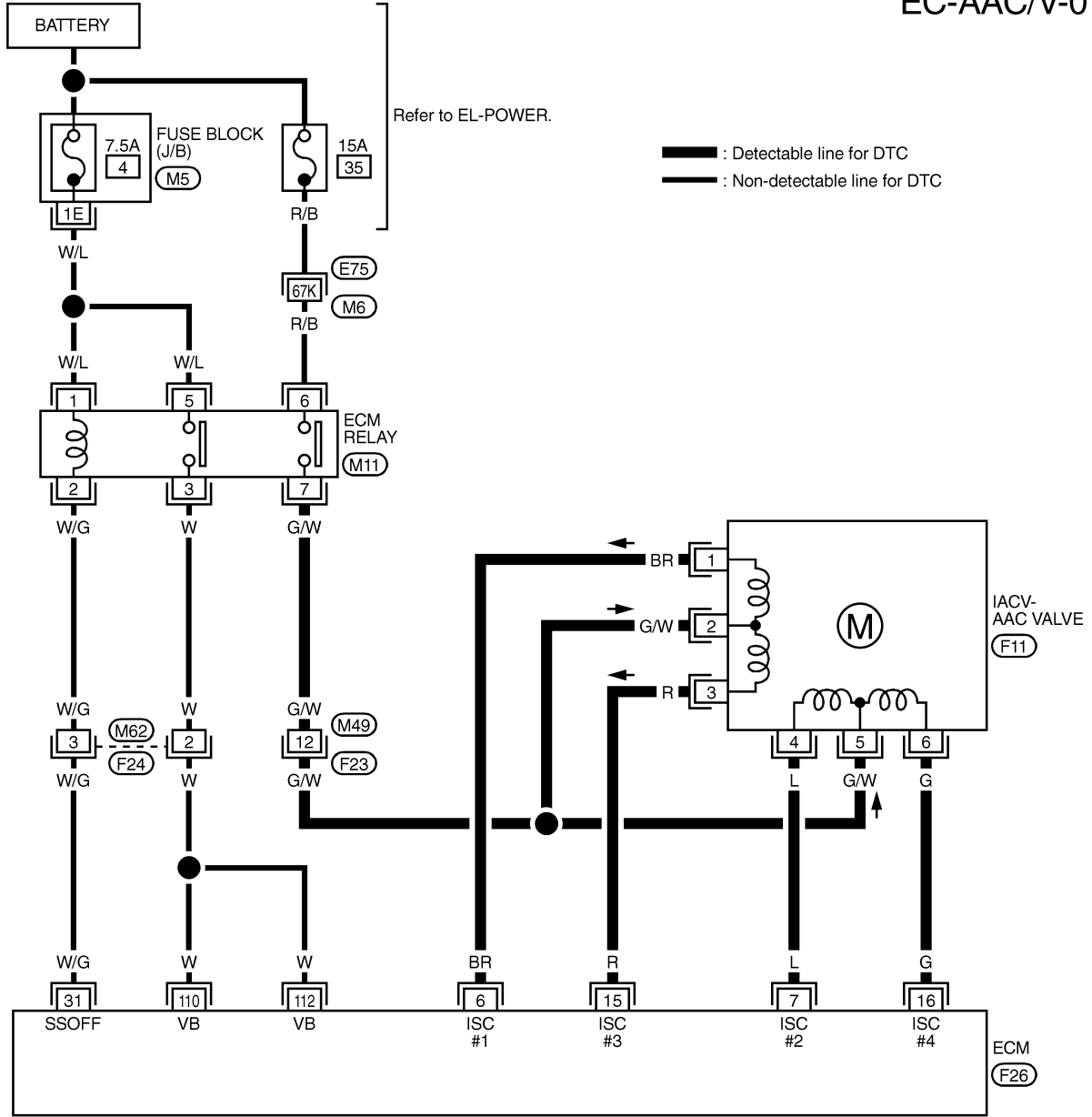
# DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

Wiring Diagram

## Wiring Diagram

NCEC0284

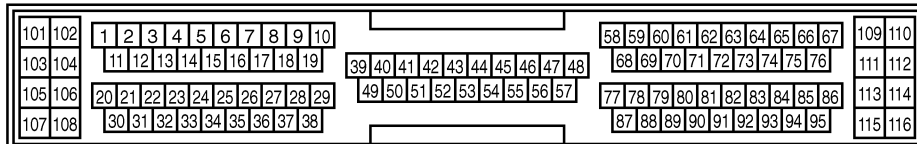
EC-AAC/V-01



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(M5) -FUSE BLOCK-JUNCTION BOX (J/B)



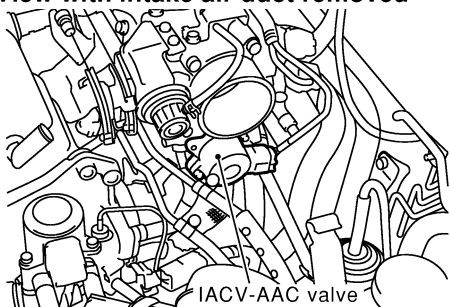
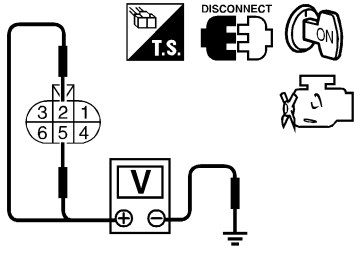
TEC715

# DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

Diagnostic Procedure

## Diagnostic Procedure

NCEC0285

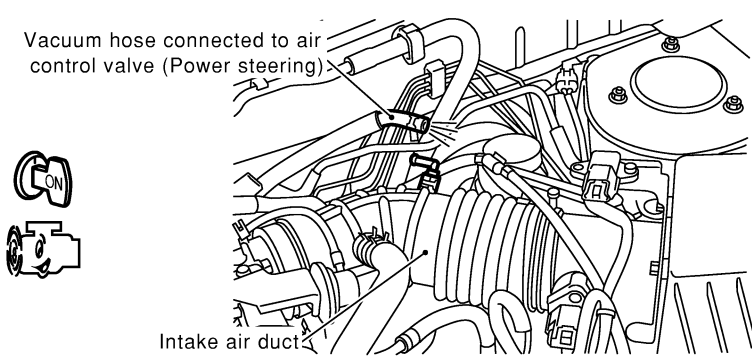
|          |                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                      |
|----------|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | <b>CHECK IACV-AAC VALVE POWER SUPPLY CIRCUIT</b> | <p>1. Stop engine.<br/>2. Disconnect IACV-AAC valve harness connector.</p> <p style="text-align: center;"><b>View with intake air duct removed</b></p>  <p style="text-align: center;">IACV-AAC valve</p> <p>3. Turn ignition switch "ON".<br/>4. Check voltage between IACV-AAC valve terminals 2, 5 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: right;">SEF852X</p> <p style="text-align: center;"><b>OK or NG</b></p> <p style="text-align: right;">SEF343X</p> | <p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p><b>EC</b></p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> |
| OK       | ▶                                                | GO TO 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                      |
| NG       | ▶                                                | GO TO 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                      |

|          |                                   |                                                                                                                                                                                                                                                          |                                                                        |
|----------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>2</b> | <b>DETECT MALFUNCTIONING PART</b> | <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M49, F23</li> <li>● Harness for open or short between IACV-AAC valve and ECM relay</li> </ul> <p style="text-align: center;">▶ Repair harness or connectors.</p> | <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p> |
|----------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|

# DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE


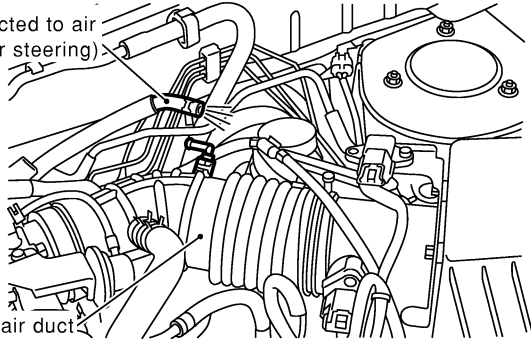
Diagnostic Procedure (Cont'd)

| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>CHECK IACV-AAC VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |                                                                                    |              |                         |   |   |   |   |    |   |    |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------|-------------------------|---|---|---|---|----|---|----|---|
| <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Disconnect ECM harness connector.</li> <li>3. Check harness continuity between ECM terminals and IACV-AAC valve terminals as follows.<br/>Refer to Wiring Diagram.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                      |                                                                                    |              |                         |   |   |   |   |    |   |    |   |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">IACV-AAC valve terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">6</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">7</td> <td style="text-align: center; padding: 5px;">4</td> </tr> <tr> <td style="text-align: center; padding: 5px;">15</td> <td style="text-align: center; padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; padding: 5px;">16</td> <td style="text-align: center; padding: 5px;">6</td> </tr> </tbody> </table> |                                                                      |                                                                                    | ECM terminal | IACV-AAC valve terminal | 6 | 1 | 7 | 4 | 15 | 3 | 16 | 6 |
| ECM terminal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | IACV-AAC valve terminal                                              |                                                                                    |              |                         |   |   |   |   |    |   |    |   |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                                                                    |                                                                                    |              |                         |   |   |   |   |    |   |    |   |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4                                                                    |                                                                                    |              |                         |   |   |   |   |    |   |    |   |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3                                                                    |                                                                                    |              |                         |   |   |   |   |    |   |    |   |
| 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6                                                                    |                                                                                    |              |                         |   |   |   |   |    |   |    |   |
| MTBL0390                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                      |                                                                                    |              |                         |   |   |   |   |    |   |    |   |
| <p style="color: blue; margin: 0;"><b>Continuity should exist.</b></p> <ol style="list-style-type: none"> <li>4. Also check harness for short to ground and short to power.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                      |                                                                                    |              |                         |   |   |   |   |    |   |    |   |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                      |                                                                                    |              |                         |   |   |   |   |    |   |    |   |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶                                                                    | GO TO 4.                                                                           |              |                         |   |   |   |   |    |   |    |   |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶                                                                    | Repair open circuit or short to ground or short to power in harness or connectors. |              |                         |   |   |   |   |    |   |    |   |


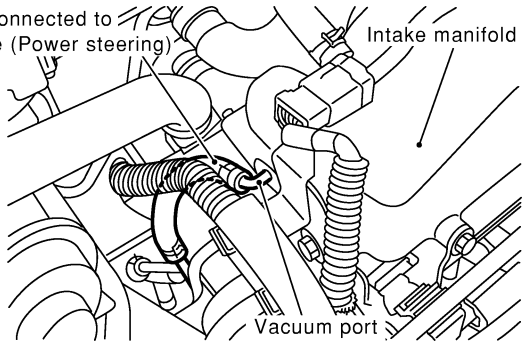
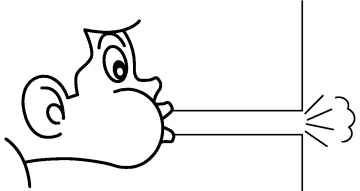
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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                        | <b>CHECK AIR CONTROL VALVE (POWER STEERING) OPERATION-I</b> |                                             |
| <ol style="list-style-type: none"> <li>1. Reconnect ECM harness connector and IACV-AAC valve harness connector.</li> <li>2. Disconnect vacuum hose connected to air control valve (Power steering) at intake air duct.</li> <li>3. Start engine and let it idle.</li> <li>4. Check vacuum hose for vacuum existence.</li> </ol> |                                                             |                                             |
|                                                                                                                                                                                                                                              |                                                             |                                             |
| SEF969X                                                                                                                                                                                                                                                                                                                         |                                                             |                                             |
| <p style="color: blue; margin: 0;"><b>Vacuum slightly exists or does not exist.</b></p>                                                                                                                                                                                                                                         |                                                             |                                             |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                 |                                                             |                                             |
| OK                                                                                                                                                                                                                                                                                                                              | ▶                                                           | GO TO 5.                                    |
| NG                                                                                                                                                                                                                                                                                                                              | ▶                                                           | Replace air control valve (Power steering). |

# DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                              |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------|
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK AIR CONTROL VALVE (POWER STEERING) OPERATION-II</b> |          |
| <p>Check vacuum hose for vacuum existence when steering wheel is turned.</p> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 20%;">  </div> <div style="width: 50%; text-align: center;">  <p>Vacuum hose connected to air control valve (Power steering)</p> <p>Intake air duct</p> </div> <div style="width: 20%; text-align: right;"> <p>SEF969X</p> </div> </div> <p><b>Vacuum should exist.</b></p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                              |          |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                                                            | GO TO 8. |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                                                            | GO TO 6. |

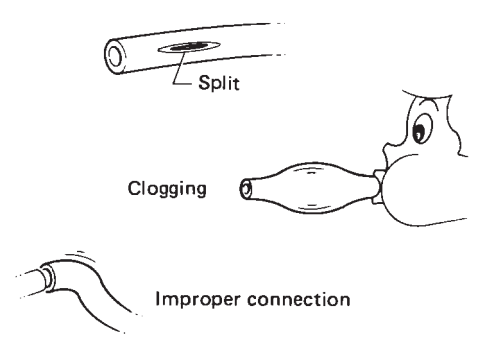
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MA  
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------------|
| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>CHECK VACUUM PORT</b> |                              |
| <ol style="list-style-type: none"> <li>1. Stop engine.</li> <li>2. Disconnect vacuum hose connected to air control valve (Power steering) at the vacuum port.</li> <li>3. Blow air into vacuum port.</li> <li>4. Check that air flows freely.</li> </ol> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 20%;">  </div> <div style="width: 50%; text-align: center;">  <p>Vacuum hose connected to air control valve (Power steering)</p> <p>Intake manifold collector</p> <p>Vacuum port</p> </div> <div style="width: 20%; text-align: center;">  <p>Intake manifold</p> <p>SEF970X</p> </div> </div> <p style="text-align: center;"><b>OK or NG</b></p> |                          |                              |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ▶                        | GO TO 7.                     |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ▶                        | Repair or clean vacuum port. |

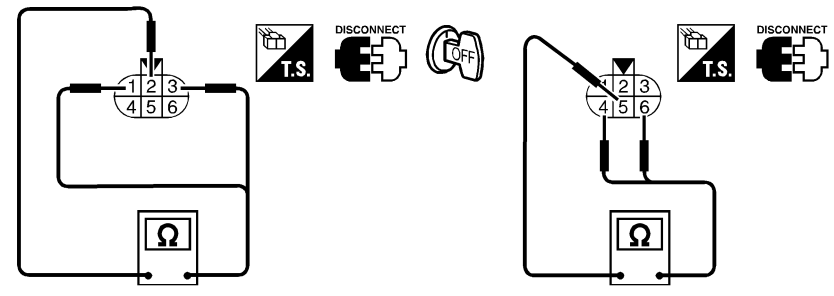
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# DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

Diagnostic Procedure (Cont'd)

|          |                                     |                                                                                                                                                                                                                                                       |  |
|----------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>7</b> | <b>CHECK VACUUM HOSES AND TUBES</b> | <p>1. Disconnect vacuum hoses between air control valve (Power steering) and vacuum port, air control valve (Power steering) and intake air duct.</p> <p>2. Check the hoses and tubes for cracks, clogging, improper connection or disconnection.</p> |  |
|          |                                     |                                                                                                                                                                     |  |
|          |                                     | <p><b>OK or NG</b></p>                                                                                                                                                                                                                                |  |
| OK       | ▶                                   | GO TO 8.                                                                                                                                                                                                                                              |  |
| NG       | ▶                                   | Repair hoses or tubes.                                                                                                                                                                                                                                |  |

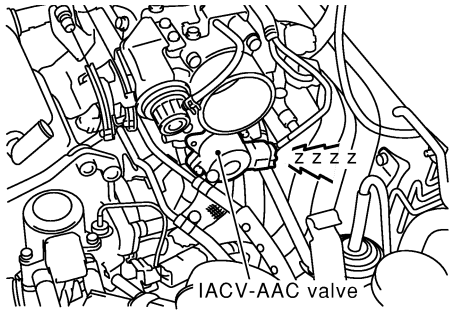
SEF109L

|          |                               |                                                                                                                                                                        |  |
|----------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>8</b> | <b>CHECK IACV-AAC VALVE-I</b> | <p>1. Disconnect IACV-AAC valve harness connector.</p> <p>2. Check resistance between IACV-AAC valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p> |  |
|          |                               |                                                                                     |  |
|          |                               | <p><b>Resistance:</b><br/>20 - 24 Ω [at 20°C (68°F)]</p>                                                                                                               |  |
|          |                               | <p><b>OK or NG</b></p>                                                                                                                                                 |  |
| OK       | ▶                             | GO TO 9.                                                                                                                                                               |  |
| NG       | ▶                             | GO TO 10.                                                                                                                                                              |  |

SEF214Z

# DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                            |                                |           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------|
| <b>9</b>                                                                                                                                                                                                                                                                   | <b>CHECK IACV-AAC VALVE-II</b> |           |
| <ol style="list-style-type: none"> <li>1. Reconnect IACV-AAC valve harness connector and ECM harness connector.</li> <li>2. Turn ignition switch "ON" and "OFF", and ensure the IACV-AAC valve makes operating sound according to the ignition switch position.</li> </ol> |                                |           |
| <p><b>View with intake air duct removed</b></p>                                                                                                                                          |                                |           |
| SEF853X                                                                                                                                                                                                                                                                    |                                |           |
| <b>OK or NG</b>                                                                                                                                                                                                                                                            |                                |           |
| OK                                                                                                                                                                                                                                                                         | ▶                              | GO TO 11. |
| NG                                                                                                                                                                                                                                                                         | ▶                              | GO TO 10. |

GI

MA

EM

LC

**EC**

FE

CL

|                                                                                                                                                                                                               |                               |                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------|
| <b>10</b>                                                                                                                                                                                                     | <b>REPLACE IACV-AAC VALVE</b> |                                                        |
| <ol style="list-style-type: none"> <li>1. Replace IACV-AAC valve assembly.</li> <li>2. Perform "Idle Air Volume Learning", EC-65.</li> </ol> <p style="color: blue;"><b>Is the result CMPLT or INCMP?</b></p> |                               |                                                        |
| <b>CMPLT or INCMP</b>                                                                                                                                                                                         |                               |                                                        |
| CMPLT                                                                                                                                                                                                         | ▶                             | <b>INSPECTION END</b>                                  |
| INCMP                                                                                                                                                                                                         | ▶                             | Follow the construction of "Idle Air Volume Learning". |

MT

AT

AX

SU

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                |                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------|
| <b>11</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>CHECK TARGET IDLE SPEED</b> |                                            |
| <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Reconnect all harness connectors and vacuum hoses.</li> <li>3. Start engine and warm it up to normal operating temperature.</li> <li>4. Also warm up transmission to normal operating temperature. <ul style="list-style-type: none"> <li>● For A/T models with CONSULT-II, drive vehicle until "FLUID TEMP SE" in "DATA MONITOR" mode of "A/T" system indicates less than 0.9V.</li> <li>● For A/T models without CONSULT-II and M/T models, drive vehicle for 10 minutes.</li> </ul> </li> <li>5. Stop vehicle with engine running.</li> <li>6. Check target idle speed. <ul style="list-style-type: none"> <li><b>M/T: 800±50 rpm</b></li> <li><b>A/T: 800±50 rpm (in "P" or "N" position)</b></li> </ul> </li> </ol> |                                |                                            |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                |                                            |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶                              | GO TO 12.                                  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶                              | Perform "Idle Air Volume Learning", EC-65. |

BR

ST

RS

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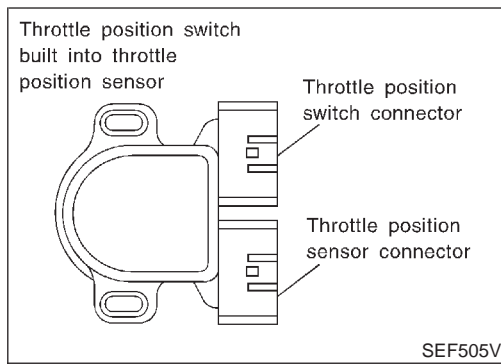
|                                                                 |                                    |  |
|-----------------------------------------------------------------|------------------------------------|--|
| <b>12</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |  |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |  |
| <b>INSPECTION END</b>                                           |                                    |  |

EL

IDX

# DTC P0510 CLOSED THROTTLE POSITION SWITCH

## Component Description



## Component Description

NCEC0287

A closed throttle position switch and wide open throttle position switch are built into the throttle position sensor unit. The wide open throttle position switch is used only for A/T control. When the throttle valve is in the closed position, the closed throttle position switch sends a voltage signal to the ECM. The ECM only uses this signal to open or close the EVAP canister purge volume control solenoid valve when the throttle position sensor is malfunctioning.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0655

Specification data are reference values.

| MONITOR ITEM  | CONDITION                                                                                   | SPECIFICATION                 |
|---------------|---------------------------------------------------------------------------------------------|-------------------------------|
| CLSD THL/P SW | <ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> </ul> | Throttle valve: Idle position |
|               |                                                                                             | Throttle valve: Slightly open |

## ECM Terminals and Reference Value

NCEC0288

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-NAL NO. | WIRE COLOR | ITEM                                       | CONDITION                                                                                                                          | DATA (DC Voltage)          |
|---------------|------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 40            | Y          | Throttle position switch (Closed position) | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Accelerator pedal released</li> </ul> | BATTERY VOLTAGE (11 - 14V) |
|               |            |                                            | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Accelerator pedal depressed</li> </ul>                           | Approximately 0V           |

## On Board Diagnosis Logic

NCEC0289

| DTC No. | Malfunction is detected when ...                                                                                                                          | Check Items (Possible Cause)                                                                                                                                                                                 |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0510   | <ul style="list-style-type: none"> <li>Battery voltage from the closed throttle position switch is sent to ECM with the throttle valve opened.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors (The closed throttle position switch circuit is shorted.)</li> <li>Closed throttle position switch</li> <li>Throttle position sensor</li> </ul> |



# DTC P0510 CLOSED THROTTLE POSITION SWITCH

DTC Confirmation Procedure

NCEC0290

|          |                     |         |
|----------|---------------------|---------|
| <b>4</b> | <b>DATA MONITOR</b> |         |
|          | MONITOR             | NO DTC  |
|          | ENG SPEED           | XXX rpm |
|          | COOLAN TEMP/S       | XXX °C  |
|          | CLSD THL/P SW       | ON      |

SEF197Y

|          |                     |          |
|----------|---------------------|----------|
| <b>6</b> | <b>DATA MONITOR</b> |          |
|          | MONITOR             | NO DTC   |
|          | COOLAN TEMP/S       | XXX °C   |
|          | VHCL SPEED SE       | XXX km/h |
|          | THRTL POS SEN       | XXX V    |

SEF198Y

## DTC Confirmation Procedure

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF", wait at least 10 seconds and then start engine.
- 3) Select "CLSD THL/P SW" in "DATA MONITOR" mode.
- 4) Check the signal under the following conditions.

| Condition                     | Signal indication |
|-------------------------------|-------------------|
| Throttle valve: Idle position | ON                |
| Throttle valve: Slightly open | OFF               |

If the result is NG, go to "Diagnostic Procedure", EC-435.  
If OK, go to following step.

- 5) Select "DATA MONITOR" mode with CONSULT-II.
- 6) Drive the vehicle for at least 5 consecutive seconds under the following condition.

|                  |                                                                                                                  |
|------------------|------------------------------------------------------------------------------------------------------------------|
| THRTL POS SEN    | More than 2.3V                                                                                                   |
| VHCL SPEED SE    | More than 4 km/h (2 MPH)                                                                                         |
| Selector lever   | Suitable position                                                                                                |
| Driving location | Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test. |

- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-435.

## Overall Function Check

NCEC0291

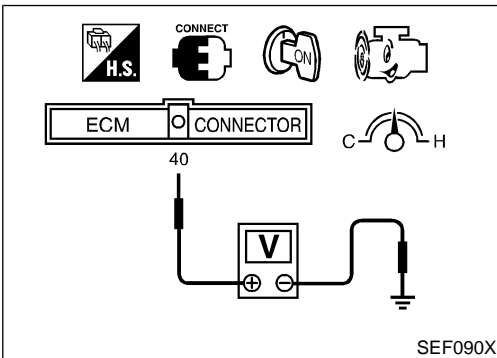
Use this procedure to check the overall function of the closed throttle position switch circuit. During this check, a 1st trip DTC might not be confirmed.

### ⓧ Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check the voltage between ECM terminal 40 (Closed throttle position switch signal) and ground under the following conditions.

| Condition    | Voltage          |
|--------------|------------------|
| At idle      | Battery voltage  |
| At 2,000 rpm | Approximately 0V |

- 3) If NG, go to "Diagnostic Procedure", EC-435.



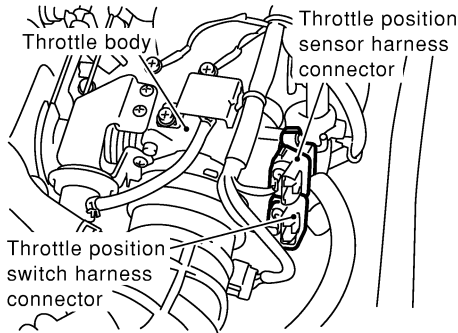
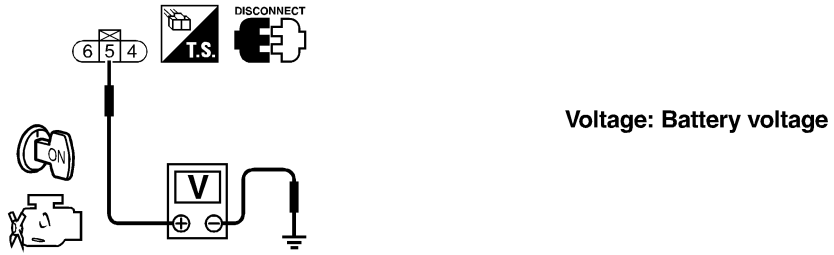


# DTC P0510 CLOSED THROTTLE POSITION SWITCH

Diagnostic Procedure

## Diagnostic Procedure

NCEC0293

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                   |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>CHECK CLOSED THROTTLE POSITION SWITCH POWER SUPPLY CIRCUIT</b> |          |
| <p>1. Turn ignition switch "OFF".<br/>2. Disconnect throttle position switch harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON".<br/>4. Check voltage between throttle position switch terminal 5 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF837X</p> <p style="text-align: right;">SEF346X</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                   |          |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ▶                                                                 | GO TO 3. |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ▶                                                                 | GO TO 2. |

|                                                                                                                                                                                                                                                                                  |                                   |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--|
| <b>2</b>                                                                                                                                                                                                                                                                         | <b>DETECT MALFUNCTIONING PART</b> |  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M62, F24</li> <li>● 10A fuse</li> <li>● Harness for open or short between throttle position switch and fuse</li> </ul> <p style="text-align: right;">▶ Repair harness or connectors.</p> |                                   |  |

|                                                                                                                                                                                                                                                                                                                                                                       |                                                                                      |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                              | <b>CHECK CLOSED THROTTLE POSITION SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |          |
| <p>1. Turn ignition switch "OFF".<br/>2. Disconnect ECM harness connector.<br/>3. Check harness continuity between ECM terminal 40 and throttle position switch terminal 4.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b><br/>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                      |          |
| OK                                                                                                                                                                                                                                                                                                                                                                    | ▶                                                                                    | GO TO 5. |
| NG                                                                                                                                                                                                                                                                                                                                                                    | ▶                                                                                    | GO TO 4. |


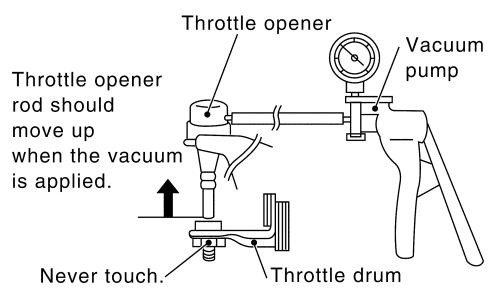
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# DTC P0510 CLOSED THROTTLE POSITION SWITCH

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                |                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                       | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness for open or short between ECM and throttle position switch</li> <li>● Harness for open or short between throttle position switch and TCM (Transmission control module)</li> </ul> |                                                                                    |
| ▶                                                                                                                                                                                                                                                              | Repair open circuit or short to ground or short to power in harness or connectors. |

| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK IGNITION TIMING AND ENGINE IDLE SPEED</b>                      |       |                |                 |                                 |            |                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------|----------------|-----------------|---------------------------------|------------|-------------------------------------------------------------------------|
| <p>Check the following items. Refer to "Basic Inspection", EC-107.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Items</th> <th style="text-align: center;">Specifications</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Ignition timing</td> <td style="text-align: center;"><math>15^{\circ} \pm 2^{\circ}</math> BTDC</td> </tr> <tr> <td style="text-align: center;">Idle speed</td> <td style="text-align: center;">M/T: <math>800 \pm 50</math> rpm<br/>A/T: <math>800 \pm 50</math> rpm (in "P" or "N" position)</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL0391</p> |                                                                         | Items | Specifications | Ignition timing | $15^{\circ} \pm 2^{\circ}$ BTDC | Idle speed | M/T: $800 \pm 50$ rpm<br>A/T: $800 \pm 50$ rpm (in "P" or "N" position) |
| Items                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Specifications                                                          |       |                |                 |                                 |            |                                                                         |
| Ignition timing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | $15^{\circ} \pm 2^{\circ}$ BTDC                                         |       |                |                 |                                 |            |                                                                         |
| Idle speed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | M/T: $800 \pm 50$ rpm<br>A/T: $800 \pm 50$ rpm (in "P" or "N" position) |       |                |                 |                                 |            |                                                                         |
| Models with CONSULT-II ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | GO TO 6.                                                                |       |                |                 |                                 |            |                                                                         |
| Models without CONSULT-II ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | GO TO 7.                                                                |       |                |                 |                                 |            |                                                                         |

| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>CHECK THROTTLE POSITION SWITCH</b> |                           |               |                   |    |                                   |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------|---------------|-------------------|----|-----------------------------------|-----|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Start engine and warm it up to normal operating temperature.</li> <li>2. Turn ignition switch "OFF".</li> <li>3. Remove vacuum hose connected to throttle opener.</li> <li>4. Connect suitable vacuum hose to vacuum pump and the throttle opener.</li> <li>5. Apply vacuum [more than <math>-40.0</math> kPa (<math>-300</math> mmHg, <math>-11.81</math> inHg)] until the throttle drum becomes free from the rod of the throttle opener.</li> </ol> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF793W</p> <ol style="list-style-type: none"> <li>6. Turn ignition switch "ON".</li> <li>7. Select "DATA MONITOR" mode with CONSULT-II.</li> <li>8. Check indication of "CLSD THL/P SW" under the following conditions.<br/>Measurement must be made with throttle position switch installed in vehicle.</li> </ol> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Throttle valve conditions</th> <th style="text-align: center;">CLSD THL/P SW</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Completely closed</td> <td style="text-align: center;">ON</td> </tr> <tr> <td style="text-align: center;">Partially open or completely open</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL0355</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                       | Throttle valve conditions | CLSD THL/P SW | Completely closed | ON | Partially open or completely open | OFF |
| Throttle valve conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CLSD THL/P SW                         |                           |               |                   |    |                                   |     |
| Completely closed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ON                                    |                           |               |                   |    |                                   |     |
| Partially open or completely open                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | OFF                                   |                           |               |                   |    |                                   |     |
| OK (With CONSULT-II) ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | GO TO 9.                              |                           |               |                   |    |                                   |     |
| OK (Without CONSULT-II) ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GO TO 10.                             |                           |               |                   |    |                                   |     |
| NG ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | GO TO 8.                              |                           |               |                   |    |                                   |     |

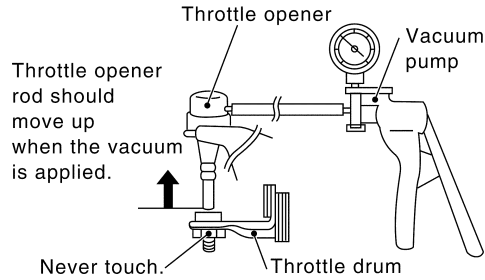
# DTC P0510 CLOSED THROTTLE POSITION SWITCH

Diagnostic Procedure (Cont'd)

## 7 CHECK THROTTLE POSITION SWITCH

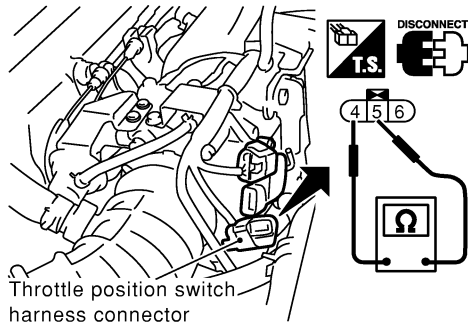
### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Remove vacuum hose connected to throttle opener.
4. Connect suitable vacuum hose to vacuum pump and the throttle opener.
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

6. Disconnect closed throttle position switch harness connector.
7. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions. Resistance measurement must be made with throttle position switch installed in vehicle.



| Throttle valve conditions         | Continuity |
|-----------------------------------|------------|
| Completely closed                 | Yes        |
| Partially open or completely open | No         |

SEF940X

OK or NG

|                         |   |           |
|-------------------------|---|-----------|
| OK (With CONSULT-II)    | ▶ | GO TO 9.  |
| OK (Without CONSULT-II) | ▶ | GO TO 10. |
| NG                      | ▶ | GO TO 8.  |

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# DTC P0510 CLOSED THROTTLE POSITION SWITCH

Diagnostic Procedure (Cont'd)

| <b>8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>ADJUST THROTTLE POSITION SWITCH</b>                                                             |                                   |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------|-------|----------------|-----------------|-------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------|
| Check the following items. Refer to "Basic Inspection", EC-107.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                    |                                   |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Items</th> <th style="width: 50%;">Specifications</th> </tr> </thead> <tbody> <tr> <td>Ignition timing</td> <td>15°±2° BTDC</td> </tr> <tr> <td>Closed throttle position switch idle position adjustment</td> <td>Feeler gauge thickness and switch condition<br/>0.05 mm (0.0020 in): ON<br/>0.15 mm (0.0059 in): OFF</td> </tr> <tr> <td>Target idle speed</td> <td>M/T: 800±50<br/>A/T: 800±50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table> |                                                                                                    |                                   | Items | Specifications | Ignition timing | 15°±2° BTDC | Closed throttle position switch idle position adjustment | Feeler gauge thickness and switch condition<br>0.05 mm (0.0020 in): ON<br>0.15 mm (0.0059 in): OFF | Target idle speed | M/T: 800±50<br>A/T: 800±50 rpm (in "P" or "N" position) |
| Items                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Specifications                                                                                     |                                   |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |
| Ignition timing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 15°±2° BTDC                                                                                        |                                   |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |
| Closed throttle position switch idle position adjustment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Feeler gauge thickness and switch condition<br>0.05 mm (0.0020 in): ON<br>0.15 mm (0.0059 in): OFF |                                   |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |
| Target idle speed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | M/T: 800±50<br>A/T: 800±50 rpm (in "P" or "N" position)                                            |                                   |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |
| MTBL0518                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                    |                                   |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |
| <b>Is it possible to adjust closed throttle position switch?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                    |                                   |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |
| <b>Yes or No</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                    |                                   |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |
| Yes (With CONSULT-II) ►                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                    | GO TO 9.                          |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |
| Yes (Without CONSULT-II) ►                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                    | GO TO 10.                         |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |
| No ►                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                    | Replace throttle position switch. |       |                |                 |             |                                                          |                                                                                                    |                   |                                                         |

| <b>9</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>CHECK THROTTLE POSITION SENSOR</b> |                                   |                           |               |                       |              |                |                     |                     |            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|---------------------------|---------------|-----------------------|--------------|----------------|---------------------|---------------------|------------|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Start engine and warm it up to normal operating temperature.</li> <li>2. Stop engine (ignition switch OFF).</li> <li>3. Remove the vacuum hose connected to the throttle opener.</li> <li>4. Connect suitable vacuum hose to the vacuum pump and the opener.</li> <li>5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.</li> </ol> |                                       |                                   |                           |               |                       |              |                |                     |                     |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                       |                                   |                           |               |                       |              |                |                     |                     |            |
| SEF793W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       |                                   |                           |               |                       |              |                |                     |                     |            |
| <ol style="list-style-type: none"> <li>6. Turn ignition switch ON.</li> <li>7. Select "DATA MONITOR" mode with CONSULT-II.</li> <li>8. Check voltage of "THRTL POS SEN" under the following conditions.</li> </ol> <p><b>Voltage measurement must be made with throttle position sensor installed in vehicle.</b></p>                                                                                                                                                                              |                                       |                                   |                           |               |                       |              |                |                     |                     |            |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Throttle valve conditions</th> <th style="width: 50%;">THRTL POS SEN</th> </tr> </thead> <tbody> <tr> <td>Completely closed (a)</td> <td>0.15 - 0.85V</td> </tr> <tr> <td>Partially open</td> <td>Between (a) and (b)</td> </tr> <tr> <td>Completely open (b)</td> <td>3.5 - 4.7V</td> </tr> </tbody> </table>                                                                             |                                       |                                   | Throttle valve conditions | THRTL POS SEN | Completely closed (a) | 0.15 - 0.85V | Partially open | Between (a) and (b) | Completely open (b) | 3.5 - 4.7V |
| Throttle valve conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | THRTL POS SEN                         |                                   |                           |               |                       |              |                |                     |                     |            |
| Completely closed (a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.15 - 0.85V                          |                                   |                           |               |                       |              |                |                     |                     |            |
| Partially open                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Between (a) and (b)                   |                                   |                           |               |                       |              |                |                     |                     |            |
| Completely open (b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3.5 - 4.7V                            |                                   |                           |               |                       |              |                |                     |                     |            |
| MTBL0230                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                       |                                   |                           |               |                       |              |                |                     |                     |            |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                       |                                   |                           |               |                       |              |                |                     |                     |            |
| OK ►                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       | GO TO 11.                         |                           |               |                       |              |                |                     |                     |            |
| NG ►                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                       | Replace throttle position sensor. |                           |               |                       |              |                |                     |                     |            |

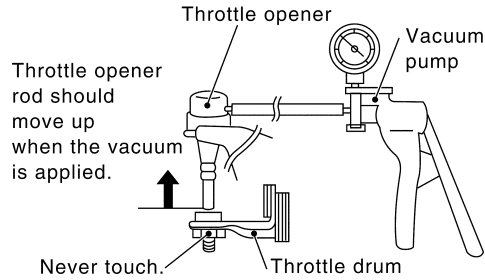
# DTC P0510 CLOSED THROTTLE POSITION SWITCH

Diagnostic Procedure (Cont'd)

## 10 CHECK THROTTLE POSITION SENSOR

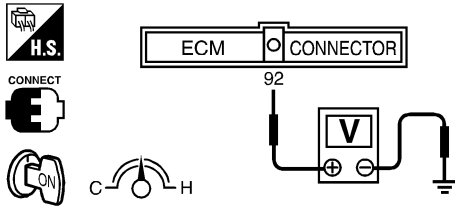
**⊗ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine (ignition switch OFF).
3. Remove the vacuum hose connected to the throttle opener.
4. Connect suitable vacuum hose to the vacuum pump and the opener.
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

6. Turn ignition switch ON.
7. Check voltage between ECM terminal 92 (Throttle position sensor signal) and ground.  
**Voltage measurement must be made with throttle position sensor installed in vehicle.**



| Throttle valve conditions | Voltage             |
|---------------------------|---------------------|
| Completely closed (a)     | 0.15 - 0.85V        |
| Partially open            | Between (a) and (b) |
| Completely open (b)       | 3.5 - 4.7V          |

SEF526Z

**OK or NG**

|    |   |                                   |
|----|---|-----------------------------------|
| OK | ▶ | GO TO 11.                         |
| NG | ▶ | Replace throttle position sensor. |

## 11 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.

▶ **INSPECTION END**

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

# DTC P0600 A/T CONTROL

System Description

## System Description

NCEC0494

These circuit lines are used to control the smooth shifting up and down of A/T during the hard acceleration/deceleration. Voltage signals are exchanged between ECM and TCM (Transmission control module).

## ECM Terminals and Reference Value

NCEC0495

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM             | CONDITION                                  | DATA (DC Voltage)      |
|----------------------|---------------|------------------|--------------------------------------------|------------------------|
| 10                   | Y/B           | A/T signal No. 3 | <b>[Engine is running]</b><br>● Idle speed | 0 - 1.0V               |
| 19                   | BR/W          | A/T signal No. 5 | <b>[Engine is running]</b><br>● Idle speed | Approximately 8V       |
| 54                   | Y/R           | A/T signal No. 1 | <b>[Engine is running]</b><br>● Idle speed | Approximately 0 - 1.0V |
| 55                   | Y/G           | A/T signal No. 2 | <b>[Engine is running]</b><br>● Idle speed | Approximately 0 - 1.0V |
| 56                   | G/Y           | A/T signal No. 4 | <b>[Engine is running]</b><br>● Idle speed | Approximately 0 - 1.0V |

## On Board Diagnosis Logic

NCEC0496

| DTC No. | Malfunction is detected when ...                                                      | Check Items (Possible Cause)                                                                                   |
|---------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| P0600*  | ● ECM receives incorrect voltage from TCM (Transmission control module) continuously. | ● Harness or connectors<br>[The circuit between ECM and TCM (Transmission control module) is open or shorted.] |

\*: This DTC can be detected only by "DATA MONITOR (AUTO TRIG)" with CONSULT-II.

3

| DATA MONITOR |         |
|--------------|---------|
| MONITOR      | NO DTC  |
| ENG SPEED    | XXX rpm |

SEF058Y

## DTC Confirmation Procedure

NCEC0497

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### Ⓛ With CONSULT-II

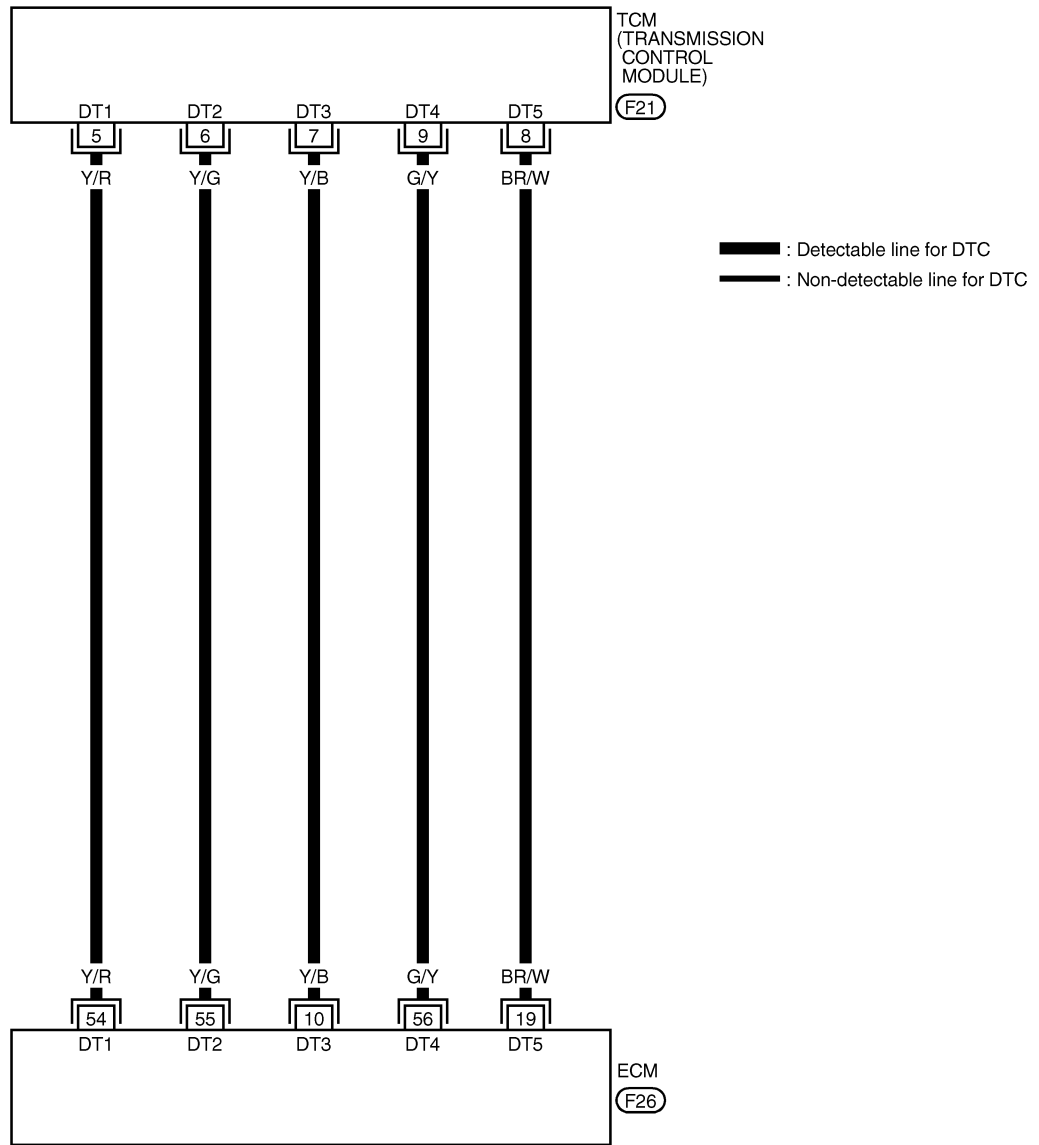
- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 10 seconds.
- 4) If DTC is detected, go to "Diagnostic Procedure", EC-442.



## Wiring Diagram

NCEC0499

EC-AT/C-01 GI



MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

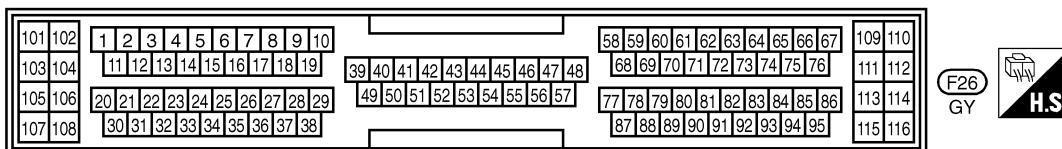
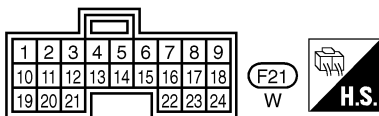
BT

HA

SC

EL

IDX

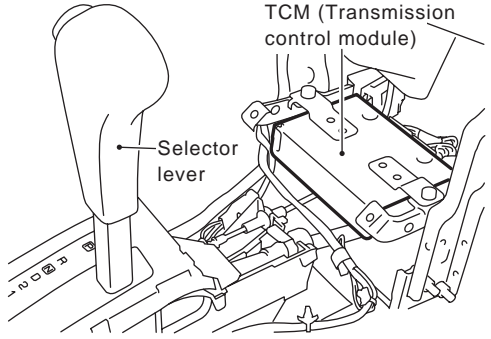


# DTC P0600 A/T CONTROL

Diagnostic Procedure

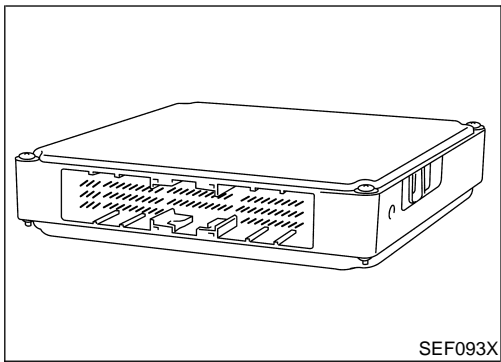
## Diagnostic Procedure

NCEC0500

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK INPUT SIGNAL CIRCUIT</b> |                               |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect ECM harness connector and TCM (Transmission control module) harness connector.</p> <div style="text-align: center;">  <p>The diagram shows a selector lever on the left and a TCM (Transmission control module) harness connector on the right. The TCM is a rectangular component with several electrical connectors. The selector lever is a vertical shaft with a knob on top. The TCM is mounted on a metal plate. The harness connector is a multi-pin connector with a locking mechanism.</p> </div> <p style="text-align: right;">SEF313W</p> <p>3. Check harness continuity between ECM terminal 10 and TCM terminal 7, ECM terminal 19 and TCM terminal 8, ECM terminal 54 and terminal 5, ECM terminal 55 and TCM terminal 6, ECM terminal 56 and TCM terminal 9. Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b></p> <p style="text-align: center;"><b>OK or NG</b></p> |                                   |                               |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                                 | GO TO 2.                      |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                                 | Repair harness or connectors. |

|                                                                                                                                                                                                                                                                                                                                                              |                                   |                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                     | <b>CHECK INPUT SIGNAL CIRCUIT</b> |                                                      |
| <p>1. Check harness continuity between ECM terminal 10 and ground, ECM terminal 19 and ground, ECM terminal 54 and ground, ECM terminal 55 and ground, ECM terminal 56 and ground. Refer to Wiring Diagram.<br/> <b>Continuity should not exist.</b></p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                   |                                                      |
| OK                                                                                                                                                                                                                                                                                                                                                           | ▶                                 | GO TO 3.                                             |
| NG                                                                                                                                                                                                                                                                                                                                                           | ▶                                 | Repair short to ground or short to power in harness. |

|                                                                 |                                    |                       |
|-----------------------------------------------------------------|------------------------------------|-----------------------|
| <b>3</b>                                                        | <b>CHECK INTERMITTENT INCIDENT</b> |                       |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                       |
|                                                                 | ▶                                  | <b>INSPECTION END</b> |



**Component Description**

NCEC0295

The ECM consists of a microcomputer and connector for signal input and output and for power supply. The ECM controls the engine.

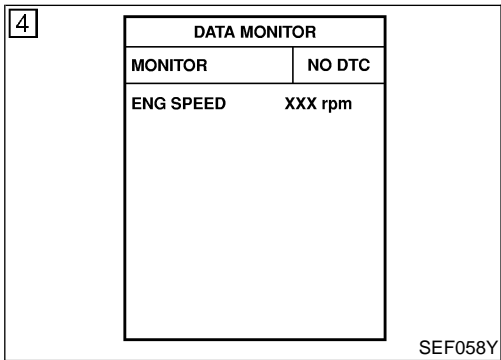
GI  
MA  
EM  
LC

**On Board Diagnosis Logic**

NCEC0296

| DTC No. | Malfunction is detected when ...                                                              | Check Items (Possible Cause)                          |
|---------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------|
| P0605   | <ul style="list-style-type: none"> <li>ECM calculation function is malfunctioning.</li> </ul> | <ul style="list-style-type: none"> <li>ECM</li> </ul> |

EC  
FE



**DTC Confirmation Procedure**

NCEC0297

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

AT  
AX  
SU  
BR  
ST

**Ⓜ With CONSULT-II**

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine.
- 4) Run engine for at least 30 seconds at idle speed.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-444.

**Ⓜ With GST**

Follow the procedure "With CONSULT-II" above.



RS  
BT  
HA  
SC  
EL  
IDX

# DTC P0605 ECM

Diagnostic Procedure

## Diagnostic Procedure

NCEC0298

|                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                         | <b>INSPECTION START</b> |                       |
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "ON".</li> <li>2. Select "SELF DIAG RESULTS" mode with CONSULT-II.</li> <li>3. Touch "ERASE".</li> <li>4. Perform "DTC Confirmation Procedure".<br/>See EC-443.</li> <li>5. Is the 1st trip DTC P0605 displayed again?</li> </ol> |                         |                       |
| <p> <b>With GST</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "ON".</li> <li>2. Select MODE 4 with GST.</li> <li>3. Touch "ERASE".</li> <li>4. Perform "DTC Confirmation Procedure".<br/>See EC-443.</li> <li>5. Is the 1st trip DTC P0605 displayed again?</li> </ol>                                 |                         |                       |
| <b>Yes or No</b>                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                       |
| Yes                                                                                                                                                                                                                                                                                                                                                                                                              | ▶                       | GO TO 2.              |
| No                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                       | <b>INSPECTION END</b> |

|                                                                                                                                                                                                                                                                                                                                                       |                    |                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                                                                                                              | <b>REPLACE ECM</b> |                                                        |
| <ol style="list-style-type: none"> <li>1. Replace ECM.</li> <li>2. Perform initialization of IVIS (NATS) system and registration of all IVIS (NATS) ignition key IDs. Refer to "IVIS (INFINITI VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-81.</li> <li>3. Perform "Idle Air Volume Learning", EC-65.<br/><b>Is the result CMPLT or INCMP?</b></li> </ol> |                    |                                                        |
| <b>CMPLT or INCMP</b>                                                                                                                                                                                                                                                                                                                                 |                    |                                                        |
| CMPLT                                                                                                                                                                                                                                                                                                                                                 | ▶                  | <b>INSPECTION END</b>                                  |
| INCMP                                                                                                                                                                                                                                                                                                                                                 | ▶                  | Follow the construction of "Idle Air Volume Learning". |

## On Board Diagnosis Logic

NCEC0568

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough. This is due to a leak in the seal or the thermostat open stuck. Malfunction is detected when the engine coolant temperature does not reach to specified temperature even though the engine has run long enough.

GI

MA

EM

LC

## Possible Cause

NCEC0569

- Thermostat function
- Leakage from sealing portion of thermostat
- Engine coolant temperature sensor

EC

FE

CL

MT

## DTC Confirmation Procedure

NCEC0570

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

AT

AX

### TESTING CONDITION:

- For best results, perform at ambient temperature of  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) or higher.
- For best results, perform at engine coolant temperature of  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) to  $60^{\circ}\text{C}$  ( $140^{\circ}\text{F}$ ).

SU

BR

### Ⓜ WITH CONSULT-II

NCEC0570S01

- 1) Replace thermostat with new one. Refer to LC-12, "Thermostat". Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on.
- 2) Turn ignition switch "ON".
- 3) Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
- 4) Check that the "COOLAN TEMP/S" is above  $60^{\circ}\text{C}$  ( $140^{\circ}\text{F}$ ).  
If it is below  $60^{\circ}\text{C}$  ( $140^{\circ}\text{F}$ ), go to following step.  
If it is above  $60^{\circ}\text{C}$  ( $140^{\circ}\text{F}$ ), stop engine and cool down the engine to less than  $60^{\circ}\text{C}$  ( $140^{\circ}\text{F}$ ), then retry from step 1.
- 5) Drive vehicle for 10 consecutive minutes under the following conditions.

ST

RS

BT

HA

SC

|               |                             |
|---------------|-----------------------------|
| VHCL SPEED SE | 80 - 120 km/h (50 - 75 MPH) |
|---------------|-----------------------------|

If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-446.

EL

### Ⓜ WITH GST

NCEC0570S02

- 1) Follow the procedure "WITH CONSULT-II" above.

IDX

# DTC P1126 THERMOSTAT FUNCTION

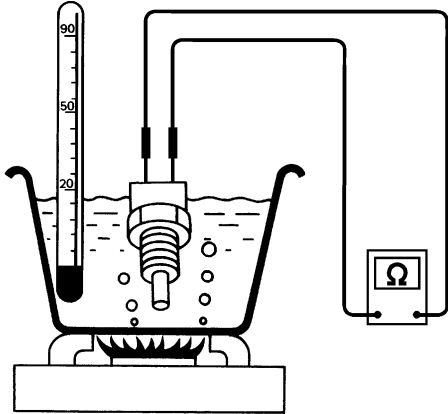
Diagnostic Procedure

## Diagnostic Procedure

NCEC0571

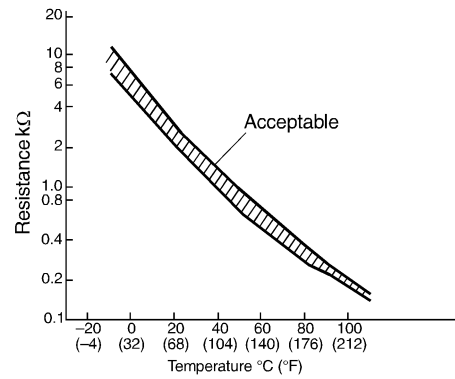
### 1 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Remove engine coolant temperature sensor.
3. Check resistance between engine coolant temperature sensor terminals under the following conditions.



#### <Reference data>

| Temperature °C (°F) | Resistance kΩ |
|---------------------|---------------|
| 20 (68)             | 2.1 - 2.9     |
| 50 (122)            | 0.68 - 1.00   |
| 90 (194)            | 0.236 - 0.260 |



SEF304X

OK or NG

OK



INSPECTION END

NG



Replace engine coolant temperature sensor.

## On Board Diagnosis Logic

NCEC0307

★ The closed loop control has the one trip detection logic.

| DTC No. | Malfunction is detected when ...                                                                                                                             | Check Items (Possible Cause)                                                                                                                                                                            |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P1148   | <ul style="list-style-type: none"> <li>The closed loop control function does not operate even when vehicle is driving in the specified condition.</li> </ul> | <ul style="list-style-type: none"> <li>The heated oxygen sensor 1 (front) circuit is open or shorted.</li> <li>Heated oxygen sensor 1 (front)</li> <li>Heated oxygen sensor 1 heater (front)</li> </ul> |

GI

MA

EM

LC

3

| DATA MONITOR  |          |
|---------------|----------|
| MONITOR       | NO DTC   |
| ENG SPEED     | XXX rpm  |
| B/FUEL SCHDL  | XXX msec |
| COOLAN TEMP/S | XXX °C   |
| HO2S1 (B1)    | XXX V    |
| VHCL SPEED SE | XXX km/h |

SEF682Y

### DTC Confirmation Procedure

NCEC0308

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Never raise engine speed above 3,200 rpm during the “DTC Confirmation Procedure”. If the engine speed limit is exceeded, retry the procedure from step 4.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**Ⓜ With CONSULT-II**

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select “DATA MONITOR” mode with CONSULT-II.
- 3) Hold engine speed at 2,000 rpm and check the following.
  - “HO2S1 (B1)” voltage should go above 0.70V at least once.
  - “HO2S1 (B1)” voltage should go below 0.21V at least once. If the result is NG, perform “Diagnosis Procedure”, EC-448. If the result is OK, perform the following step.
- 4) Let engine idle at least 4 minutes.
- 5) Maintain the following condition at least 50 consecutive seconds.

|                |                            |
|----------------|----------------------------|
| B/FUEL SCHDL   | More than 2.4 msec         |
| ENG SPEED      | More than 1,500 rpm        |
| Selector lever | Suitable position          |
| VHCL SPEED SE  | More than 71 km/h (44 MPH) |

**During this test, P0130 DTC may be displayed on CONSULT-II screen.**

- 6) If DTC is detected, go to “Diagnostic Procedure”, EC-448.

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

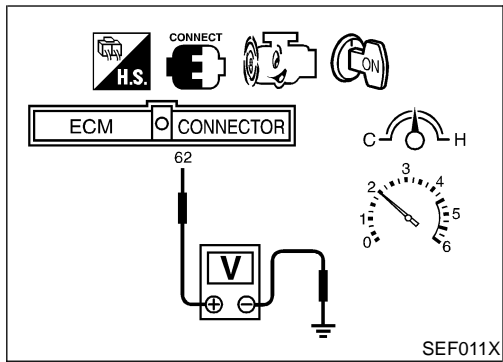
SC

EL

IDX

# DTC P1148 CLOSED LOOP CONTROL

## Overall Function Check



## Overall Function Check

NCEC0309

Use this procedure to check the overall function of the closed loop control. During this check, a DTC might not be confirmed.

### With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
  - The voltage should go above 0.70V at least once.
  - The voltage should go below 0.21V at least once.
- 4) If NG, go to "Diagnostic Procedure", EC-448.

## Diagnostic Procedure

NCEC0310

Refer to "Diagnostic Procedure" for DTC P0133, EC-221.



# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

System Description

## System Description

NCEC0433

NCEC0433S01

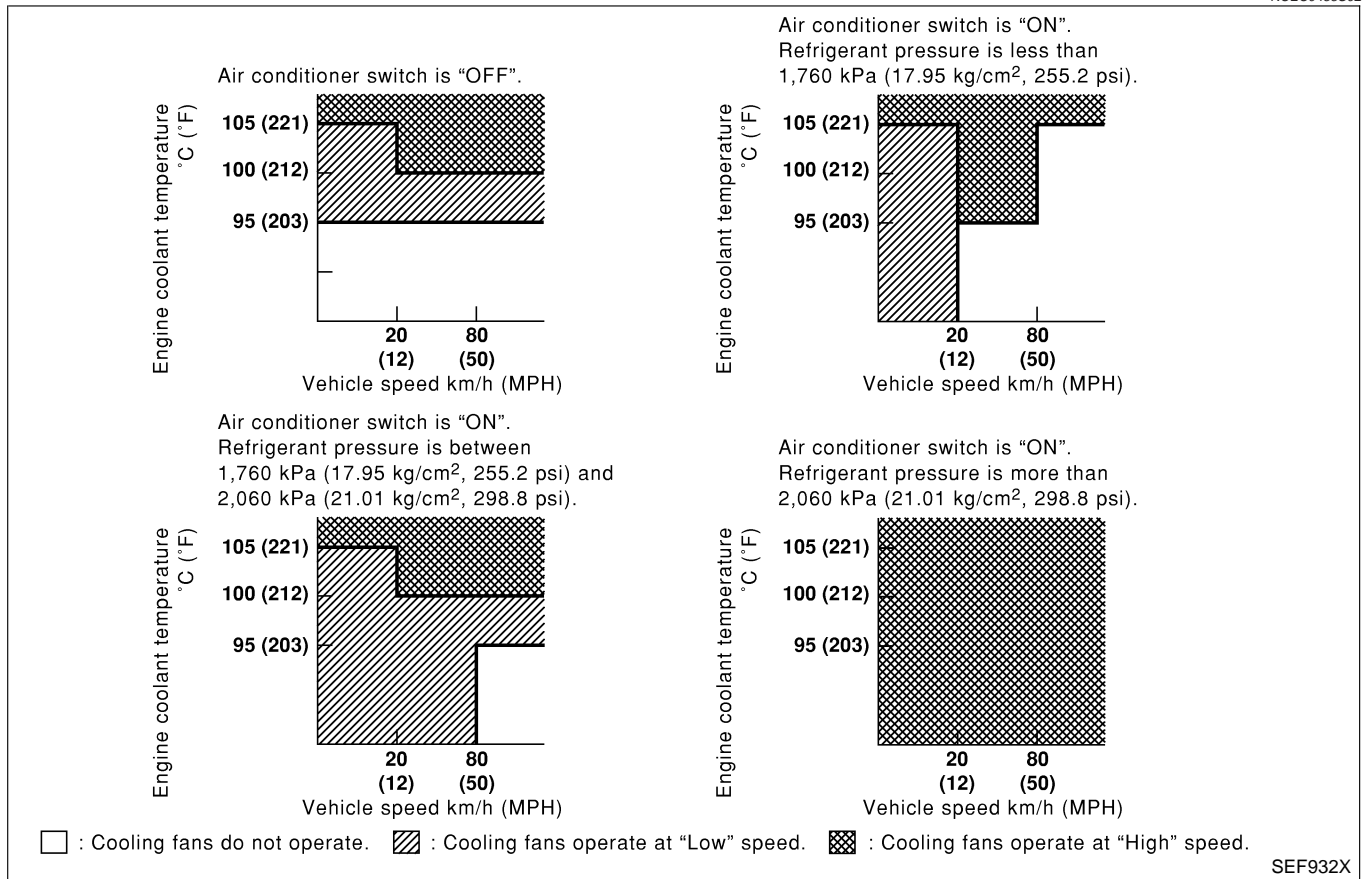
### COOLING FAN CONTROL

| Sensor                            | Input Signal to ECM         | ECM function | Actuator             |
|-----------------------------------|-----------------------------|--------------|----------------------|
| Vehicle speed sensor              | Vehicle speed               | ECM          | Cooling fan relay(s) |
| Engine coolant temperature sensor | Engine coolant temperature  |              |                      |
| Air conditioner switch            | Air conditioner "ON" signal |              |                      |
| Ignition switch                   | Start signal                |              |                      |
| Refrigerant pressure sensor       | Refrigerant pressure        |              |                      |

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

### OPERATION

NCEC0433S02



SEF932X

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0486

Specification data are reference values.

| MONITOR ITEM | CONDITION                                   | SPECIFICATION                                    |
|--------------|---------------------------------------------|--------------------------------------------------|
| AIR COND SIG | • Engine: After warming up, idle the engine | Air conditioner switch: OFF                      |
|              |                                             | Air conditioner switch: ON (Compressor operates) |

# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

| MONITOR ITEM | CONDITION                                                                                                                        |                                                                      | SPECIFICATION |
|--------------|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------|
| COOLING FAN  | <ul style="list-style-type: none"> <li>After warming up engine, idle the engine.</li> <li>Air conditioner switch: OFF</li> </ul> | Engine coolant temperature is 94°C (201°F) or less                   | OFF           |
|              |                                                                                                                                  | Engine coolant temperature is between 95°C (203°F) and 104°C (219°F) | LOW           |
|              |                                                                                                                                  | Engine coolant temperature is 105°C (221°F) or more                  | HIGH          |

## ECM Terminals and Reference Value

NCEC0487

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-NAL NO. | WIRE COLOR | ITEM                     | CONDITION                                                | DATA (DC Voltage)          |
|---------------|------------|--------------------------|----------------------------------------------------------|----------------------------|
| 12            | LG         | Cooling fan relay (High) | [Engine is running]<br>● Cooling fan is not operating    | BATTERY VOLTAGE (11 - 14V) |
|               |            |                          | [Engine is running]<br>● Cooling fan (High) is operating | 0 - 0.6V                   |
| 13            | L/Y        | Cooling fan relay (Low)  | [Engine is running]<br>● Cooling fan is not operating    | BATTERY VOLTAGE (11 - 14V) |
|               |            |                          | [Engine is running]<br>● Cooling fan is operating        | 0 - 0.6V                   |

## On Board Diagnosis Logic

NCEC0488

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

| Diagnostic Trouble Code No. | Malfunction is detected when ...                                                                                                                                                                                                                           | Check Items (Possible Cause)                                                                                                                                                                                                                                                                                                     |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P1217                       | <ul style="list-style-type: none"> <li>Cooling fan does not operate properly (Overheat).</li> <li>Cooling fan system does not operate properly (Overheat).</li> <li>Engine coolant was not added to the system using the proper filling method.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors (The cooling fan circuit is open or shorted.)</li> <li>Cooling fan</li> <li>Radiator hose</li> <li>Radiator</li> <li>Radiator cap</li> <li>Water pump</li> <li>Thermostat</li> </ul> <p>For more information, refer to "MAIN 12 CAUSES OF OVERHEATING", EC-465.</p> |

### CAUTION:

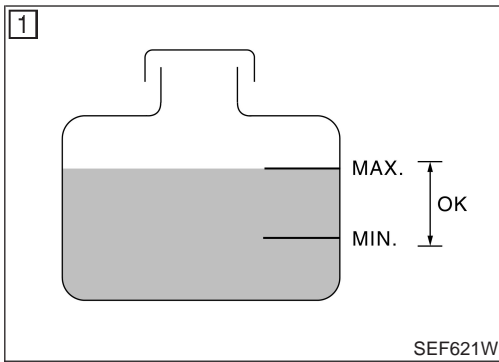
**When a malfunction is indicated, be sure to replace the coolant. Refer to MA-14, "Changing Engine Coolant". Also, replace the engine oil. Refer to MA-18, "Changing Engine Oil".**

- 1) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-12, "Anti-freeze Coolant Mixture Ratio".
- 2) After refilling coolant, run engine to ensure that no water-flow noise is emitted.

# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Overall Function Check

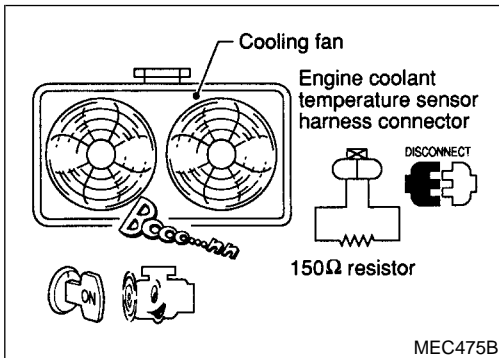
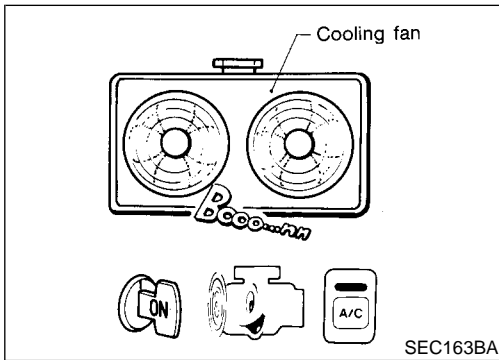
NCEC0489



4

| ACTIVE TEST   |        |
|---------------|--------|
| COOLING FAN   | OFF    |
| MONITOR       |        |
| COOLAN TEMP/S | XXX °C |
|               |        |
|               |        |
|               |        |
|               |        |
|               |        |
|               |        |

SEF111X



## Overall Function Check

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

### WARNING:

**Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.**

**Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.**

### With CONSULT-II

- 1) Check the coolant level in the reservoir tank and radiator.  
**Allow engine to cool before checking coolant level.**  
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to "Diagnostic Procedure", EC-453.
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-453.
- 3) Turn ignition switch "ON".
- 4) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
- 5) If the results are NG, go to "Diagnostic Procedure", EC-453.

### With GST

- 1) Check the coolant level in the reservoir tank and radiator.  
**Allow engine to cool before checking coolant level.**  
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to "Diagnostic Procedure", EC-453.
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-453.
- 3) Start engine.  
**Be careful not to overheat engine.**
- 4) Set temperature control lever to full cold position.
- 5) Turn air conditioner switch "ON".
- 6) Turn blower fan switch "ON".
- 7) Run engine at idle for a few minutes with air conditioner operating.  
**Be careful not to overheat engine.**
- 8) Make sure that cooling fan operates at low speed.  
If NG, go to "Diagnostic Procedure", EC-453.  
If OK, go to the following step.
- 9) Turn ignition switch "OFF".
- 10) Turn air conditioner switch and blower fan switch "OFF".
- 11) Disconnect engine coolant temperature sensor harness connector.
- 12) Connect 150Ω resistor to engine coolant temperature sensor harness connector.
- 13) Restart engine and make sure that cooling fan operates at higher speed than low speed.  
**Be careful not to overheat engine.**
- 14) If NG, go to "Diagnostic Procedure", EC-453.

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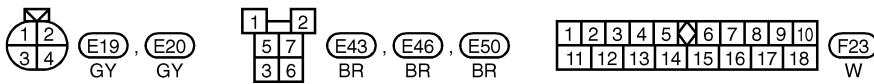
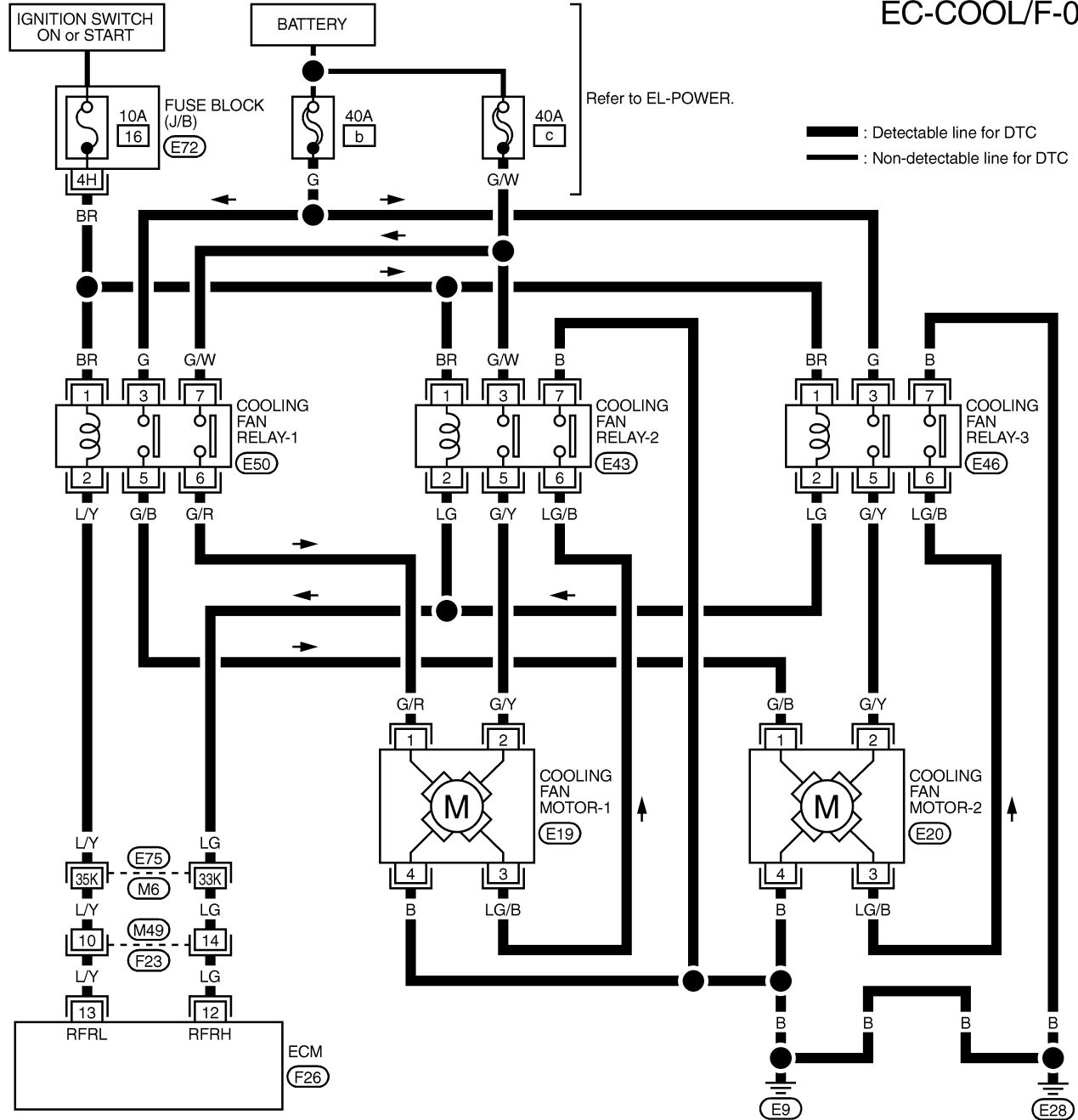
# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Wiring Diagram

## Wiring Diagram

NCEC0490

EC-COOL/F-01



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(E72) -FUSE BLOCK-JUNCTION BOX (J/B)

|     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |     |    |    |    |     |     |     |
|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|----|----|----|-----|-----|-----|
| 101 | 102 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |    |    |    |    | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 109 | 110 |    |    |    |     |     |     |
| 103 | 104 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |    | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 68 | 69 | 70 | 71 | 72  | 73  | 74 | 75 | 76 | 111 | 112 |     |
| 105 | 106 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 |    | 77 | 78 | 79 | 80 | 81  | 82  | 83 | 84 | 85 | 86  | 113 | 114 |
| 107 | 108 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |    |    |    |    |    |    |    |    |    |    |    | 87 | 88 | 89 | 90 | 91  | 92  | 93 | 94 | 95 | 115 | 116 |     |



TEC777

# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)


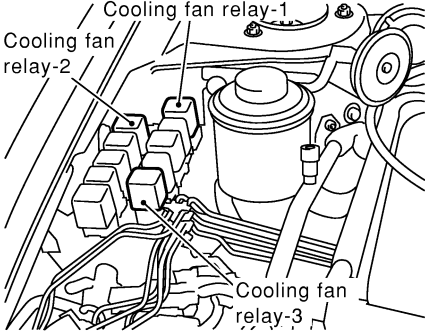
Diagnostic Procedure

## Diagnostic Procedure

NCEC0491

|                         |                         |          |
|-------------------------|-------------------------|----------|
| <b>1</b>                | <b>INSPECTION START</b> |          |
| Do you have CONSULT-II? |                         |          |
| <b>Yes or No</b>        |                         |          |
| Yes                     | ▶                       | GO TO 2. |
| No                      | ▶                       | GO TO 4. |

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EM

| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>CHECK COOLING FAN LOW SPEED OPERATION</b> |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------|-------------|--|-------------|-----|---------|--|---------------|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <p>1. Disconnect cooling fan relays-2 and -3.</p> <div style="text-align: center;">  </div> <p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p> <div style="text-align: center;"> <table border="1"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>LOW</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> </div> <p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p> |                                              |                                                                           | ACTIVE TEST |  | COOLING FAN | LOW | MONITOR |  | COOLAN TEMP/S | XXX °C |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| COOLING FAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | LOW                                          |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| COOLAN TEMP/S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | XXX °C                                       |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |                                                                           |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶                                            | GO TO 3.                                                                  |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶                                            | Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-459.) |             |  |             |     |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (Cont'd)

| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>CHECK COOLING FAN HIGH SPEED OPERATION</b> |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------------|--|-------------|------|---------|--|---------------|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p>Ⓟ <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Reconnect cooling fan relays-2 and -3.</li> <li>3. Disconnect cooling fan relay-1.</li> <li>4. Turn ignition switch "ON".</li> <li>5. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</li> </ol>                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>HIGH</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> |                                               | ACTIVE TEST                                                                |  | COOLING FAN | HIGH | MONITOR |  | COOLAN TEMP/S | XXX °C |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| COOLING FAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | HIGH                                          |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| COOLAN TEMP/S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | XXX °C                                        |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SEF785Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <p>6. Make sure that cooling fans-1 and -2 operate at higher speed than low speed.</p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                                                                                                                                                                                                                                          |                                               |                                                                            |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶                                             | GO TO 6.                                                                   |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶                                             | Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-462.) |  |             |      |         |  |               |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

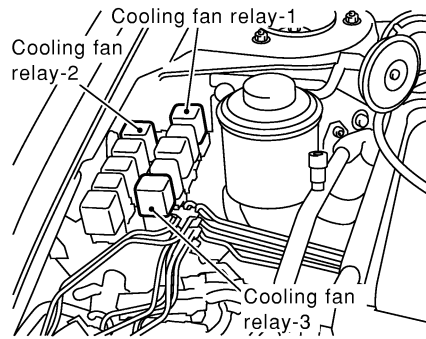
# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (Cont'd)

## 4 CHECK COOLING FAN LOW SPEED OPERATION

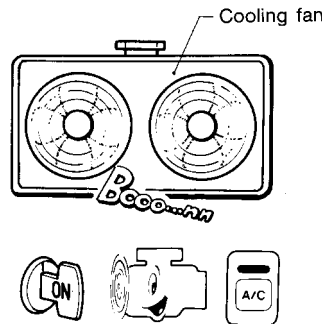
⊗ Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3.



SEF857X

2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fans-1 and -2 operate at low speed.



SEC163BA

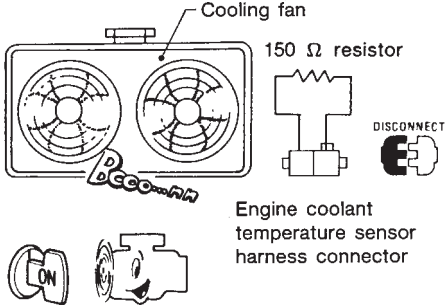
OK or NG

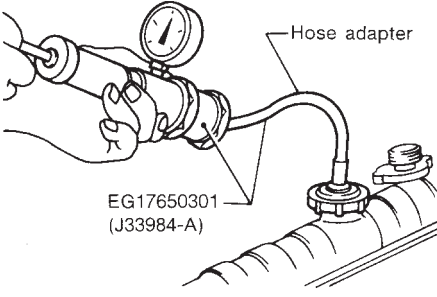
|    |   |                                                                           |
|----|---|---------------------------------------------------------------------------|
| OK | ▶ | GO TO 5.                                                                  |
| NG | ▶ | Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-459.) |

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# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (Cont'd)

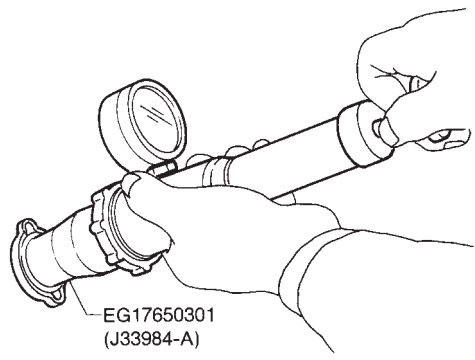
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                               |                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>CHECK COOLING FAN HIGH SPEED OPERATION</b> |                                                                            |
| <p>⊗ <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Reconnect cooling fan relays-2 and -3.</li> <li>3. Disconnect cooling fan relay-1.</li> <li>4. Turn air conditioner switch and blower fan switch "OFF".</li> <li>5. Disconnect engine coolant temperature sensor harness connector.</li> <li>6. Connect 150Ω resistor to engine coolant temperature sensor harness connector.</li> <li>7. Restart engine and make sure that cooling fans-1 and -2 operate at higher speed than low speed.</li> </ol> |                                               |                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                               |                                                                            |
| MEF613EA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                               |                                                                            |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                               |                                                                            |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶                                             | GO TO 6.                                                                   |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶                                             | Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-462.) |

|                                                                                                                                                                                                                                                              |                                      |                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>6</b>                                                                                                                                                                                                                                                     | <b>CHECK COOLING SYSTEM FOR LEAK</b> |                                                                                                                                                                                    |
| <p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p><b>Testing pressure: 157 kPa (1.6 kg/cm<sup>2</sup>, 23 psi)</b></p> <p><b>CAUTION:</b><br/>Higher than the specified pressure may cause radiator damage.</p> |                                      |                                                                                                                                                                                    |
|                                                                                                                                                                          |                                      |                                                                                                                                                                                    |
| SLC754A                                                                                                                                                                                                                                                      |                                      |                                                                                                                                                                                    |
| <b>Pressure should not drop.</b>                                                                                                                                                                                                                             |                                      |                                                                                                                                                                                    |
| <b>OK or NG</b>                                                                                                                                                                                                                                              |                                      |                                                                                                                                                                                    |
| OK                                                                                                                                                                                                                                                           | ▶                                    | GO TO 7.                                                                                                                                                                           |
| NG                                                                                                                                                                                                                                                           | ▶                                    | <p><b>Check the following for leak</b></p> <ul style="list-style-type: none"> <li>● Hose</li> <li>● Radiator</li> <li>● Water pump</li> </ul> <p>Refer to LC-10, "Water Pump".</p> |

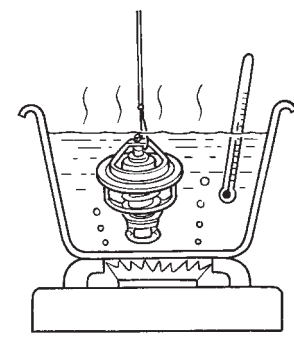


# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                  |                           |                       |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------|--|
| <b>7</b>                                                                                                                                                         | <b>CHECK RADIATOR CAP</b> |                       |  |
| Apply pressure to cap with a tester.                                                                                                                             |                           |                       |  |
|                                                                                |                           |                       |  |
| SLC755A                                                                                                                                                          |                           |                       |  |
| <p><b>Radiator cap relief pressure:</b><br/> <b>59 - 98 kPa (0.6 - 1.0 kg/cm<sup>2</sup>, 9 - 14 psi)</b></p> <p style="text-align: center;"><b>OK or NG</b></p> |                           |                       |  |
| OK                                                                                                                                                               | ▶                         | GO TO 8.              |  |
| NG                                                                                                                                                               | ▶                         | Replace radiator cap. |  |

GI  
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 LC  
**EC**

|                                                                                                                                                                                                                                                                              |                         |                    |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------|--|
| <b>8</b>                                                                                                                                                                                                                                                                     | <b>CHECK THERMOSTAT</b> |                    |  |
| 1. Check valve seating condition at normal room temperatures.<br><b>It should seat tightly.</b><br>2. Check valve opening temperature and valve lift.                                                                                                                        |                         |                    |  |
|                                                                                                                                                                                            |                         |                    |  |
| SLC343                                                                                                                                                                                                                                                                       |                         |                    |  |
| <p><b>Valve opening temperature:</b><br/> <b>82°C (180°F) [standard]</b><br/> <b>Valve lift:</b><br/> <b>More than 8 mm/95°C (0.31 in/203°F)</b></p> 3. Check if valve is closed at 5°C (9°F) below valve opening temperature.<br>For details, refer to LC-12, "Thermostat". |                         |                    |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                              |                         |                    |  |
| OK                                                                                                                                                                                                                                                                           | ▶                       | GO TO 9.           |  |
| NG                                                                                                                                                                                                                                                                           | ▶                       | Replace thermostat |  |

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|                                          |                                                |                                            |  |
|------------------------------------------|------------------------------------------------|--------------------------------------------|--|
| <b>9</b>                                 | <b>CHECK ENGINE COOLANT TEMPERATURE SENSOR</b> |                                            |  |
| Refer to "COMPONENT INSPECTION", EC-195. |                                                |                                            |  |
| <b>OK or NG</b>                          |                                                |                                            |  |
| OK                                       | ▶                                              | GO TO 10.                                  |  |
| NG                                       | ▶                                              | Replace engine coolant temperature sensor. |  |

SC  
 EL  
 IDX

## DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

*Diagnostic Procedure (Cont'd)*

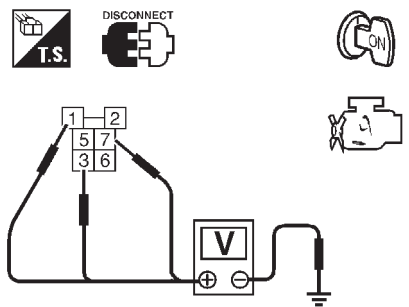
|                                                                                 |                             |
|---------------------------------------------------------------------------------|-----------------------------|
| <b>10</b>                                                                       | <b>CHECK MAIN 12 CAUSES</b> |
| If the cause cannot be isolated, go to "MAIN 12 CAUSES OF OVERHEATING", EC-465. |                             |
| ▶                                                                               | <b>INSPECTION END</b>       |

# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (Cont'd)

## PROCEDURE A

=NCEC0491S01

|                                                                                                                                                                                                                                                                            |                           |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------|
| <b>1</b>                                                                                                                                                                                                                                                                   | <b>CHECK POWER SUPPLY</b> |          |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect cooling fan relay-1.<br/>                 3. Turn ignition switch "ON".<br/>                 4. Check voltage between cooling fan relay-1 terminals 1, 3, 7 and ground with CONSULT-II or tester.</p> |                           |          |
|                                                                                                                                                                                          |                           |          |
|                                                                                                                                                                                                                                                                            |                           | SEF727W  |
| <b>Voltage: Battery voltage</b>                                                                                                                                                                                                                                            |                           |          |
| <b>OK or NG</b>                                                                                                                                                                                                                                                            |                           |          |
| OK                                                                                                                                                                                                                                                                         | ▶                         | GO TO 3. |
| NG                                                                                                                                                                                                                                                                         | ▶                         | GO TO 2. |

|                                                                                                                                                                                                                                                                              |                                   |                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                                     | <b>DETECT MALFUNCTIONING PART</b> |                                                                                      |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● 10A fuse</li> <li>● 40A fusible links</li> <li>● Harness for open or short between cooling fan relay-1 and fuse</li> <li>● Harness for open or short between cooling fan relay-1 and battery</li> </ul> |                                   |                                                                                      |
|                                                                                                                                                                                                                                                                              |                                   | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

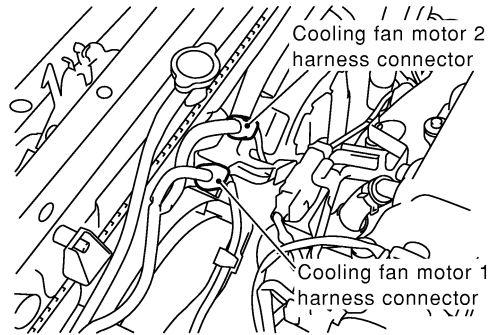
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# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (Cont'd)

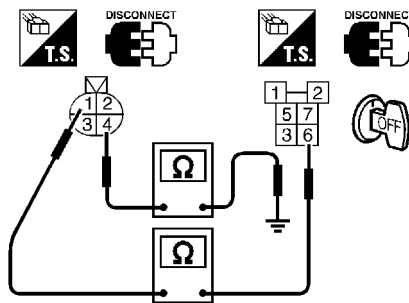
## 3 CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.



SEF854X

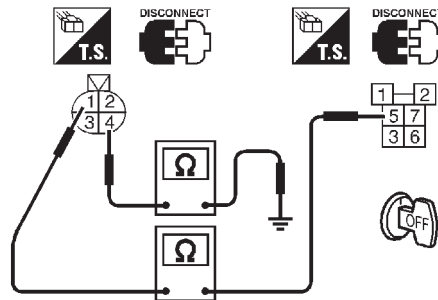
3. Check harness continuity between cooling fan relay-1 terminal 6 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground.



SEF728W

**Continuity should exist.**

4. Also check harness for short to ground and short to power.
5. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground.



SEF729W

**Continuity should exist.**

6. Also check harness for short to ground and short to power.

**OK or NG**

|    |   |                                                                                    |
|----|---|------------------------------------------------------------------------------------|
| OK | ▶ | GO TO 4.                                                                           |
| NG | ▶ | Repair open circuit or short to ground or short to power in harness or connectors. |

# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                       |                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                              | <b>CHECK OUTPUT SIGNAL CIRCUIT</b> |
| 1. Disconnect ECM harness connector.<br>2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2.<br>Refer to Wiring Diagram.<br><b>Continuity should exist.</b><br>3. Also check harness for short to ground and short to power.<br><p style="text-align: center;"><b>OK or NG</b></p> |                                    |
| OK                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 6.                         |
| NG                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 5.                         |

GI  
MA  
EM  
LC

|                                                                                                                                                                                                                        |                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                               | <b>DETECT MALFUNCTIONING PART</b>                                                    |
| Check the following.<br><ul style="list-style-type: none"> <li>● Harness connectors E75, M6</li> <li>● Harness connectors M49, F23</li> <li>● Harness for open or short between cooling fan relay-1 and ECM</li> </ul> |                                                                                      |
|                                                                                                                                                                                                                        | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

**EC**  
FE  
CL

|                                                                                                |                                  |
|------------------------------------------------------------------------------------------------|----------------------------------|
| <b>6</b>                                                                                       | <b>CHECK COOLING FAN RELAY-1</b> |
| Refer to "Component Inspection", EC-465.<br><p style="text-align: center;"><b>OK or NG</b></p> |                                  |
| OK                                                                                             | ▶ GO TO 7.                       |
| NG                                                                                             | ▶ Replace cooling fan relay.     |

MT  
AT

|                                                                                                |                                          |
|------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>7</b>                                                                                       | <b>CHECK COOLING FAN MOTORS-1 AND -2</b> |
| Refer to "Component Inspection", EC-466.<br><p style="text-align: center;"><b>OK or NG</b></p> |                                          |
| OK                                                                                             | ▶ GO TO 8.                               |
| NG                                                                                             | ▶ Replace cooling fan motors.            |

AX  
SU  
BR

|                                                                    |                                    |
|--------------------------------------------------------------------|------------------------------------|
| <b>8</b>                                                           | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.<br> |                                    |
|                                                                    | ▶ <b>INSPECTION END</b>            |

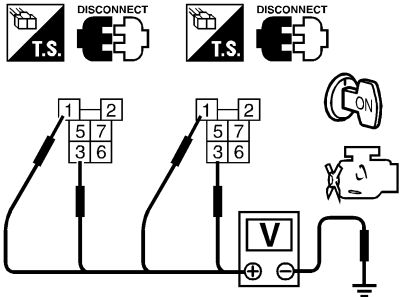
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# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (Cont'd)

## PROCEDURE B

=NCEC0491S02

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>CHECK POWER SUPPLY</b> |
| <p>1. Turn ignition switch "OFF".<br/>2. Disconnect cooling fan relays-2 and -3.<br/>3. Turn ignition switch "ON".<br/>4. Check voltage between cooling fan relays-2 and -3 terminals 1, 3 and ground with CONSULT-II or tester.</p> <div style="display: flex; align-items: center; justify-content: center;"><div style="text-align: center;"><p>Voltage: Battery voltage</p></div><div style="margin-left: 20px;">SEF593X</div></div> <p style="text-align: center;">OK or NG</p> |                           |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 3.                |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 2.                |

|                                                                                                                                                                                                                                               |                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>2</b>                                                                                                                                                                                                                                      | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"><li>● Harness for open or short between cooling fan relays-2 and -3 and fuse</li><li>● Harness for open or short between cooling fan relays-2 and -3 and fusible link</li></ul> |                                   |
| ▶                                                                                                                                                                                                                                             | Repair harness or connectors.     |

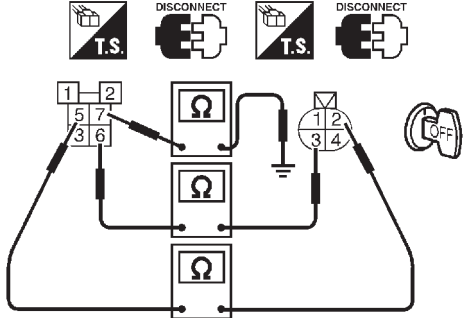
# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (Cont'd)

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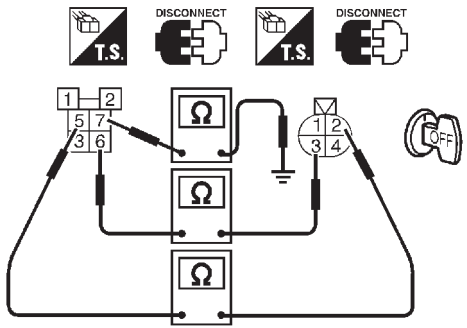
## 3 CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2, cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3, cooling fan relay-2 terminal 7 and body ground.



SEF732W

- Continuity should exist.**
4. Also check harness for short to ground and short to power.
  5. Check harness continuity between cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 2, cooling fan relay-3 terminal 6 and cooling fan motor-2 terminal 3, cooling fan relay-3 terminal 7 and body ground.



SEF732W

6. Also check harness for short to ground and short to power.

OK or NG

|    |   |                                                                                    |
|----|---|------------------------------------------------------------------------------------|
| OK | ▶ | GO TO 4.                                                                           |
| NG | ▶ | Repair open circuit or short to ground or short to power in harness or connectors. |

## 4 CHECK OUTPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 12 and cooling fan relay-2 terminal 2, cooling fan relay-3 terminal 2. Refer to Wiring Diagram.  
**Continuity should exist.**
3. Also check harness for short to ground and short to power.

OK or NG

|    |   |          |
|----|---|----------|
| OK | ▶ | GO TO 6. |
| NG | ▶ | GO TO 5. |

## 5 DETECT MALFUNCTIONING PART

- Check the following.
- Harness connectors E75, M6
  - Harness connectors M49, F23
  - Harness for open or short between cooling fan relays-2 and -3 and ECM

▶ Repair open circuit or short to ground or short to power in harness or connectors.

# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (Cont'd)

|                                          |                                          |
|------------------------------------------|------------------------------------------|
| <b>6</b>                                 | <b>CHECK COOLING FAN RELAYS-2 AND -3</b> |
| Refer to "Component Inspection", EC-465. |                                          |
| <b>OK or NG</b>                          |                                          |
| OK                                       | ▶ GO TO 7.                               |
| NG                                       | ▶ Replace cooling fan relays.            |

|                                          |                                 |
|------------------------------------------|---------------------------------|
| <b>7</b>                                 | <b>CHECK COOLING FAN MOTORS</b> |
| Refer to "Component Inspection", EC-466. |                                 |
| <b>OK or NG</b>                          |                                 |
| OK                                       | ▶ GO TO 8.                      |
| NG                                       | ▶ Replace cooling fan motors.   |

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>8</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
|                                                                | ▶ <b>INSPECTION END</b>            |



# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Main 12 Causes of Overheating

## Main 12 Causes of Overheating

NCEC0492

| Engine | Step | Inspection item                                                                                                                                        | Equipment                                                                                      | Standard                                                           | Reference page                                  |
|--------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------|
| OFF    | 1    | <ul style="list-style-type: none"> <li>Blocked radiator</li> <li>Blocked condenser</li> <li>Blocked radiator grille</li> <li>Blocked bumper</li> </ul> | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | No blocking                                                        | —                                               |
|        | 2    | <ul style="list-style-type: none"> <li>Coolant mixture</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>Coolant tester</li> </ul>                               | 50 - 50% coolant mixture                                           | See MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS". |
|        | 3    | <ul style="list-style-type: none"> <li>Coolant level</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | Coolant up to MAX level in reservoir tank and radiator filler neck | See MA-14, "Changing Engine Coolant".           |
|        | 4    | <ul style="list-style-type: none"> <li>Radiator cap</li> </ul>                                                                                         | <ul style="list-style-type: none"> <li>Pressure tester</li> </ul>                              | 59 - 98 kPa (0.6 - 1.0 kg/cm <sup>2</sup> , 9 - 14 psi) (Limit)    | See LC-9, "System Check".                       |
| ON*2   | 5    | <ul style="list-style-type: none"> <li>Coolant leaks</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | No leaks                                                           | See LC-9, "System Check".                       |
| ON*2   | 6    | <ul style="list-style-type: none"> <li>Thermostat</li> </ul>                                                                                           | <ul style="list-style-type: none"> <li>Touch the upper and lower radiator hoses</li> </ul>     | Both hoses should be hot                                           | See LC-12, "Thermostat", and LC-14, "Radiator". |
| ON*1   | 7    | <ul style="list-style-type: none"> <li>Cooling fan</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li>CONSULT-II</li> </ul>                                   | Operating                                                          | See trouble diagnosis for DTC P1217 (EC-449).   |
| OFF    | 8    | <ul style="list-style-type: none"> <li>Combustion gas leak</li> </ul>                                                                                  | <ul style="list-style-type: none"> <li>Color checker chemical tester 4 Gas analyzer</li> </ul> | Negative                                                           | —                                               |
| ON*3   | 9    | <ul style="list-style-type: none"> <li>Coolant temperature gauge</li> </ul>                                                                            | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | Gauge less than 3/4 when driving                                   | —                                               |
|        |      | <ul style="list-style-type: none"> <li>Coolant overflow to reservoir tank</li> </ul>                                                                   | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | No overflow during driving and idling                              | See MA-14, "Changing Engine Coolant".           |
| OFF*4  | 10   | <ul style="list-style-type: none"> <li>Coolant return from reservoir tank to radiator</li> </ul>                                                       | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | Should be initial level in reservoir tank                          | See MA-13, "ENGINE MAINTENANCE".                |
| OFF    | 11   | <ul style="list-style-type: none"> <li>Cylinder head</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>Straight gauge feeler gauge</li> </ul>                  | 0.1 mm (0.004 in) Maximum distortion (warping)                     | See EM-36, "Inspection".                        |
|        | 12   | <ul style="list-style-type: none"> <li>Cylinder block and pistons</li> </ul>                                                                           | <ul style="list-style-type: none"> <li>Visual</li> </ul>                                       | No scuffing on cylinder walls or piston                            | See EM-59, "Inspection".                        |

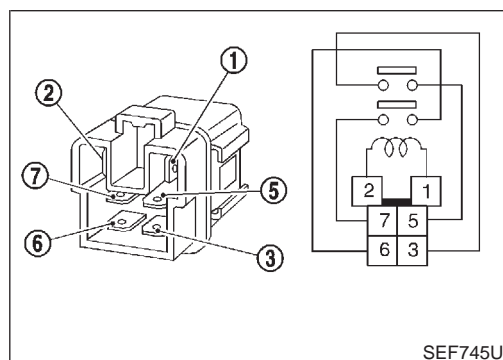
\*1: Turn the ignition switch ON.

\*2: Engine running at 3,000 rpm for 10 minutes.

\*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

\*4: After 60 minutes of cool down time.

For more information, refer to LC-15, "OVERHEATING CAUSE ANALYSIS".



### Component Inspection

#### COOLING FAN RELAYS-1, -2 AND -3

NCEC0493

NCEC0493S01

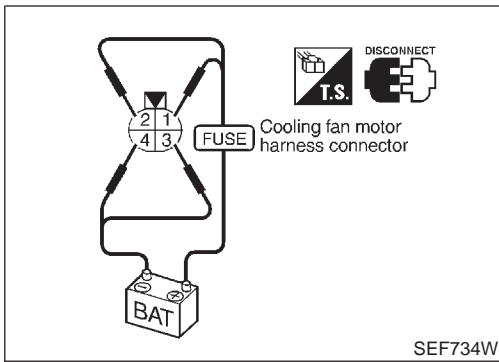
Check continuity between terminals 3 and 5, 6 and 7.

| Conditions                                          | Continuity |
|-----------------------------------------------------|------------|
| 12V direct current supply between terminals 1 and 2 | Yes        |
| No current supply                                   | No         |

If NG, replace relay.

# DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Component Inspection (Cont'd)



## COOLING FAN MOTORS-1 AND -2

NCEC0493S02

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

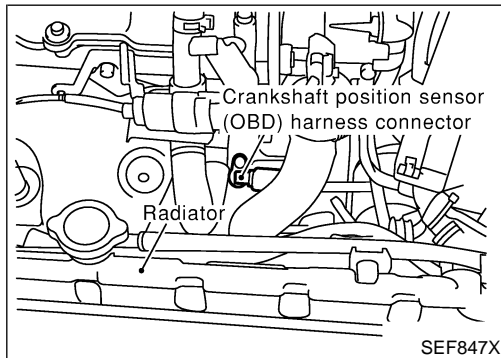
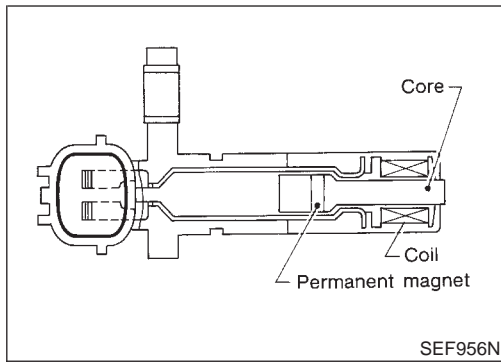
|                   | Speed | Terminals |      |
|-------------------|-------|-----------|------|
|                   |       | (+)       | (-)  |
| Cooling fan motor | Low   | 1         | 4    |
|                   | High  | 1, 2      | 3, 4 |

**Cooling fan motor should operate.**

If NG, replace cooling fan motor.

# DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

Component Description



## Component Description

NCEC0327

The crankshaft position sensor (OBD) is located on the transmission housing facing the gear teeth (cogs) of the flywheel or drive plate. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet, core and coil.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

This sensor is not used to control the engine system.

It is used only for the on board diagnosis.

GI

MA

EM

LC

EC

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## ECM Terminals and Reference Value

NCEC0328

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

AT

AX

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                             | CONDITION                                                  | DATA (AC Voltage)                |
|----------------------|---------------|----------------------------------|------------------------------------------------------------|----------------------------------|
| 58                   | B             | Sensors' ground                  | [Engine is running]<br>● Warm-up condition<br>● Idle speed | Approximately 0V                 |
| 65                   | W             | Crankshaft position sensor (OBD) | [Engine is running]<br>● Warm-up condition<br>● Idle speed | 3 - 5V (AC range)<br><br>SEF721W |
|                      |               |                                  | [Engine is running]<br>● Engine speed is 2,000 rpm         | 6 - 9V (AC range)<br><br>SEF722W |

SU

BR

ST

RS

BT

HA

SC

EL

## On Board Diagnosis Logic

NCEC0329

| DTC No. | Malfunction is detected when ...                                                     | Check Items (Possible Cause)                                                            |
|---------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| P1336   | ● A chipping of the flywheel or drive plate gear tooth (cog) is detected by the ECM. | ● Harness or connectors<br>● Crankshaft position sensor (OBD)<br>● Drive plate/Flywheel |

IDX

# DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

## DTC Confirmation Procedure

2

| DATA MONITOR |         |
|--------------|---------|
| MONITOR      | NO DTC  |
| ENG SPEED    | XXX rpm |

SEF058Y

## DTC Confirmation Procedure

NCEC0330

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 4 minutes at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-470.

### Ⓜ With GST

Follow the procedure "With CONSULT-II" above.



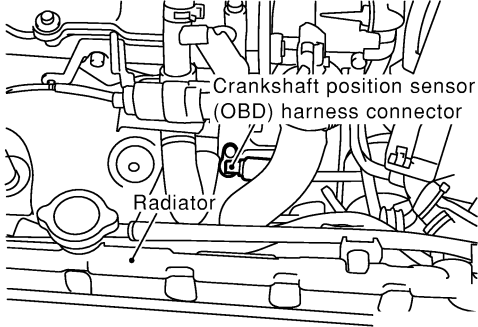
# DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

Diagnostic Procedure

## Diagnostic Procedure

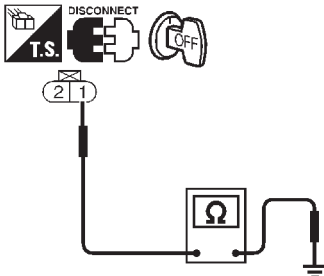
NCEC0332

|                                                                                 |                                |
|---------------------------------------------------------------------------------|--------------------------------|
| <b>1</b>                                                                        | <b>RETIGHTEN GROUND SCREWS</b> |
| 1. Turn ignition switch "OFF".<br>2. Loosen and retighten engine ground screws. |                                |
| ▶                                                                               | GO TO 2.                       |

|                                                                                                                            |                                   |
|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>2</b>                                                                                                                   | <b>CHECK INPUT SIGNAL CIRCUIT</b> |
| 1. Disconnect crankshaft position sensor (OBD) and ECM harness connectors.                                                 |                                   |
|                                          |                                   |
| 2. Check continuity between ECM terminal 65 and terminal 2.<br>Refer to Wiring Diagram.<br><b>Continuity should exist.</b> |                                   |
| 3. Also check harness for short to ground and short to power.                                                              |                                   |
| <b>OK or NG</b>                                                                                                            |                                   |
| OK                                                                                                                         | ▶ GO TO 4.                        |
| NG                                                                                                                         | ▶ GO TO 3.                        |

SEF847X

|                                                                                                                                                                    |                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>3</b>                                                                                                                                                           | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| Check the following.                                                                                                                                               |                                                                                    |
| <ul style="list-style-type: none"><li>● Harness connectors F6, E123</li><li>● Harness for open or short between crankshaft position sensor (OBD) and ECM</li></ul> |                                                                                    |
| ▶                                                                                                                                                                  | Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                                                     |                             |
|-------------------------------------------------------------------------------------|-----------------------------|
| <b>4</b>                                                                            | <b>CHECK GROUND CIRCUIT</b> |
| 1. Reconnect ECM harness connectors.                                                |                             |
| 2. Check harness continuity between CKPS (OBD) terminal 1 and engine ground.        |                             |
|  |                             |
| <b>Continuity should exist.</b>                                                     |                             |
| 3. Also check harness for short to power.                                           |                             |
| <b>OK or NG</b>                                                                     |                             |
| OK                                                                                  | ▶ GO TO 6.                  |
| NG                                                                                  | ▶ GO TO 5.                  |

SEF229W

# DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                |                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                                                                       | <b>DETECT MALFUNCTIONING PART</b> |
| Check the following. <ul style="list-style-type: none"> <li>● Harness connectors F6, E123</li> <li>● Harness for open or short between crankshaft position sensor (OBD) and ECM</li> <li>● Harness for open or short between crankshaft position sensor (OBD) and TCM (Transmission control module)</li> </ul> |                                   |
| ▶ Repair open circuit or short to power in harness or connectors.                                                                                                                                                                                                                                              |                                   |

GI  
MA

|                                                                                                                                                                                                                                                                                          |                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>6</b>                                                                                                                                                                                                                                                                                 | <b>CHECK SHIELD CIRCUIT</b> |
| 1. Disconnect harness connectors F6, E123.<br>2. Check harness continuity between harness connector F6 terminal 8 and engine ground.<br>Refer to Wiring Diagram.<br><b>Continuity should exist</b><br>3. Also check harness for short to power.<br>4. Then reconnect harness connectors. |                             |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                          |                             |
| OK                                                                                                                                                                                                                                                                                       | ▶ GO TO 8.                  |
| NG                                                                                                                                                                                                                                                                                       | ▶ GO TO 7.                  |

EM  
LC  
EC

|                                                                                                                                                                                                                                                            |                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>7</b>                                                                                                                                                                                                                                                   | <b>DETECT MALFUNCTIONING PART</b> |
| Check the following. <ul style="list-style-type: none"> <li>● Harness connectors F6, E123</li> <li>● Joint connector-1 (Refer to EL-314, "HARNESS LAYOUT".)</li> <li>● Harness for open or short between harness connector F6 and engine ground</li> </ul> |                                   |
| ▶ Repair open circuit or short to ground or short to power in harness or connectors.                                                                                                                                                                       |                                   |

FE  
CL

|                                                                                            |                                    |
|--------------------------------------------------------------------------------------------|------------------------------------|
| <b>8</b>                                                                                   | <b>CHECK IMPROPER INSTALLATION</b> |
| Loosen and retighten the fixing bolt of the crankshaft position sensor (OBD). Then retest. |                                    |
| Trouble is not fixed. ▶ GO TO 9.                                                           |                                    |

MT  
AT  
AX

|                                          |                                               |
|------------------------------------------|-----------------------------------------------|
| <b>9</b>                                 | <b>CHECK CRANKSHAFT POSITION SENSOR (OBD)</b> |
| Refer to "Component Inspection", EC-472. |                                               |
| <b>OK or NG</b>                          |                                               |
| OK                                       | ▶ GO TO 10.                                   |
| NG                                       | ▶ Replace crankshaft position sensor (OBD).   |

SU  
BR  
ST

|                                                                       |                                        |
|-----------------------------------------------------------------------|----------------------------------------|
| <b>10</b>                                                             | <b>CHECK GEAR TOOTH</b>                |
| Visually check for chipping flywheel or drive plate gear tooth (cog). |                                        |
| <b>OK or NG</b>                                                       |                                        |
| OK                                                                    | ▶ GO TO 11.                            |
| NG                                                                    | ▶ Replace the flywheel or drive plate. |

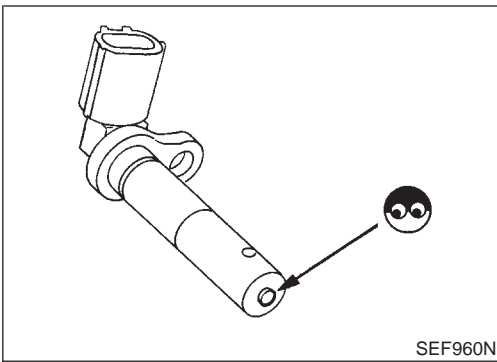
RS  
BT  
HA

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>11</b>                                                      | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
| ▶ <b>INSPECTION END</b>                                        |                                    |

SC  
EL  
IDX

# DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

## Component Inspection



## Component Inspection

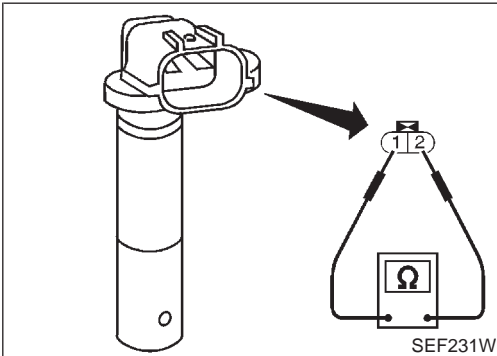
### CRANKSHAFT POSITION SENSOR (OBD)

NCEC0333

NCEC0333S01

1. Disconnect crankshaft position sensor (OBD) harness connector.
2. Loosen the fixing bolt of the sensor.
3. Remove the sensor.
4. Visually check the sensor for chipping.
5. Check resistance as shown in the figure.

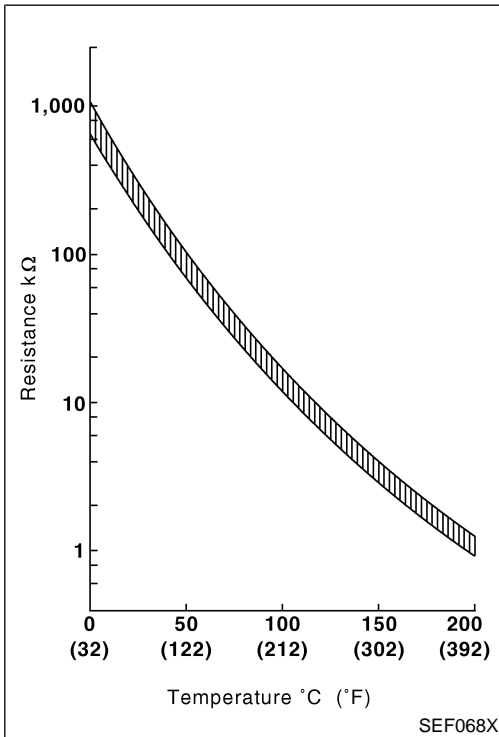
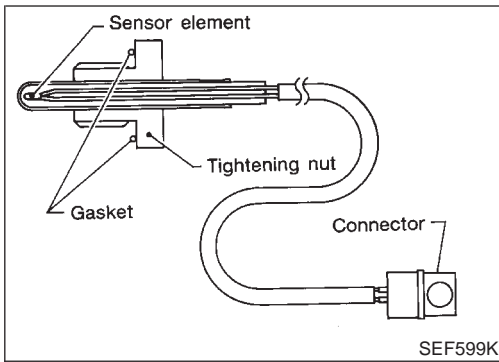
**Resistance: 166 - 204  $\Omega$  [at 20°C (68°F)]**





# DTC P1401 EGR TEMPERATURE SENSOR

Component Description



## Component Description

NCEC0572

The EGR temperature sensor detects temperature changes in the EGR passage way. When the EGR volume control valve opens, hot exhaust gases flow, and the temperature in the passage way changes. The EGR temperature sensor is a thermistor that modifies a voltage signal sent from the ECM. This modified signal then returns to the ECM as an input signal. As the temperature increases, EGR temperature sensor resistance decreases.

This sensor is not directly used to control the engine system. It is used only for the on board diagnosis.

### <Reference data>

| EGR temperature<br>°C (°F) | Voltage*<br>V | Resistance<br>MΩ |
|----------------------------|---------------|------------------|
| 0 (32)                     | 4.56          | 0.73 - 0.89      |
| 50 (122)                   | 2.25          | 0.074 - 0.082    |
| 100 (212)                  | 0.59          | 0.012 - 0.014    |

\*: These data are reference values and are measured between ECM terminal 72 (EGR temperature sensor) and ground.

When EGR system is operating.

Voltage: 0 - 1.5V

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

## On Board Diagnosis Logic

NCEC0573

Malfunction is detected when

**(Malfunction A)** an excessively low voltage from the EGR temperature sensor is sent to ECM even when engine coolant temperature is low.

**(Malfunction B)** an excessively high voltage from the EGR temperature sensor is sent to ECM even when engine coolant temperature is high.

## Possible Cause

NCEC0574

### MALFUNCTION A

NCEC0574S01

- Harness or connectors (The EGR temperature sensor circuit is shorted.)
- EGR temperature sensor
- Malfunction of EGR function

### MALFUNCTION B

NCEC0574S02

- Harness or connectors (The EGR temperature sensor circuit is open.)
- EGR temperature sensor

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

# DTC P1401 EGR TEMPERATURE SENSOR

Possible Cause (Cont'd)

- Malfunction of EGR function

## DTC Confirmation Procedure

Perform "PROCEDURE FOR MALFUNCTION A" first. If 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B".

NCEC0575

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

|   |               |         |
|---|---------------|---------|
| 4 | DATA MONITOR  |         |
|   | MONITOR       | NO DTC  |
|   | ENG SPEED     | XXX rpm |
|   | COOLAN TEMP/S | XXX °C  |

SEF174Y

## PROCEDURE FOR MALFUNCTION A

NCEC0575S01

### With CONSULT-II

NCEC0575S0101

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Verify that "COOLAN TEMP/S" is less than 50°C (122°F).  
**If the engine coolant temperature is above the range, cool the engine down.**
- 4) Start engine and let it idle for at least 8 seconds.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-477.

### With GST

NCEC0575S0102

Follow the procedure "With CONSULT-II" above.

# DTC P1401 EGR TEMPERATURE SENSOR

DTC Confirmation Procedure (Cont'd)

NCEC0575S02

| ACTIVE TEST    |         |
|----------------|---------|
| EGR VOL CONT/V | 50 step |
| MONITOR        |         |
| ENG SPEED      | XXX rpm |
| EGR TEMP SEN   | XXX V   |
|                |         |
|                |         |
|                |         |
|                |         |
|                |         |

SEF200Y

| DATA MONITOR  |          |
|---------------|----------|
| MONITOR       | NO DTC   |
| ENG SPEED     | XXX rpm  |
| COOLAN TEMP/S | XXX °C   |
| VHCL SPEED SE | XXX km/h |
| THRTL POS SEN | XXX V    |
| B/FUEL SCHDL  | XXX msec |

SEF201Y

## PROCEDURE FOR MALFUNCTION B

### CAUTION:

Always drive vehicle at a safe speed.

### TESTING CONDITION:

Always perform the test at a temperature above  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ).

#### With CONSULT-II

NCEC0575S0201

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
- 3) Hold engine speed at 1,500 rpm.
- 4) Touch "Qu" and set the EGR volume control valve opening to 50 step and check EGR TEMP SEN.  
EGR TEMP SEN should decrease to less than 1.0V.  
If the check result is NG, go to "Diagnostic Procedure", EC-477.  
If the check result is OK, go to the following step.
- 5) Turn ignition switch "OFF" and wait at least 10 seconds then turn "ON".
- 6) Check the output voltage of "THRTL POS SEN" (at closed throttle position) and note it.
- 7) Start engine and maintain the following conditions for at least 5 consecutive seconds.

|                |                                                                     |
|----------------|---------------------------------------------------------------------|
| ENG SPEED      | 1,800 - 2,800 rpm                                                   |
| VHCL SPEED SE  | 10 km/h (6 MPH) or more                                             |
| B/FUEL SCHDL   | 5.0 - 8.5 msec                                                      |
| THRTL POS SEN  | $(X + 0.05) - (X - 0.87)$ V<br>X = Voltage value measured at step 6 |
| Selector lever | Suitable position                                                   |

- 8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-477.

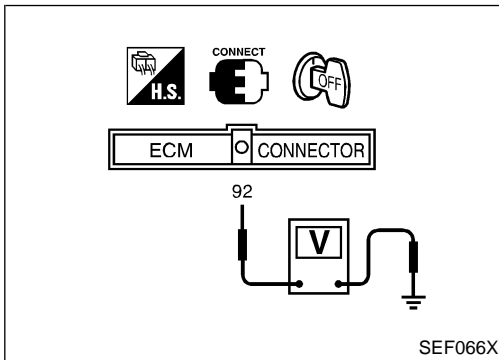
#### With GST

NCEC0575S0202

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds, then turn "ON".
- 3) Select "MODE 1" with GST and maintain the following conditions for at least 5 consecutive seconds.

|                                            |                         |
|--------------------------------------------|-------------------------|
| Engine speed                               | 1,800 - 2,800 rpm       |
| Vehicle speed                              | 10 km/h (6 MPH) or more |
| Voltage between ECM terminal 92 and ground | 0.86 - 2.0V             |
| Selector lever                             | Suitable position       |

- 4) Select "MODE 7" with GST.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-477.



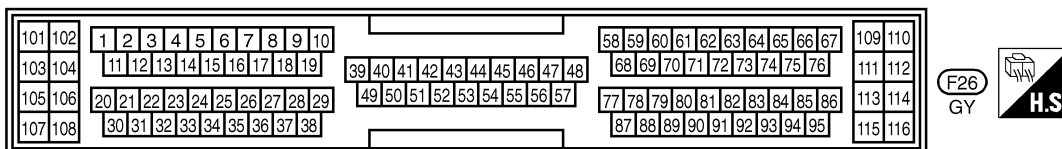
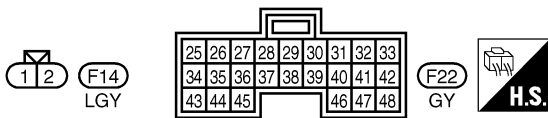
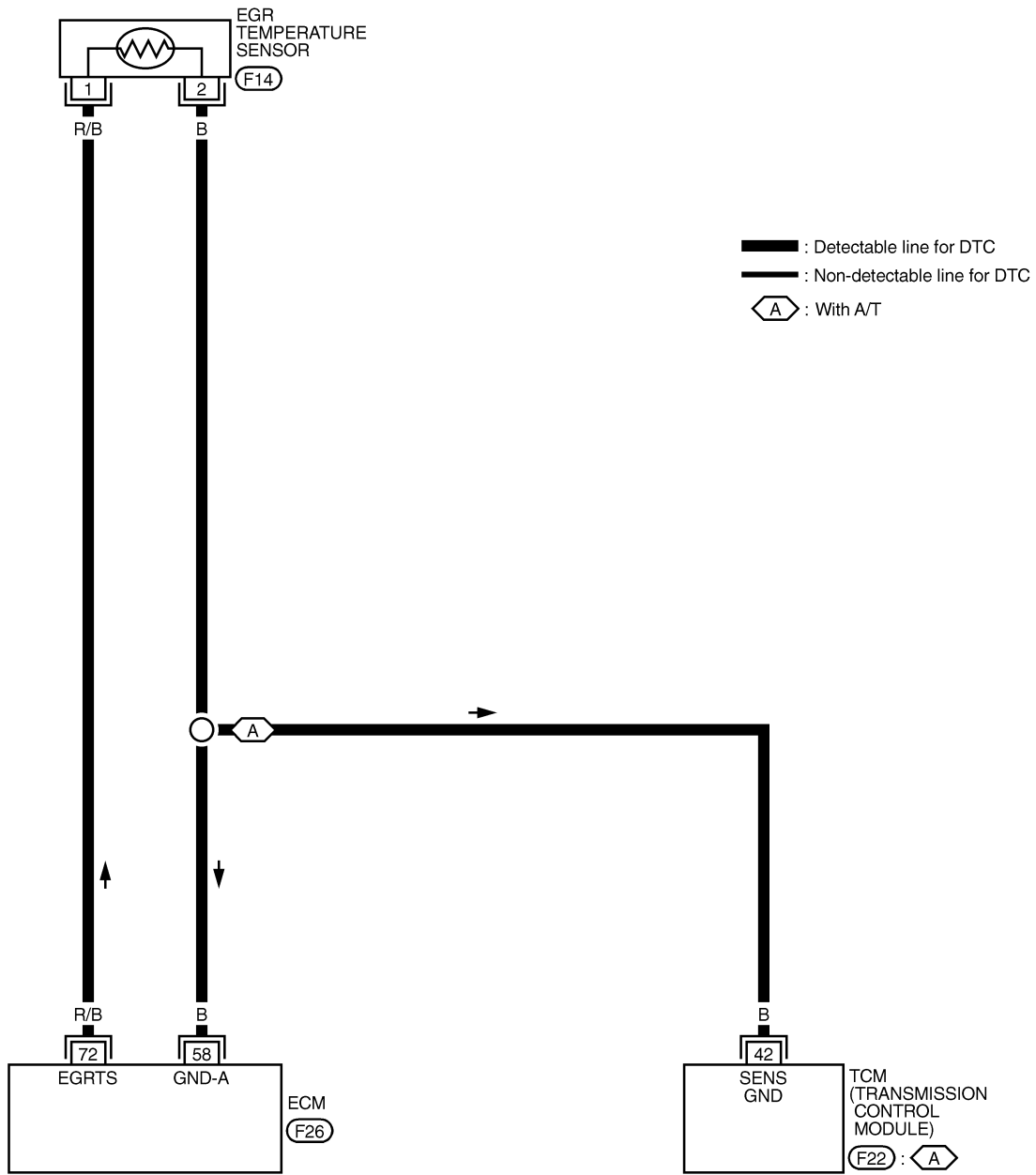
# DTC P1401 EGR TEMPERATURE SENSOR

Wiring Diagram

## Wiring Diagram

NCEC0576

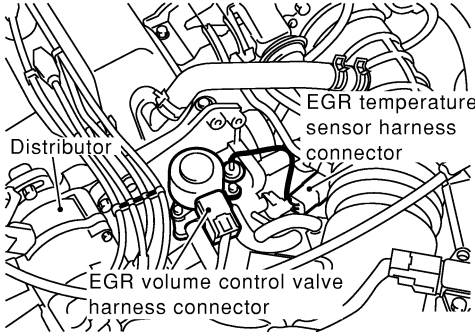
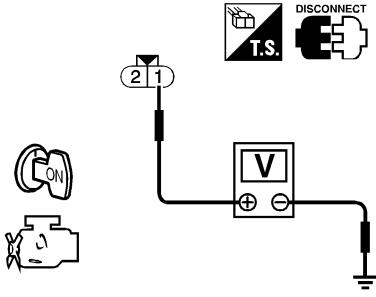
### EC-EGR/TS-01



TEC719

## Diagnostic Procedure

NCEC0577

|          |                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                               |
|----------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>1</b> | <b>CHECK EGR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT</b> | <p>1. Turn ignition switch "OFF".<br/>2. Disconnect EGR temperature sensor harness connector.</p> <div style="text-align: center;">  <p>Distributor<br/>EGR temperature sensor harness connector<br/>EGR volume control valve harness connector</p> </div> <p>3. Turn ignition switch "ON".<br/>4. Check voltage between EGR temperature sensor terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p><b>Voltage: Approximately 5V</b></p> <p>OK or NG</p> </div> | <p>GI<br/>MA<br/>EM<br/>LC<br/><b>EC</b><br/>FE<br/>CL<br/>MT<br/>AT<br/>AX<br/>SU<br/>BR</p> |
| OK       | ▶                                                        | GO TO 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                               |
| NG       | ▶                                                        | Repair or replace harness or connectors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                               |

|          |                                                                       |                                                                                                                                                                                                                                                                                                  |                                |
|----------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>2</b> | <b>CHECK EGR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT</b> | <p>1. Turn ignition switch "OFF".<br/>2. Check harness continuity between EGR temperature sensor terminal 2 and engine ground. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b><br/>3. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> | <p>ST<br/>RS<br/>BT<br/>HA</p> |
| OK       | ▶                                                                     | GO TO 4.                                                                                                                                                                                                                                                                                         |                                |
| NG       | ▶                                                                     | GO TO 3.                                                                                                                                                                                                                                                                                         |                                |

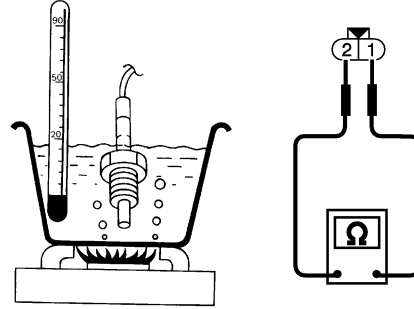
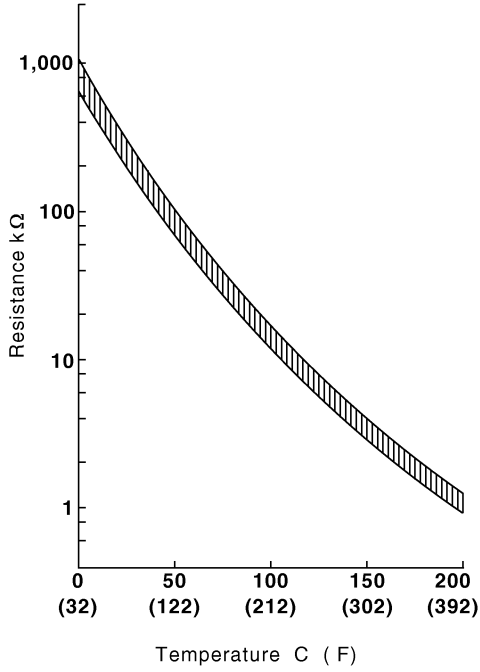
|          |                                   |                                                                                                                                                                                                                                                            |                          |
|----------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>3</b> | <b>DETECT MALFUNCTIONING PART</b> | <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness for open or short between ECM and EGR temperature sensor</li> <li>● Harness for open or short between TCM (Transmission Control Module) and EGR temperature sensor</li> </ul> | <p>SC<br/>EL<br/>IDX</p> |
|          | ▶                                 | Repair open circuit or short to power in harness or connector.                                                                                                                                                                                             |                          |

# DTC P1401 EGR TEMPERATURE SENSOR

Diagnostic Procedure (Cont'd)

## 4 CHECK EGR TEMPERATURE SENSOR

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

| EGR temperature<br>C ( F ) | Voltage<br>V | Resistance<br>MΩ |
|----------------------------|--------------|------------------|
| 0 (32)                     | 4.56         | 0.73 - 0.89      |
| 50 (122)                   | 2.25         | 0.074 - 0.082    |
| 100 (212)                  | 0.59         | 0.012 - 0.014    |

SEF919Z

OK or NG

|    |   |                                 |
|----|---|---------------------------------|
| OK | ▶ | GO TO 5.                        |
| NG | ▶ | Replace EGR temperature sensor. |

# DTC P1401 EGR TEMPERATURE SENSOR

Diagnostic Procedure (Cont'd)


|                                                                                                                                                                                        |                                         |                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                               | <b>CHECK EGR VOLUME CONTROL VALVE-I</b> |                                                                               |
| <p>1. Disconnect EGR volume control valve.<br/>                 2. Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p> |                                         |                                                                               |
|                                                                                                                                                                                        |                                         | <p><b>Resistance:</b><br/>                 20.9 - 23.1 Ω [At 20°C (68°F)]</p> |
| OK or NG                                                                                                                                                                               |                                         | SEF588X                                                                       |
| OK (With CONSULT-II)                                                                                                                                                                   | ▶                                       | GO TO 6.                                                                      |
| OK (Without CONSULT-II)                                                                                                                                                                | ▶                                       | GO TO 7.                                                                      |
| NG                                                                                                                                                                                     | ▶                                       | Replace EGR volume control valve.                                             |

| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>CHECK EGR VOLUME CONTROL VALVE-II</b> |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|--|----------------|---------|---------|--|-----------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p><b>Ⓟ With CONSULT-II</b></p> <p>1. Remove EGR volume control valve.<br/>                 2. Reconnect ECM harness connector and EGR volume control valve harness connector.<br/>                 3. Turn ignition switch ON.<br/>                 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.<br/>                 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps.</p>                                                                             |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> |                                          | ACTIVE TEST                       |  | EGR VOL CONT/V | 20 step | MONITOR |  | ENG SPEED | XXX rpm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| EGR VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 20 step                                  |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | XXX rpm                                  |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK or NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          | SEF067Y                           |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶                                        | GO TO 8.                          |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ▶                                        | Replace EGR volume control valve. |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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# DTC P1401 EGR TEMPERATURE SENSOR

Diagnostic Procedure (Cont'd)

| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CHECK EGR VOLUME CONTROL VALVE-II   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"><li>1. Remove EGR volume control valve.</li><li>2. Reconnect ECM harness connector and EGR volume control valve harness connector.</li><li>3. Turn ignition switch ON and OFF.</li><li>4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position.</li></ol> <div></div> <p>OK or NG</p> <p>SEF560W</p> |                                     |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ▶ GO TO 8.                          |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ▶ Replace EGR volume control valve. |

| 8                                                               | CHECK INTERMITTENT INCIDENT |
|-----------------------------------------------------------------|-----------------------------|
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                             |
| ▶                                                               | INSPECTION END              |



# DTC P1402 EGR FUNCTION (OPEN)

Description

## Description SYSTEM DESCRIPTION

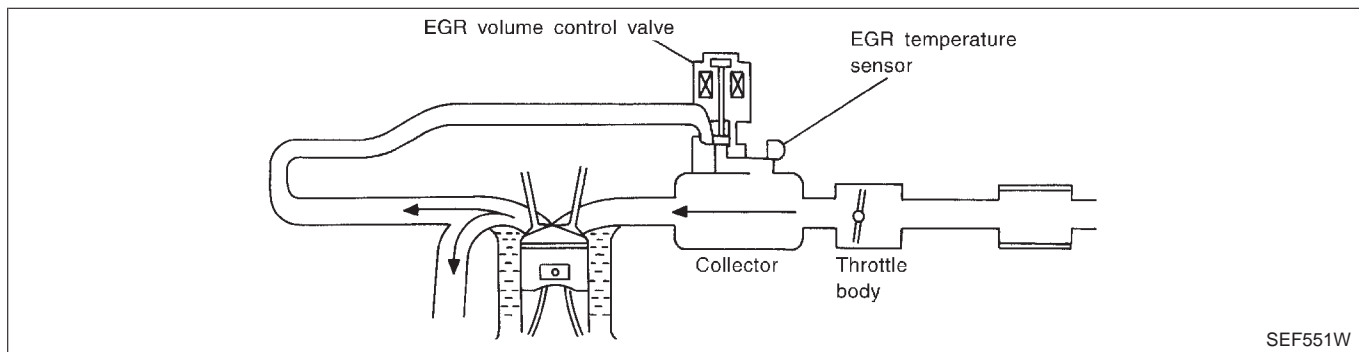
NCEC0578

NCEC0578S01

| Sensor                             | Input Signal to ECM            | ECM function       | Actuator                 |
|------------------------------------|--------------------------------|--------------------|--------------------------|
| Camshaft position sensor           | Engine speed                   | EGR volume control | EGR volume control valve |
| Vehicle speed sensor               | Vehicle speed                  |                    |                          |
| Engine coolant temperature sensor  | Engine coolant temperature     |                    |                          |
| Ignition switch                    | Start signal                   |                    |                          |
| Throttle position sensor           | Throttle position              |                    |                          |
| Battery                            | Battery voltage                |                    |                          |
| Mass air flow sensor               | Amount of intake air           |                    |                          |
| Air conditioner switch             | Air conditioner operation      |                    |                          |
| Power steering oil pressure switch | Power steering load signal     |                    |                          |
| Electrical load                    | Electrical load signal         |                    |                          |
| Park/Neutral position switch       | Park/Neutral position          |                    |                          |
| TCM (Transmission Control Module)  | Gear position, shifting signal |                    |                          |

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

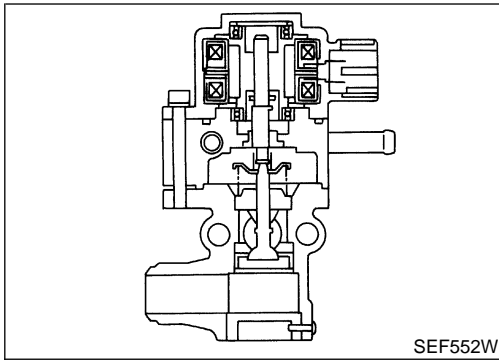
- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage



SEF551W

# DTC P1402 EGR FUNCTION (OPEN)

Description (Cont'd)



## COMPONENT DESCRIPTION EGR Volume Control Valve

NCEC0578S02

NCEC0578S0201

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0579

Specification data are reference values.

| MONITOR ITEM  | CONDITION                                                                                                                                                         | SPECIFICATION  |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| EGR TEMP SEN  | <ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul>                                                                                        | Less than 4.5V |
| EGR VOL CON/V | <ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Air conditioner switch: "OFF"</li> <li>Shift lever: "N"</li> <li>No-load</li> </ul> Idle | 0 step         |
|               | Revsing engine up to 3,000 rpm quickly                                                                                                                            | 10 - 55 step   |

## ECM Terminals and Reference Value

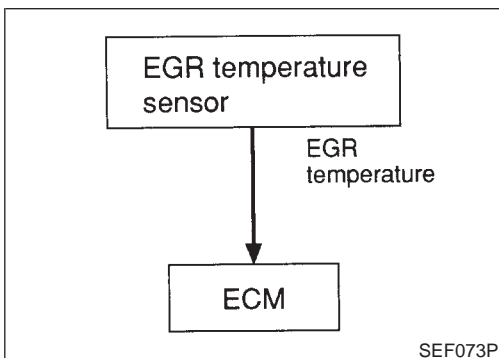
NCEC0656

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR           | ITEM                     | CONDITION                                                                                                                | DATA (DC Voltage) |
|----------------------|-------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------|
| 8<br>9<br>17<br>18   | SB<br>W/B<br>R/W<br>G/R | EGR volume control valve | [Engine is running] <ul style="list-style-type: none"> <li>Idle speed</li> </ul>                                         | 0.1 - 14V         |
| 58                   | B                       | Sensor's ground          | [Engine is running] <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Idle speed</li> </ul>              | Approximately 0V  |
| 72                   | R/B                     | EGR temperature sensor   | [Engine is running] <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Idle speed</li> </ul>              | Less than 4.5V    |
|                      |                         |                          | [Engine is running] <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>EGR system is operating</li> </ul> | 0 - 1.5V          |



## On Board Diagnosis Logic

NCEC0580

If the EGR temperature sensor detects EGR flow under the condition that does not call for EGR, a high-flow malfunction is diagnosed.

Malfunction is detected when EGR flow is detected under condition that does not call for EGR.

# DTC P1402 EGR FUNCTION (OPEN)

On Board Diagnosis Logic (Cont'd)

## NOTE:

Diagnosis for this DTC will occur when engine coolant temperature is below 50 to 60°C (122 to 140°F). Therefore, it will be better to turn ignition switch "ON" (start engine) at the engine coolant temperature below 30°C (86°F) when starting DTC confirmation procedure.

GI

MA

EM

LC

## Possible Cause

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve leaking or stuck open
- EGR temperature sensor

NCEC0581

EC

FE

CL

MT

| DATA MONITOR  |        |
|---------------|--------|
| MONITOR       | NO DTC |
| COOLAN TEMP/S | XXX °C |
| EGR TEMP SEN  | XXX V  |

SEF202Y

## DTC Confirmation Procedure

NCEC0582

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

AT

AX

### TESTING CONDITION:

- Always perform the test at a temperature above -10°C (14°F).
- Engine coolant temperature and EGR temperature must be verified in "DATA MONITOR" mode with CONSULT-II before starting DTC WORK SUPPORT test. If it is out of range below, the test cannot be conducted.

SU

BR

**COOLAN TEMP/S: -10 to 50°C (14 to 122°F)\***

**EGR TEMP SEN: Less than 4.8V**

ST

If the values are out of the ranges indicated above, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to reduce the engine coolant temperature or EGR temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.

RS

BT

| EGR SYSTEM P1402 |          |
|------------------|----------|
| OUT OF CONDITION |          |
| MONITOR          |          |
| ENG SPEED        | XXX rpm  |
| THRTL POS SEN    | XXX V    |
| B/FUEL SCHDL     | XXX msec |

SEF203Y

\*: Although CONSULT-II screen displays "-10 to 40°C (14 to 104°F)" as a range of engine coolant temperature, ignore it.

HA

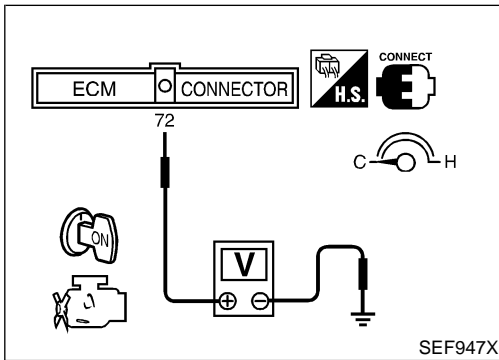
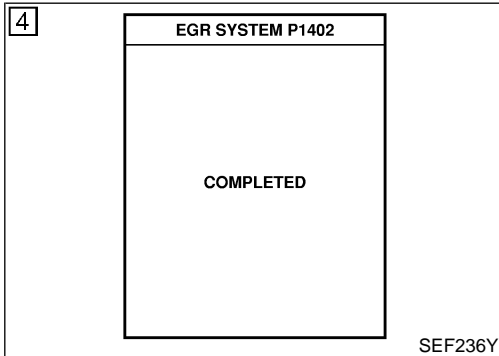
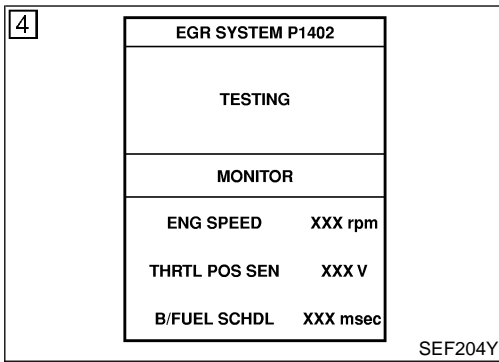
SC

EL

IDX

# DTC P1402 EGR FUNCTION (OPEN)

DTC Confirmation Procedure (Cont'd)



## WITH CONSULT-II

NCEC0582S01

- 1) Turn ignition switch "OFF", and wait at least 10 seconds, and then turn "ON".
- 2) Select "EGR SYSTEM P1402" of "EGR SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 3) Touch "START".
- 4) Start engine and let it idle until "TESTING" on CONSULT-II screen is turned to "COMPLETED". (It will take 80 seconds or more.)  
**If "TESTING" is not displayed after 5 minutes, turn ignition "OFF" and cool the engine coolant temperature to the range of -10 to 50°C (14 to 122°F). Retry from step 1.**
- 5) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-486.

## WITH GST

NCEC0582S02

- 1) Turn ignition switch "ON" and select "MODE 1" with GST.
  - 2) Check that engine coolant temperature is within the range of -10 to 50°C (14 to 122°F).
  - 3) Check that voltage between ECM terminal 72 (EGR temperature sensor signal) and ground is less than 4.8V.
  - 4) Start engine and let it idle for at least 80 seconds.
  - 5) Stop engine.
  - 6) Perform from step 1 to 4.
  - 7) Select "MODE 3" with GST.
  - 8) If DTC is detected, go to "Diagnostic Procedure", EC-486.
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

# DTC P1402 EGR FUNCTION (OPEN)

Wiring Diagram

## Wiring Diagram

NCEC0583

EC-EGRC1-01

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MA

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LC

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ST

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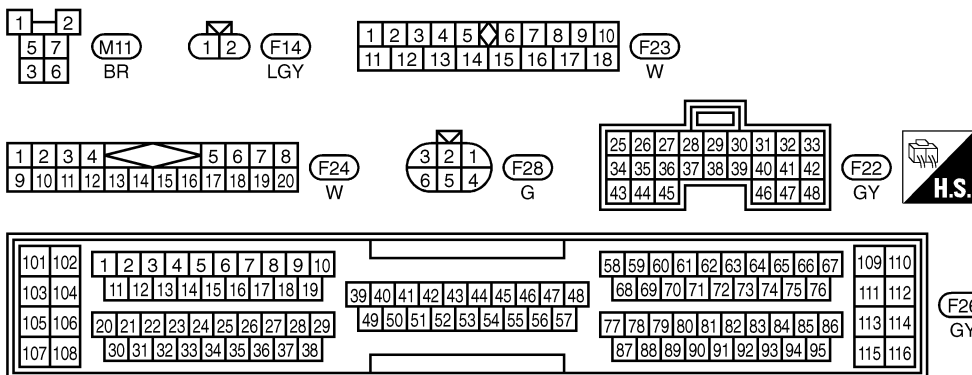
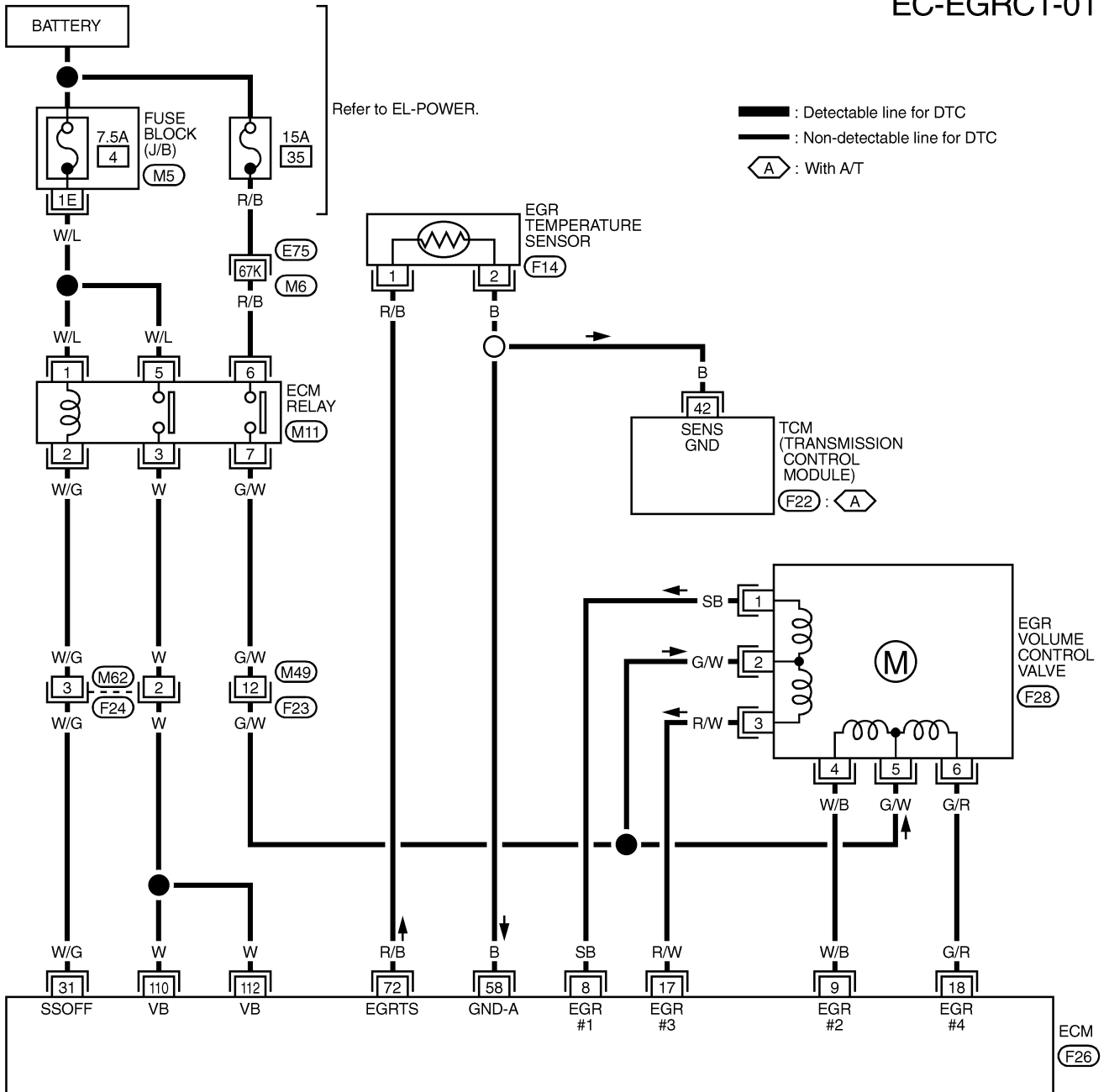
BT

HA

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IDX



REFER TO THE FOLLOWING.  
 (E75) -SUPER MULTIPLE JUNCTION (SMJ)  
 (M5) -FUSE BLOCK-JUNCTION BOX (J/B)



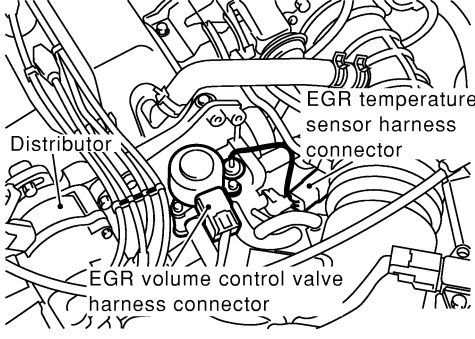
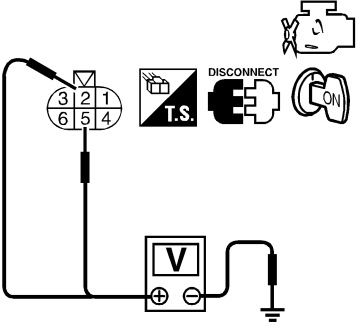
TEC755

# DTC P1402 EGR FUNCTION (OPEN)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0584

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT</b> |
| <p>1. Disconnect EGR volume control valve harness connector.</p>  <p style="text-align: right;">SEF849X</p> <p>2. Turn ignition switch ON.</p> <p>3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;"><b>Voltage: Battery voltage</b></p> <p style="text-align: center;"><b>OK or NG</b></p> <p style="text-align: right;">SEF327X</p> |                                                            |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶ GO TO 3.                                                 |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ▶ GO TO 2.                                                 |

|                                                                                                                                                                                                 |                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>2</b>                                                                                                                                                                                        | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors F23, M49</li> <li>● Harness for open or short between ECM relay and EGR volume control valve</li> </ul> |                                   |
| ▶                                                                                                                                                                                               | Repair harness or connectors.     |

# DTC P1402 EGR FUNCTION (OPEN)

Diagnostic Procedure (Cont'd)

| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT |                                                                                    |              |                          |   |   |   |   |    |   |    |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------|--------------------------|---|---|---|---|----|---|----|---|
| <p>1. Turn ignition switch OFF.<br/>                     2. Disconnect ECM harness connector.<br/>                     3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>ECM terminal</th> <th>EGR volume control valve</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>1</td> </tr> <tr> <td>9</td> <td>4</td> </tr> <tr> <td>17</td> <td>3</td> </tr> <tr> <td>18</td> <td>6</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL0389</p> <p><b>Continuity should exist.</b></p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                         |                                                                                    | ECM terminal | EGR volume control valve | 8 | 1 | 9 | 4 | 17 | 3 | 18 | 6 |
| ECM terminal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | EGR volume control valve                                                |                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1                                                                       |                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4                                                                       |                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3                                                                       |                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6                                                                       |                                                                                    |              |                          |   |   |   |   |    |   |    |   |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶                                                                       | GO TO 4.                                                                           |              |                          |   |   |   |   |    |   |    |   |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶                                                                       | Repair open circuit or short to ground or short to power in harness or connectors. |              |                          |   |   |   |   |    |   |    |   |

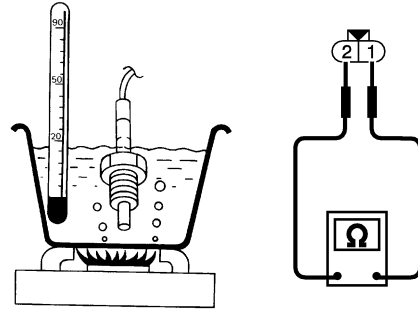
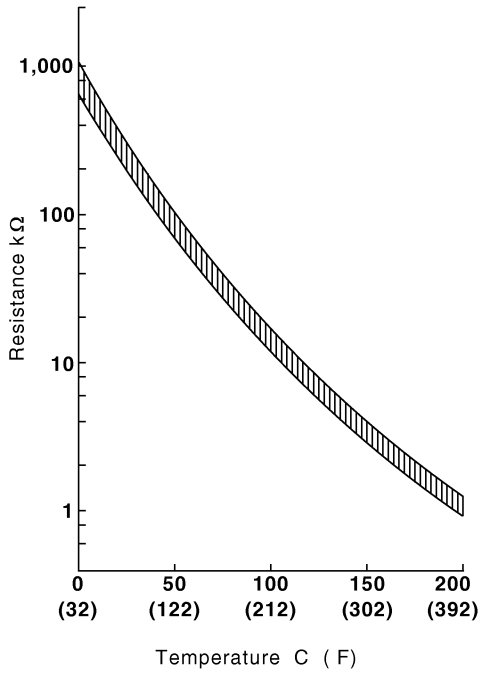
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# DTC P1402 EGR FUNCTION (OPEN)

Diagnostic Procedure (Cont'd)

## 4 CHECK EGR TEMPERATURE SENSOR

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

| EGR temperature C ( F ) | Voltage V | Resistance MΩ |
|-------------------------|-----------|---------------|
| 0 (32)                  | 4.56      | 0.73 - 0.89   |
| 50 (122)                | 2.25      | 0.074 - 0.082 |
| 100 (212)               | 0.59      | 0.012 - 0.014 |

SEF919Z

OK or NG

- |    |   |                                 |
|----|---|---------------------------------|
| OK | ▶ | GO TO 5.                        |
| NG | ▶ | Replace EGR temperature sensor. |



# DTC P1402 EGR FUNCTION (OPEN)

Diagnostic Procedure (Cont'd)


|                                                                                                                        |                                         |                                                              |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------|
| <b>5</b>                                                                                                               | <b>CHECK EGR VOLUME CONTROL VALVE-I</b> |                                                              |
| <p>Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p> |                                         |                                                              |
|                                                                                                                        |                                         | <p><b>Resistance:</b><br/>20.9 - 23.1 Ω [At 20°C (68°F)]</p> |
| OK or NG                                                                                                               |                                         | SEF588X                                                      |
| OK (With CONSULT-II)                                                                                                   | ▶                                       | GO TO 6.                                                     |
| OK (Without CONSULT-II)                                                                                                | ▶                                       | GO TO 7.                                                     |
| NG                                                                                                                     | ▶                                       | Replace EGR volume control valve.                            |

| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>CHECK EGR VOLUME CONTROL VALVE-II</b> |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|--|----------------|---------|---------|--|-----------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Remove EGR volume control valve.</li> <li>2. Reconnect ECM harness connector and EGR volume control valve harness connector.</li> <li>3. Turn ignition switch "ON".</li> <li>4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.</li> <li>5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps.</li> </ol>                                                                                                                                                                                                                                                                                        |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> <tr> <th style="text-align: center;">EGR VOL CONT/V</th> <th style="text-align: center;">20 step</th> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <th style="text-align: center;">ENG SPEED</th> <th style="text-align: center;">XXX rpm</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> |                                          | ACTIVE TEST                       |  | EGR VOL CONT/V | 20 step | MONITOR |  | ENG SPEED | XXX rpm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| EGR VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 20 step                                  |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | XXX rpm                                  |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                   |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK or NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          | SEF067Y                           |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶                                        | GO TO 8.                          |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶                                        | Replace EGR volume control valve. |  |                |         |         |  |           |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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# DTC P1402 EGR FUNCTION (OPEN)

Diagnostic Procedure (Cont'd)

| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CHECK EGR VOLUME CONTROL VALVE-II   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"><li>1. Remove EGR volume control valve.</li><li>2. Reconnect ECM harness connector and EGR volume control valve harness connector.</li><li>3. Turn ignition switch ON and OFF.</li><li>4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position.</li></ol> <div style="text-align: center;"><p>OK or NG</p></div> <p style="text-align: right;">SEF560W</p> |                                     |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶ GO TO 8.                          |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶ Replace EGR volume control valve. |

| 8                                                               | CHECK INTERMITTENT INCIDENT |
|-----------------------------------------------------------------|-----------------------------|
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                             |
| ▶                                                               | INSPECTION END              |

## On Board Diagnosis Logic

NCEC0585

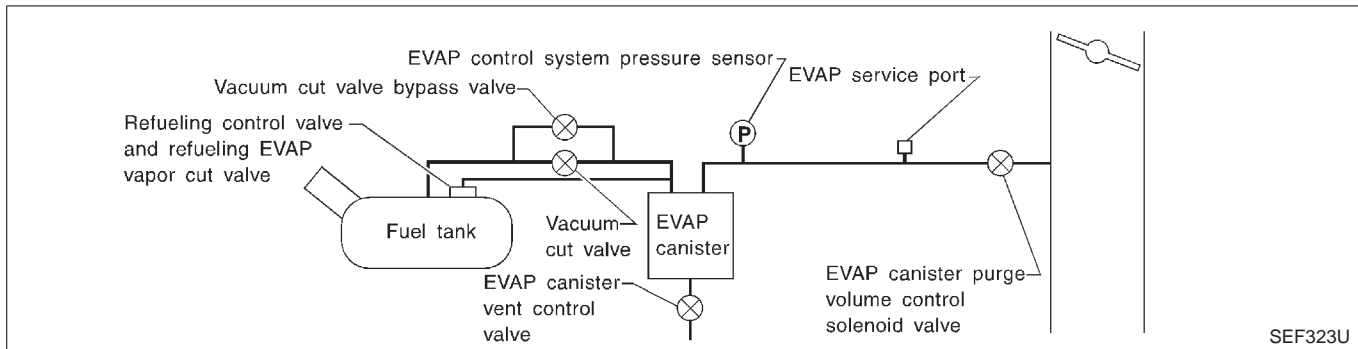
### NOTE:

If DTC P1440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-525.)

This diagnosis detects leaks in the EVAP purge line using of vapor pressure in the fuel tank.

The EVAP canister vent control valve is closed to shut the EVAP purge line. The vacuum cut valve bypass valve will then be opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP control system pressure sensor can now monitor the pressure inside the fuel tank.

If pressure increases, the ECM will check for leaks in the line between the vacuum cut valve and EVAP canister purge volume control solenoid valve.



Malfunction is detected when EVAP control system has a leak, EVAP control system does not operate properly.

### CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

### Possible Cause

NCEC0586

- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Fuel filler cap remains open or fails to close.
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks

## DTC P1440 EVAP CONTROL SYSTEM (SMALL LEAK) (POSITIVE PRESSURE)

Possible Cause (Cont'd)

---

- EVAP purge line rubber tube bent.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- Water separator
- EVAP canister is saturated with water.
- Fuel level sensor and the circuit
- EVAP control system pressure sensor
- Refueling control valve
- ORVR system leaks

### DTC Confirmation Procedure

Refer to “P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)”, EC-356. <sup>NCEC0587</sup>

### Diagnostic Procedure

Refer to “P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)”, EC-357. <sup>NCEC0588</sup>

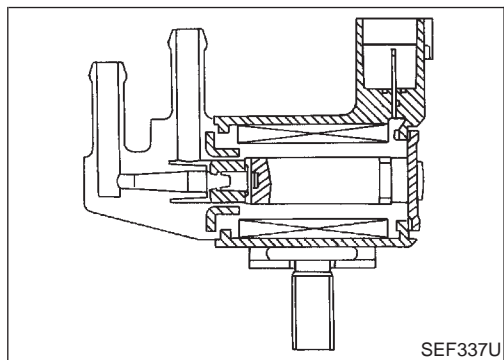
## Description SYSTEM DESCRIPTION

NCEC0589

NCEC0589S01

| Sensor                            | Input Signal to ECM                                              | ECM function                     | Actuator                                          |
|-----------------------------------|------------------------------------------------------------------|----------------------------------|---------------------------------------------------|
| Camshaft position sensor          | Engine speed                                                     | EVAP canister purge flow control | EVAP canister purge volume control solenoid valve |
| Mass air flow sensor              | Amount of intake air                                             |                                  |                                                   |
| Engine coolant temperature sensor | Engine coolant temperature                                       |                                  |                                                   |
| Ignition switch                   | Start signal                                                     |                                  |                                                   |
| Throttle position sensor          | Throttle position                                                |                                  |                                                   |
| Throttle position switch          | Closed throttle position                                         |                                  |                                                   |
| Heated oxygen sensor 1 (front)    | Density of oxygen in exhaust gas (Mixture ratio feedback signal) |                                  |                                                   |
| Fuel tank temperature sensor      | Fuel temperature in fuel tank                                    |                                  |                                                   |
| Vehicle speed sensor              | Vehicle speed                                                    |                                  |                                                   |

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.



### COMPONENT DESCRIPTION

NCEC0589S02

The EVAP canister purge volume control solenoid valve uses an ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

### CONSULT-II Reference Value in Data Monitor Mode

NCEC0590

Specification data are reference values.

| MONITOR ITEM | CONDITION                                                                                                                                                           | SPECIFICATION          |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| PURG VOL C/V | <ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch "OFF"</li> <li>● Shift lever: "N"</li> <li>● No-load</li> </ul> | Idle (Vehicle stopped) |
|              |                                                                                                                                                                     | 2,000 rpm              |
|              |                                                                                                                                                                     | 0%                     |
|              |                                                                                                                                                                     | —                      |

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

ECM Terminals and Reference Value

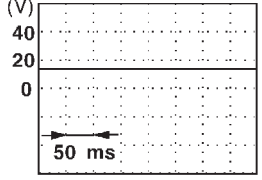
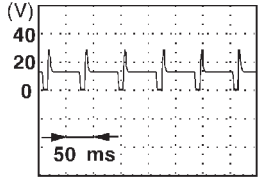
## ECM Terminals and Reference Value

NCEC0657

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                                              | CONDITION                                                                                                                                                           | DATA (DC Voltage)                                                                                                                        |
|----------------------|---------------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 14                   | P             | EVAP canister purge volume control solenoid valve | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>                                                                    | <p>BATTERY VOLTAGE<br/>(11 - 14V)</p>  <p>SEF994U</p> |
|                      |               |                                                   | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)</li> </ul> | <p>BATTERY VOLTAGE<br/>(11 - 14V)</p>  <p>SEF995U</p> |

## On Board Diagnosis Logic

NCEC0591

Malfunction is detected when the canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.

## Possible Cause

NCEC0592

- EVAP control system pressure sensor
- EVAP canister purge volume control solenoid valve (The valve is stuck open.)
- EVAP canister vent control valve
- EVAP canister
- Hoses  
(Hoses are connected incorrectly or clogged.)

## DTC Confirmation Procedure

NCEC0593

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

|   |                     |          |
|---|---------------------|----------|
| 6 | PURG VOL CN/V P1444 |          |
|   | OUT OF CONDITION    |          |
|   | MONITOR             |          |
|   | ENG SPEED           | XXX rpm  |
|   | THRTL POS SEN       | XXX V    |
|   | B/FUEL SCHDL        | XXX msec |

SEF205Y

|   |                     |          |
|---|---------------------|----------|
| 6 | PURG VOL CN/V P1444 |          |
|   | TESTING             |          |
|   | MONITOR             |          |
|   | ENG SPEED           | XXX rpm  |
|   | THRTL POS SEN       | XXX V    |
|   | B/FUEL SCHDL        | XXX msec |

SEF206Y

|   |                     |  |
|---|---------------------|--|
| 6 | PURG VOL CN/V P1444 |  |
|   | COMPLETED           |  |

SEF237Y

### WITH CONSULT-II

NCEC0593S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 5) Touch "START".
- 6) Start engine and let it idle until "TESTING" on CONSULT-II changes to "COMPLETED". (It will take for approximately 10 seconds.)  
**If "TESTING" is not displayed after 5 minutes, retry from step 2.**
- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-497.

### WITH GST

NCEC0593S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Start engine and let it idle for at least 20 seconds.
- 4) Select "MODE 7" with GST.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-497.

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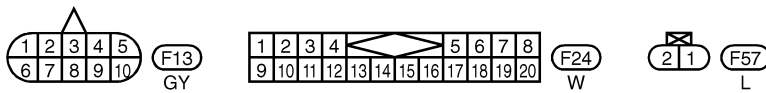
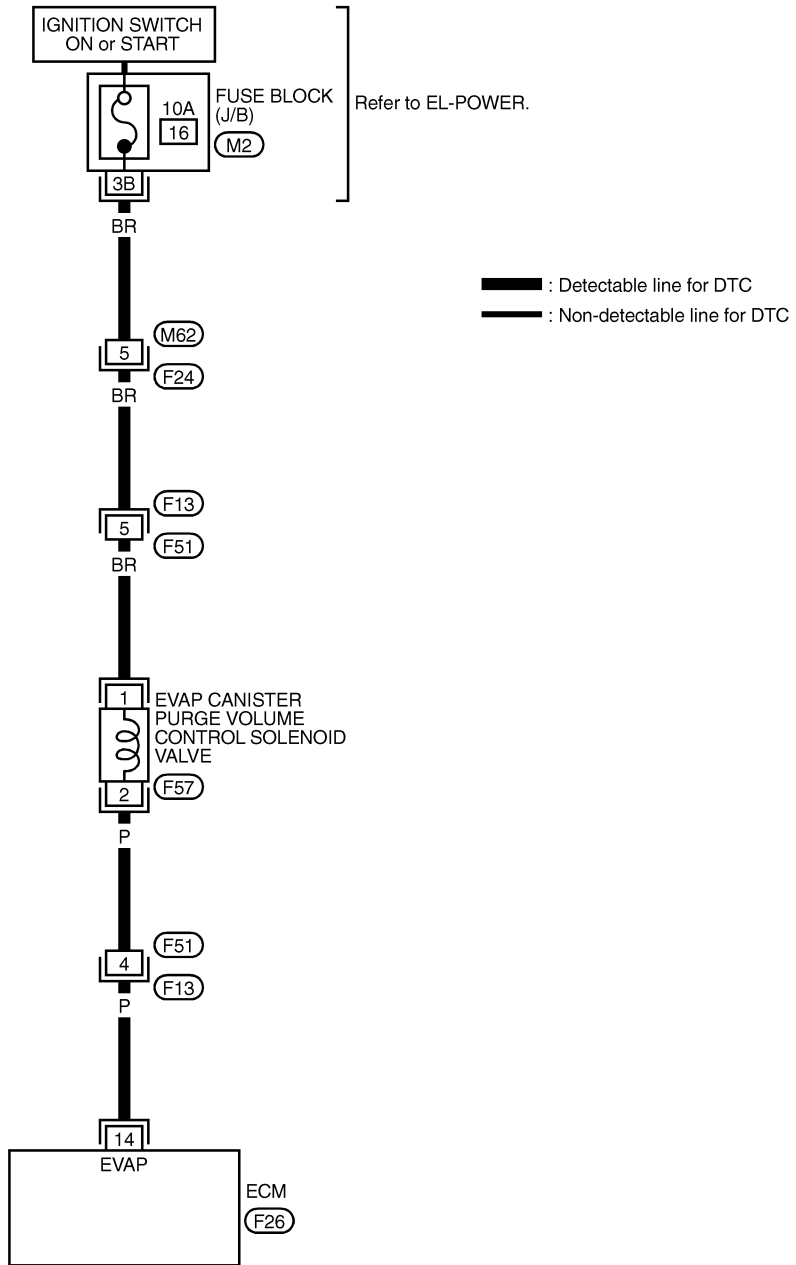
# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Wiring Diagram

## Wiring Diagram

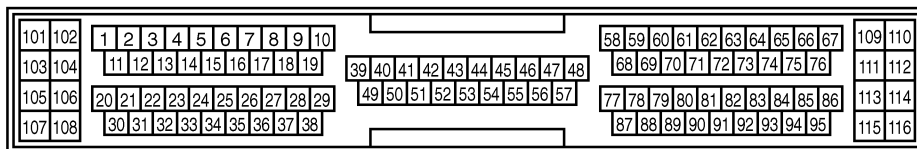
NCEC0594

EC-PGC/V-01



REFER TO THE FOLLOWING.

(M2) - FUSE BLOCK-JUNCTION BOX (J/B)

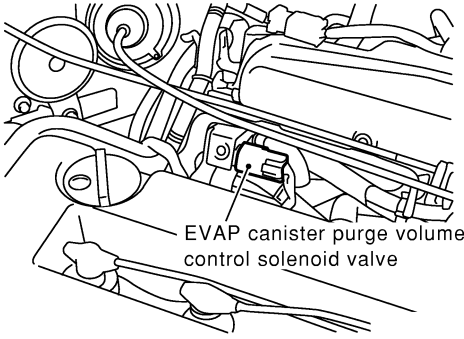
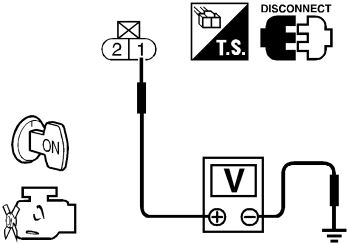


TEC711



## Diagnostic Procedure

NCEC0595

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT</b> |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  <p>EVAP canister purge volume control solenoid valve</p> </div> <p style="text-align: right;">SEF851X</p> <p>3. Turn ignition switch "ON".<br/>                 4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p><b>Voltage: Battery voltage</b></p> </div> <p style="text-align: right;">SEF948X</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                     |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶ GO TO 3.                                                                          |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶ GO TO 2.                                                                          |

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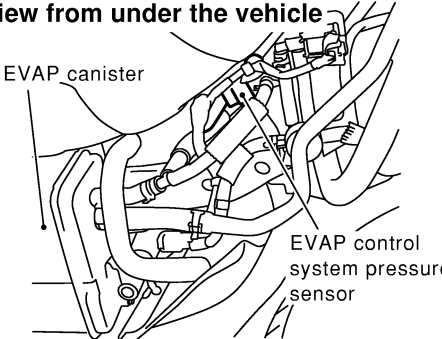
|                                                                                                                                                                                                                                                                                                                                                                                           |                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                  | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M62, F24</li> <li>● Harness connectors F13, F51</li> <li>● Fuse block (J/B) connector M2</li> <li>● 10A fuse</li> <li>● Harness for open or short between EVAP canister purge volume control solenoid valve and fuse</li> </ul> <p style="text-align: right;">▶ Repair harness or connectors.</p> |                                   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect ECM harness connector.<br/>                 3. Check harness continuity between ECM terminal 14 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b><br/>                 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                                         |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                             | ▶ GO TO 5.                                                                                              |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                             | ▶ GO TO 4.                                                                                              |

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                             |                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                                                    | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| Check the following. <ul style="list-style-type: none"> <li>● Harness connectors F13, F51</li> <li>● Harness for open or short between EVAP canister purge volume control solenoid valve and ECM</li> </ul> |                                                                                    |
| ▶                                                                                                                                                                                                           | Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                                                                      |                                                       |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <b>5</b>                                                                                             | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE</b> |
| Check disconnection or improper connection of hose connected to EVAP control system pressure sensor. |                                                       |
| <b>View from under the vehicle</b>                                                                   |                                                       |
|                    |                                                       |
| SEF860X                                                                                              |                                                       |
| <b>OK or NG</b>                                                                                      |                                                       |
| OK                                                                                                   | ▶ GO TO 6.                                            |
| NG                                                                                                   | ▶ Repair it.                                          |

|                                                                                                                                          |                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>6</b>                                                                                                                                 | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR</b> |
| 1. Disconnect EVAP control system pressure sensor harness connector.<br>2. Check connectors for water.<br><b>Water should not exist.</b> |                                                            |
| <b>OK or NG</b>                                                                                                                          |                                                            |
| OK                                                                                                                                       | ▶ GO TO 7.                                                 |
| NG                                                                                                                                       | ▶ Replace EVAP control system pressure sensor.             |

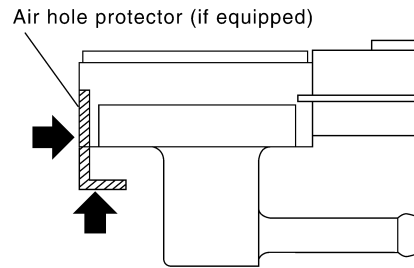
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## 7 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

**CAUTION:**

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

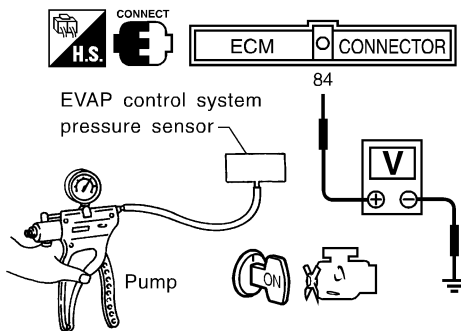
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below  $-20\text{ kPa}$  ( $-150\text{ mmHg}$ ,  $-5.91\text{ inHg}$ ) or over  $20\text{ kPa}$  ( $150\text{ mmHg}$ ,  $5.91\text{ inHg}$ ) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



| Pressure (Relative to atmospheric pressure) | Voltage V |
|---------------------------------------------|-----------|
| 0 kPa (0 mmHg, 0 inHg)                      | 3.0 - 3.6 |
| -9.3 kPa (-70 mmHg, -2.76 inHg)             | 0.4 - 0.6 |

SEF342X

**CAUTION:**


- Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.


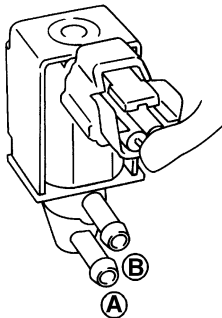
OK or NG


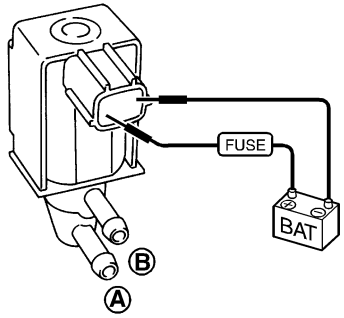
|                         |   |                                              |
|-------------------------|---|----------------------------------------------|
| OK (With CONSULT-II)    | ▶ | GO TO 8.                                     |
| OK (Without CONSULT-II) | ▶ | GO TO 9.                                     |
| NG                      | ▶ | Replace EVAP control system pressure sensor. |

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

| <b>8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE</b> |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------|-------------|--|-----------------|-------|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Reconnect harness connectors disconnected.</li> <li>3. Start engine.</li> <li>4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</li> </ol>                                                                                                                                                          |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>PURG VOL CONT/V</th> <th>XXX %</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">MONITOR</td> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> |                                                                |           | ACTIVE TEST |  | PURG VOL CONT/V | XXX % | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | LEAN | THRTL POS SEN | XXX V |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| PURG VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | XXX %                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | XXX rpm                                                        |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | XXX %                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LEAN                                                           |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | XXX V                                                          |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| SEF801Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                |           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ▶                                                              | GO TO 10. |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ▶                                                              | GO TO 9.  |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |

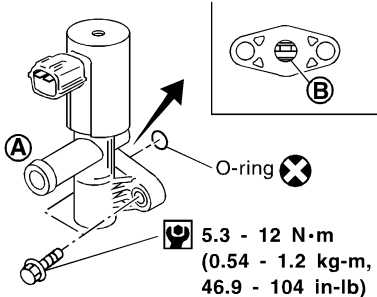
| <b>9</b>                                                                                                                                                                                                                                                                                                | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE</b> |  |                                    |                                           |        |     |      |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|--|------------------------------------|-------------------------------------------|--------|-----|------|----|
| <p> <b>With CONSULT-II</b></p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>                                                                |                                                                |  |                                    |                                           |        |     |      |    |
|                                                                                                                                                                                                                      |                                                                |  |                                    |                                           |        |     |      |    |
| SEF334X                                                                                                                                                                                                                                                                                                 |                                                                |  |                                    |                                           |        |     |      |    |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Condition<br/>PURG VOL CONT/V value</th> <th>Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td>100.0%</td> <td>Yes</td> </tr> <tr> <td>0.0%</td> <td>No</td> </tr> </tbody> </table> |                                                                |  | Condition<br>PURG VOL CONT/V value | Air passage continuity<br>between A and B | 100.0% | Yes | 0.0% | No |
| Condition<br>PURG VOL CONT/V value                                                                                                                                                                                                                                                                      | Air passage continuity<br>between A and B                      |  |                                    |                                           |        |     |      |    |
| 100.0%                                                                                                                                                                                                                                                                                                  | Yes                                                            |  |                                    |                                           |        |     |      |    |
| 0.0%                                                                                                                                                                                                                                                                                                    | No                                                             |  |                                    |                                           |        |     |      |    |

|                                                                                                                                                                                                                                               |   |                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------|
| <p> <b>Without CONSULT-II</b></p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p> |   |                                                            |
|                                                                                                                                                            |   |                                                            |
| SEF335X                                                                                                                                                                                                                                       |   |                                                            |
| <b>OK or NG</b>                                                                                                                                                                                                                               |   |                                                            |
| OK                                                                                                                                                                                                                                            | ▶ | GO TO 10.                                                  |
| NG                                                                                                                                                                                                                                            | ▶ | Replace EVAP canister purge volume control solenoid valve. |

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

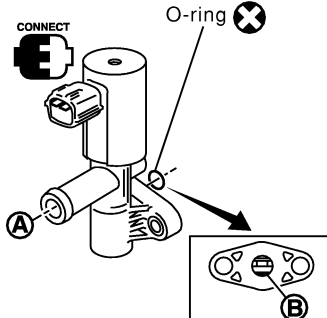
|           |                                                                                                                    |                                            |
|-----------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>10</b> | <b>CHECK RUBBER TUBE FOR CLOGGING</b>                                                                              |                                            |
|           | 1. Disconnect rubber tube connected to EVAP canister vent control valve.<br>2. Check the rubber tube for clogging. |                                            |
|           | <b>OK or NG</b>                                                                                                    |                                            |
| OK        | ▶                                                                                                                  | GO TO 11.                                  |
| NG        | ▶                                                                                                                  | Clean the rubber tube using an air blower. |

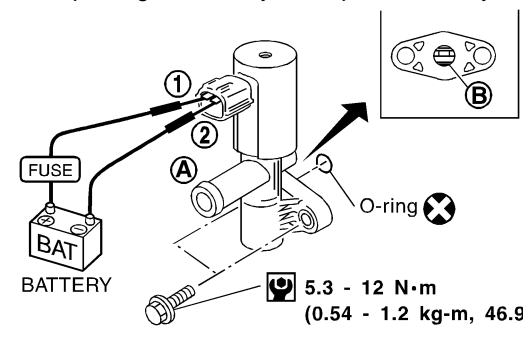
|           |                                                                                                                                                   |                                           |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>11</b> | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-I</b>                                                                                                   |                                           |
|           | 1. Remove EVAP canister vent control valve from EVAP canister.<br>2. Check portion <b>B</b> of EVAP canister vent control valve for being rusted. |                                           |
|           |                                                                 |                                           |
|           | SEF337X                                                                                                                                           |                                           |
|           | <b>OK or NG</b>                                                                                                                                   |                                           |
| OK        | ▶                                                                                                                                                 | GO TO 12.                                 |
| NG        | ▶                                                                                                                                                 | Replace EVAP canister vent control valve. |

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# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

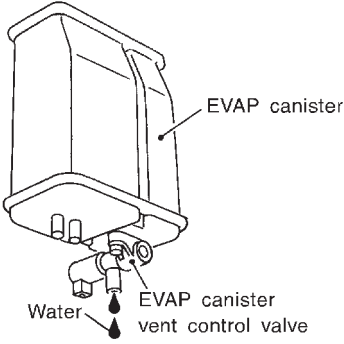
| <b>12</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-II</b> |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------|--|----------------|-----|---------|--|-----------|---------|--------------|-------|------------|-------|---------------|-------|--|--|--|--|--|--|-----------------------------|-------------------------------------------|----|----|-----|-----|
| <p><b>④ With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Reconnect harness connectors disconnected.</li> <li>2. Turn ignition switch "ON".</li> <li>3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.</li> <li>4. Check air passage continuity and operation delay time.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 30%;">  </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VENT CONTROL/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 (B1)</td> <td>XXX V</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <div style="width: 35%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Condition<br/>VENT CONTROL/V</th> <th>Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p><b>Operation takes less than 1 second.</b></p> </div> </div> |                                                  | ACTIVE TEST |  | VENT CONTROL/V | OFF | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 (B1) | XXX V | THRTL POS SEN | XXX V |  |  |  |  |  |  | Condition<br>VENT CONTROL/V | Air passage continuity<br>between A and B | ON | No | OFF | Yes |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | OFF                                              |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | XXX rpm                                          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | XXX %                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| HO2S1 (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | XXX V                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | XXX V                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| Condition<br>VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Air passage continuity<br>between A and B        |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | No                                               |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Yes                                              |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| SEF803Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |

| <p><b>⊗ Without CONSULT-II</b></p> <p>Check air passage continuity and operation delay time under the following conditions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |           |                                           |                                                     |    |     |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------|-------------------------------------------|-----------------------------------------------------|----|-----|-----|
| <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40%;">  </div> <div style="width: 55%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p><b>Operation takes less than 1 second.</b></p> </div> </div> |                                           | Condition | Air passage continuity<br>between A and B | 12V direct current supply between terminals 1 and 2 | No | OFF | Yes |
| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Air passage continuity<br>between A and B |           |                                           |                                                     |    |     |     |
| 12V direct current supply between terminals 1 and 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | No                                        |           |                                           |                                                     |    |     |     |
| OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Yes                                       |           |                                           |                                                     |    |     |     |
| SEF339X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |           |                                           |                                                     |    |     |     |
| <b>Make sure new O-ring is installed properly.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                           |           |                                           |                                                     |    |     |     |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |           |                                           |                                                     |    |     |     |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                                         | GO TO 14. |                                           |                                                     |    |     |     |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                                         | GO TO 13. |                                           |                                                     |    |     |     |

|                                                                                                                                                                                              |                                                   |                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------|
| <b>13</b>                                                                                                                                                                                    | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-III</b> |                                           |
| <ol style="list-style-type: none"> <li>1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower.</li> <li>2. Perform procedure 10 again.</li> </ol> |                                                   |                                           |
| <b>OK or NG</b>                                                                                                                                                                              |                                                   |                                           |
| OK                                                                                                                                                                                           | ▶                                                 | GO TO 14.                                 |
| NG                                                                                                                                                                                           | ▶                                                 | Replace EVAP canister vent control valve. |

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

|                                                                                                                                                          |                                                    |           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------|
| <b>14</b>                                                                                                                                                | <b>CHECK IF EVAP CANISTER SATURATED WITH WATER</b> |           |
| <p>1. Remove EVAP canister with EVAP canister vent control valve attached.<br/>                 2. Check if water will drain from the EVAP canister.</p> |                                                    |           |
|                                                                         |                                                    |           |
| SEF596U                                                                                                                                                  |                                                    |           |
| <b>Yes or No</b>                                                                                                                                         |                                                    |           |
| Yes                                                                                                                                                      | ▶                                                  | GO TO 15. |
| No                                                                                                                                                       | ▶                                                  | GO TO 18. |

GI

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|                                                                                                                                                |                            |           |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------|
| <b>15</b>                                                                                                                                      | <b>CHECK EVAP CANISTER</b> |           |
| <p>Weigh the EVAP canister with the EVAP canister vent control valve attached.<br/> <b>The weight should be less than 1.8 kg (4.0 lb).</b></p> |                            |           |
| <b>OK or NG</b>                                                                                                                                |                            |           |
| OK                                                                                                                                             | ▶                          | GO TO 17. |
| NG                                                                                                                                             | ▶                          | GO TO 16. |

MT

AT

AX

|                                                                                                                                                                                                         |                                   |                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------|
| <b>16</b>                                                                                                                                                                                               | <b>DETECT MALFUNCTIONING PART</b> |                                       |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● EVAP canister for damage</li> <li>● EVAP hose between EVAP canister and water separator for clogging or poor connection</li> </ul> |                                   |                                       |
|                                                                                                                                                                                                         | ▶                                 | Repair hose or replace EVAP canister. |

SU

BR

ST

RS

BT

HA

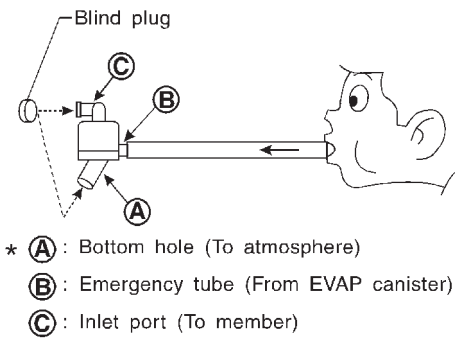
SC

EL

IDX

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

| 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CHECK WATER SEPARATOR               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <p>1. Check visually for insect nests in the water separator air inlet.</p> <p>2. Check visually for cracks or flaws in the appearance.</p> <p>3. Check visually for cracks or flaws in the hose.</p> <p>4. Check that <b>A</b> and <b>C</b> are not clogged by blowing air into <b>B</b> with <b>A</b>, and then <b>C</b> plugged.</p> <div><p>* (A) : Bottom hole (To atmosphere)<br/>(B) : Emergency tube (From EVAP canister)<br/>(C) : Inlet port (To member)</p></div> <p>5. In case of NG in items 2 - 4, replace the parts.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"><li>Do not disassemble water separator.</li></ul> <p style="text-align: right;">OK or NG</p> |                                     |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶ GO TO 18.                         |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶ Clean or replace water separator. |

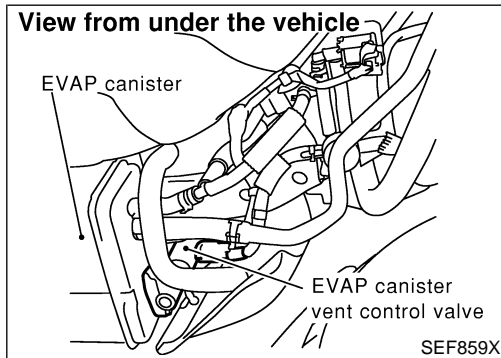
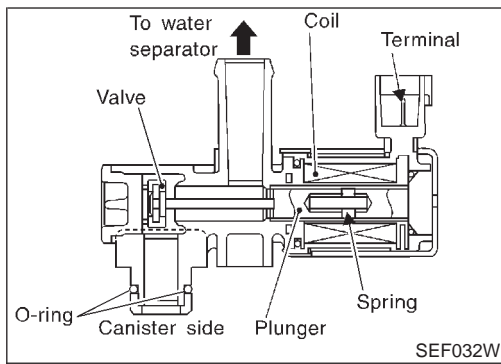
SEF829T

| 18                                                              | CHECK INTERMITTENT INCIDENT |
|-----------------------------------------------------------------|-----------------------------|
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                             |
| ▶                                                               | INSPECTION END              |



# DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Component Description



## Component Description

NCEC0596

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.

GI

MA

EM

LC

EC

FE

CL

MT

AT

NCEC0597

## CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

| MONITOR ITEM | CONDITION             | SPECIFICATION |
|--------------|-----------------------|---------------|
| VENT CONT/V  | ● Ignition switch: ON | OFF           |

AX

SU

## ECM Terminals and Reference Value

NCEC0658

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TER-MINAL NO. | WIRE COLOR | ITEM                             | CONDITION              | DATA (DC Voltage)          |
|---------------|------------|----------------------------------|------------------------|----------------------------|
| 102           | PU/W       | EVAP canister vent control valve | [Ignition switch "ON"] | BATTERY VOLTAGE (11 - 14V) |

BR

ST

RS

BT

HA

## On Board Diagnosis Logic

NCEC0598

Malfunction is detected when EVAP canister vent control valve remains closed under specified driving conditions.

EL

IDX

# DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Possible Cause

## Possible Cause

NCEC0599

- EVAP canister vent control valve
- EVAP control system pressure sensor and the circuit
- Blocked rubber tube to EVAP canister vent control valve
- Water separator
- EVAP canister is saturated with water.

| 4 | DATA MONITOR  |          |
|---|---------------|----------|
|   | MONITOR       | NO DTC   |
|   | ENG SPEED     | XXX rpm  |
|   | COOLAN TEMP/S | XXX °C   |
|   | VHCL SPEED SE | XXX km/h |
|   | B/FUEL SCHDL  | XXX msec |

SEF189Y

## DTC Confirmation Procedure

NCEC0600

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

### WITH CONSULT-II

NCEC0600S01

- 1) Turn ignition switch “ON”.
- 2) Select “DATA MONITOR” mode with CONSULT-II.
- 3) Start engine.
- 4) Drive vehicle at a speed of approximately 80 km/h (50 MPH) for a maximum of 15 minutes.

### NOTE:

If a malfunction exists, NG result may be displayed quicker.

- 5) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-508.

### WITH GST

NCEC0600S02

Follow the procedure “WITH CONSULT-II” above.

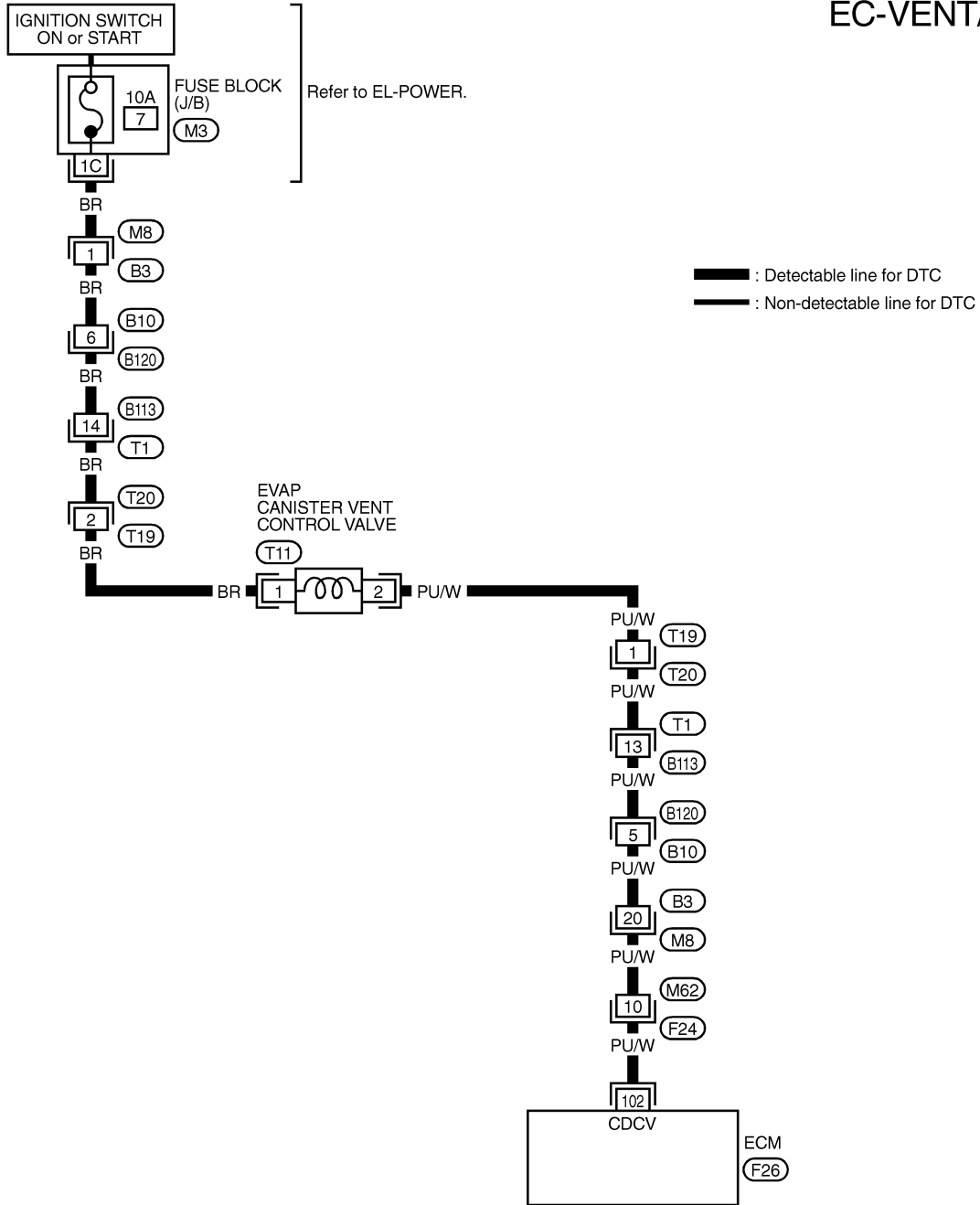
# DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Wiring Diagram

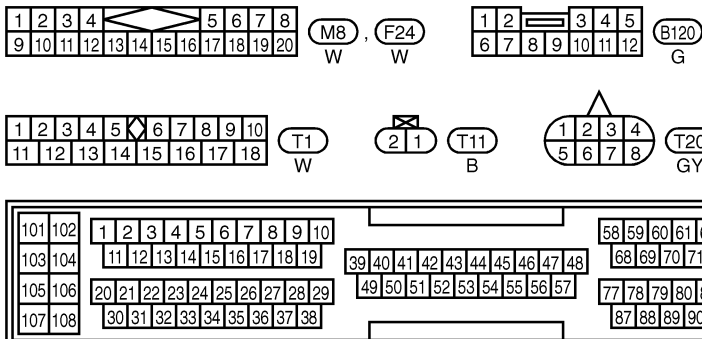
## Wiring Diagram

NCEC0601

EC-VENT/V-01



- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX



REFER TO THE FOLLOWING.  
 (M3) - FUSE BLOCK-JUNCTION BOX (J/B)



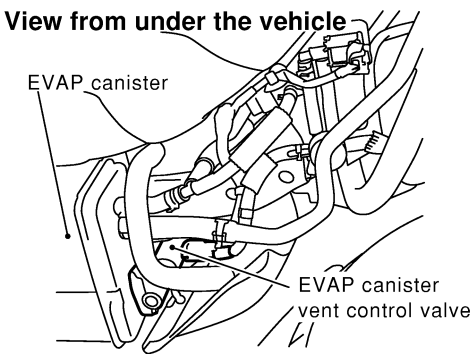
TEC712

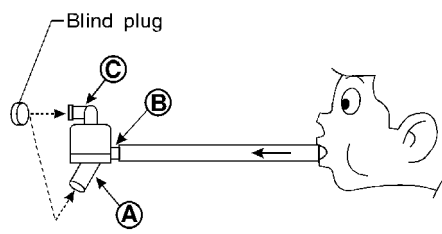
# DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0602

|                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>CHECK RUBBER TUBE</b>                 |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect rubber tube connected to EVAP canister vent control valve.<br/>                 3. Check the rubber tube for clogging.</p> <p style="text-align: center;"><b>View from under the vehicle</b></p>  <p style="text-align: right;">SEF859X</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                          |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 2.                               |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ Clean rubber tube using an air blower. |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>CHECK WATER SEPARATOR</b>        |
| <p>1. Check visually for insect nests in the water separator air inlet.<br/>                 2. Check visually for cracks or flaws in the appearance.<br/>                 3. Check visually for cracks or flaws in the hose.<br/>                 4. Check that <b>A</b> and <b>C</b> are not clogged by blowing air into <b>B</b> with <b>A</b>, and then <b>C</b> plugged.</p>  <p style="text-align: center;">* <b>(A)</b> : Bottom hole (To atmosphere)<br/> <b>(B)</b> : Emergency tube (From EVAP canister)<br/> <b>(C)</b> : Inlet port (To member)</p> <p style="text-align: right;">SEF829T</p> <p>5. In case of NG in items 2 - 4, replace the parts.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>Do not disassemble water separator.</li> </ul> <p style="text-align: center;"><b>OK or NG</b></p> |                                     |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ GO TO 3.                          |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ▶ Clean or replace water separator. |

# DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Diagnostic Procedure (Cont'd)

**3 CHECK EVAP CANISTER VENT CONTROL VALVE-I**

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

SEF337X

**OK or NG**

|    |   |                                           |
|----|---|-------------------------------------------|
| OK | ▶ | GO TO 4.                                  |
| NG | ▶ | Replace EVAP canister vent control valve. |

GI  
MA  
EM  
LC  
EC

**4 CHECK EVAP CANISTER VENT CONTROL VALVE-II**

**With CONSULT-II**

1. Turn ignition switch ON.
2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
3. Check air passage continuity and operation delay time.

| ACTIVE TEST    |         |
|----------------|---------|
| VENT CONTROL/V | OFF     |
| MONITOR        |         |
| ENG SPEED      | XXX rpm |
| A/F ALPHA-B1   | XXX %   |
| HO2S1 (B1)     | XXX V   |
| THRTL POS SEN  | XXX V   |
|                |         |
|                |         |
|                |         |

| Condition VENT CONTROL/V | Air passage continuity between A and B |
|--------------------------|----------------------------------------|
| ON                       | No                                     |
| OFF                      | Yes                                    |

**Operation takes less than 1 second.**

SEF803Y

FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST

**Without CONSULT-II**

Check air passage continuity and operation delay time under the following conditions.

| Condition                                           | Air passage continuity between A and B |
|-----------------------------------------------------|----------------------------------------|
| 12V direct current supply between terminals 1 and 2 | No                                     |
| OFF                                                 | Yes                                    |

**Operation takes less than 1 second.**

SEF339X

**Make sure new O-ring is installed properly.**

**OK or NG**

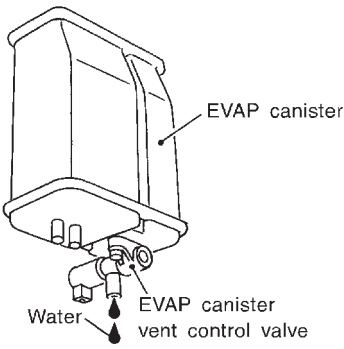
|    |   |          |
|----|---|----------|
| OK | ▶ | GO TO 6. |
| NG | ▶ | GO TO 5. |

RS  
BT  
HA  
SC  
EL  
IDX

# DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                        |                                                   |                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------|
| <b>5</b>                                                                                                                                               | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-III</b> |                                           |
| 1. Clean the air passage (Portion <b>A</b> to <b>B</b> ) of EVAP canister vent control valve using an air blower.<br>2. Perform the procedure 4 again. |                                                   |                                           |
| <b>OK or NG</b>                                                                                                                                        |                                                   |                                           |
| OK                                                                                                                                                     | ▶                                                 | GO TO 6.                                  |
| NG                                                                                                                                                     | ▶                                                 | Replace EVAP canister vent control valve. |

|                                                                                                                                 |                                                    |          |
|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------|
| <b>6</b>                                                                                                                        | <b>CHECK IF EVAP CANISTER SATURATED WITH WATER</b> |          |
| 1. Remove EVAP canister with EVAP canister vent control valve attached.<br>2. Check if water will drain from the EVAP canister. |                                                    |          |
|                                                |                                                    |          |
| <b>Yes or No</b>                                                                                                                |                                                    |          |
| Yes                                                                                                                             | ▶                                                  | GO TO 7. |
| No                                                                                                                              | ▶                                                  | GO TO 9. |

SEF596U

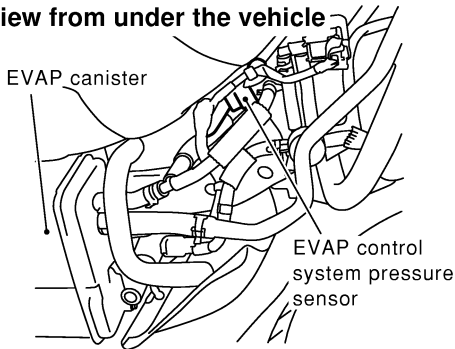
|                                                                                                                                       |                            |          |
|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>7</b>                                                                                                                              | <b>CHECK EVAP CANISTER</b> |          |
| Weigh the EVAP canister with the EVAP canister vent control valve attached.<br><b>The weight should be less than 1.8 kg (4.0 lb).</b> |                            |          |
| <b>OK or NG</b>                                                                                                                       |                            |          |
| OK                                                                                                                                    | ▶                          | GO TO 9. |
| NG                                                                                                                                    | ▶                          | GO TO 8. |

|                                                                                                                                                                                                  |                                   |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--|
| <b>8</b>                                                                                                                                                                                         | <b>DETECT MALFUNCTIONING PART</b> |  |
| Check the following. <ul style="list-style-type: none"> <li>● EVAP canister for damage</li> <li>● EVAP hose between EVAP canister and water separator for clogging or poor connection</li> </ul> |                                   |  |
| ▶ Repair hose or replace EVAP canister.                                                                                                                                                          |                                   |  |

|                                                                                                      |                                                       |            |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------|
| <b>9</b>                                                                                             | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE</b> |            |
| Check disconnection or improper connection of hose connected to EVAP control system pressure sensor. |                                                       |            |
| <b>OK or NG</b>                                                                                      |                                                       |            |
| OK                                                                                                   | ▶                                                     | GO TO 10.  |
| NG                                                                                                   | ▶                                                     | Repair it. |

# DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                |                                                            |                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------|
| <b>10</b>                                                                                                                                                                                                                                                                      | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR</b> |                                              |
| <p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <p style="text-align: center;"><b>View from under the vehicle</b></p>  <p style="text-align: right;">SEF860X</p> |                                                            |                                              |
| <p>2. Check connectors for water.<br/><b>Water should not exist.</b></p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                    |                                                            |                                              |
| OK                                                                                                                                                                                                                                                                             | ▶                                                          | GO TO 11.                                    |
| NG                                                                                                                                                                                                                                                                             | ▶                                                          | Replace EVAP control system pressure sensor. |

- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX

# DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

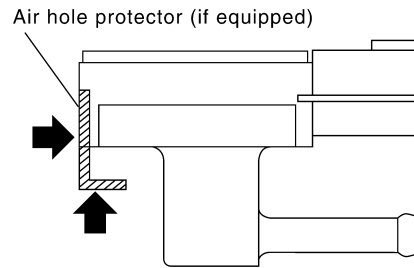
Diagnostic Procedure (Cont'd)

## 11 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

**CAUTION:**

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

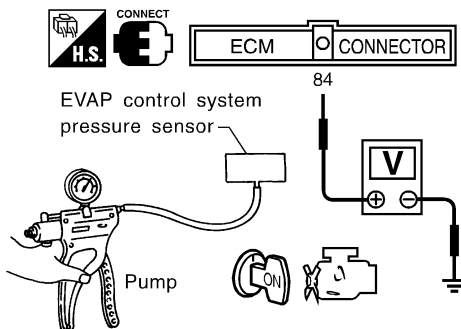
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below  $-20$  kPa ( $-150$  mmHg,  $-5.91$  inHg) or over  $20$  kPa ( $150$  mmHg,  $5.91$  inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



| Pressure (Relative to atmospheric pressure) | Voltage V |
|---------------------------------------------|-----------|
| 0 kPa (0 mmHg, 0 inHg)                      | 3.0 - 3.6 |
| $-9.3$ kPa ( $-70$ mmHg, $-2.76$ inHg)      | 0.4 - 0.6 |

SEF342X

**CAUTION:**

- Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

|    |   |                                              |
|----|---|----------------------------------------------|
| OK | ▶ | GO TO 12.                                    |
| NG | ▶ | Replace EVAP control system pressure sensor. |

## 12 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.

|  |   |                |
|--|---|----------------|
|  | ▶ | INSPECTION END |
|--|---|----------------|

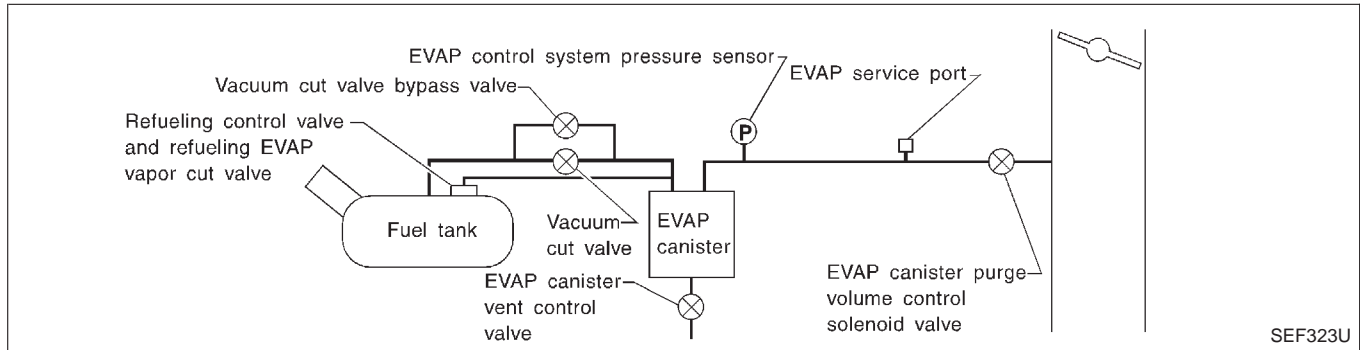


## System Description

NCEC0603

**NOTE:**

If DTC P1447 is displayed with P0510, perform trouble diagnosis for DTC P0510 first. (See EC-432.)



In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

## On Board Diagnosis Logic

NCEC0604

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a fault is determined.

Malfunction is detected when EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.

## Possible Cause

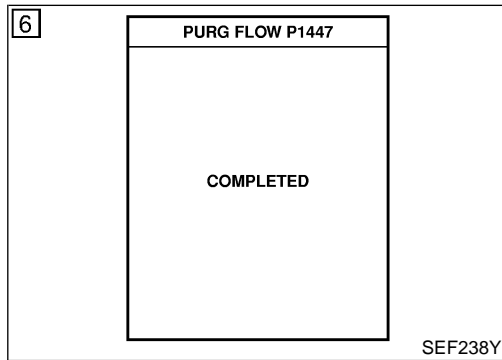
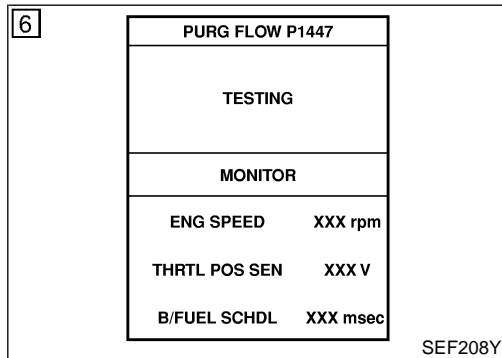
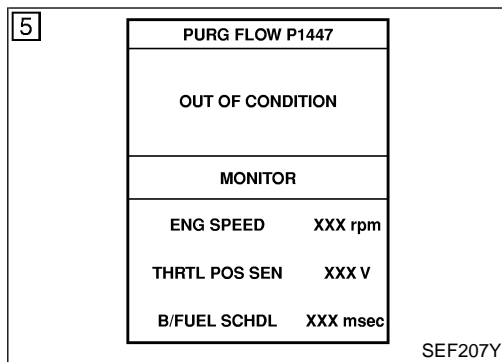
NCEC0605

- EVAP canister purge volume control solenoid valve stuck closed
- EVAP control system pressure sensor and the circuit
- Loose, disconnected or improper connection of rubber tube
- Blocked rubber tube
- Cracked EVAP canister
- EVAP canister purge volume control solenoid valve circuit
- Closed throttle position switch
- Blocked purge port
- EVAP canister vent control valve

GI  
MA  
EM  
LC  
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EL  
IDX

# DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

## DTC Confirmation Procedure



## DTC Confirmation Procedure

NCEC0606

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

### WITH CONSULT-II

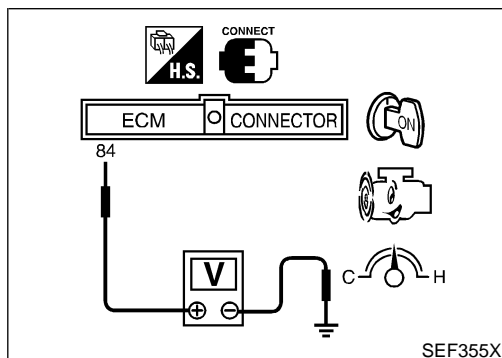
NCEC0606S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Start engine and let it idle for at least 70 seconds.
- 4) Select "PURG FLOW P1447" of "EVAPORATIVE SYSTEM" in "DTC CONFIRMATION" mode with CONSULT-II.
- 5) Touch "START".  
If "COMPLETED" is displayed, go to step 7.
- 6) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

|                            |                             |
|----------------------------|-----------------------------|
| Selector lever             | Suitable position           |
| Vehicle speed              | 32 - 120 km/h (20 - 75 MPH) |
| ENG SPEED                  | 500 - 3,650 rpm             |
| B/FUEL SCHDL               | 1.0 - 8.9 msec              |
| Engine coolant temperature | More than 70°C (158°F)      |

If "TESTING" is not changed for a long time, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-516.



## Overall Function Check

NCEC0607

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

### WITH GST

NCEC0607S01

- 1) Lift up drive wheels.
- 2) Start engine (TCS switch "OFF") and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF", wait at least 10 seconds.
- 4) Start engine and wait at least 70 seconds.

# DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Overall Function Check (Cont'd)

- 5) Set voltmeter probes to ECM terminals 84 (EVAP control system pressure sensor signal) and ground.
- 6) Check EVAP control system pressure sensor value at idle speed and note it. GI
- 7) Establish and maintain the following conditions for at least 1 minute. MA

|                             |                                         |           |
|-----------------------------|-----------------------------------------|-----------|
| Air conditioner switch      | ON                                      |           |
| Steering wheel              | Fully turned                            | EM        |
| Headlamp switch             | ON                                      |           |
| Rear window defogger switch | ON                                      | LC        |
| Engine speed                | Approx. 3,000 rpm                       |           |
| Gear position               | Any position other than "P", "N" or "R" | <b>EC</b> |

- 8) Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second. FE
- 9) If NG, go to "Diagnostic Procedure", EC-516. CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

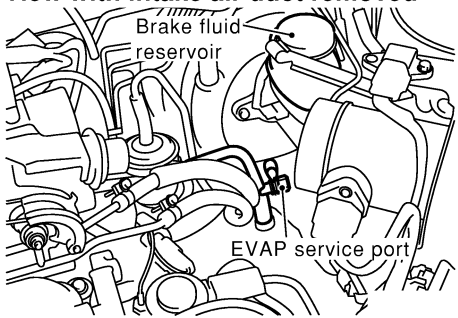
# DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure

## Diagnostic Procedure

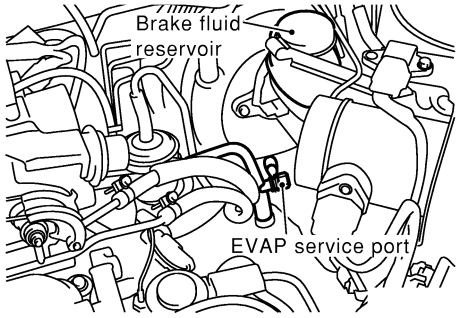
=NCEC0608

|                                                                      |                            |                        |
|----------------------------------------------------------------------|----------------------------|------------------------|
| <b>1</b>                                                             | <b>CHECK EVAP CANISTER</b> |                        |
| 1. Turn ignition switch "OFF".<br>2. Check EVAP canister for cracks. |                            |                        |
| <b>OK or NG</b>                                                      |                            |                        |
| OK (With CONSULT-II)                                                 | ▶                          | GO TO 2.               |
| OK (Without CONSULT-II)                                              | ▶                          | GO TO 3.               |
| NG                                                                   | ▶                          | Replace EVAP canister. |

| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>CHECK PURGE FLOW</b> |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------|-------------|--|-----------------|-------|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|-----------------|--------|--------|--------------|------|------------------|
| (P) <b>With CONSULT-II</b><br>1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| <b>View with intake air duct removed</b><br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| SEF850X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| 2. Start engine and let it idle.<br>3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.<br>4. Rev engine up to 2,000 rpm.<br>5. Touch "Qd" and "Qu" on CONSULT-II screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| <table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><th>PURG VOL CONT/V</th><th>XXX %</th></tr> </thead> <tbody> <tr><td colspan="2" style="text-align: center;">MONITOR</td></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <table border="1" style="display: inline-table;"> <thead> <tr><th>PURG VOL CONT/V</th><th>VACUUM</th></tr> </thead> <tbody> <tr><td style="text-align: center;">100.0%</td><td style="text-align: center;">Should exist</td></tr> <tr><td style="text-align: center;">0.0%</td><td style="text-align: center;">Should not exist</td></tr> </tbody> </table> |                         |          | ACTIVE TEST |  | PURG VOL CONT/V | XXX % | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | LEAN | THRTL POS SEN | XXX V |  |  |  |  |  |  | PURG VOL CONT/V | VACUUM | 100.0% | Should exist | 0.0% | Should not exist |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| PURG VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | XXX %                   |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | XXX rpm                 |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | XXX %                   |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | LEAN                    |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | XXX V                   |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| PURG VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | VACUUM                  |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| 100.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Should exist            |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| 0.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Should not exist        |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| SEF804Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶                       | GO TO 7. |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ▶                       | GO TO 4. |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                 |        |        |              |      |                  |

# DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

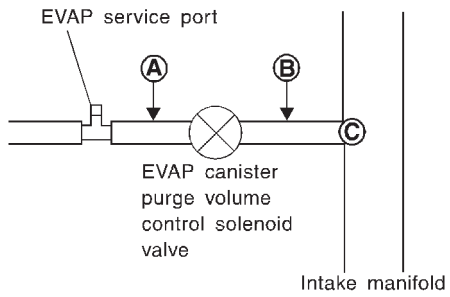
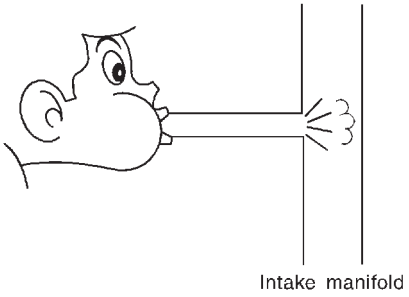
Diagnostic Procedure (Cont'd)

|          |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |    |   |          |    |   |          |                                                                                                  |
|----------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|----------|----|---|----------|--------------------------------------------------------------------------------------------------|
| <b>3</b> | <b>CHECK PURGE FLOW</b> | <p>⊗ <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Start engine and warm it up to normal operating temperature.</li> <li>2. Stop engine.</li> <li>3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.</li> </ol> <div style="text-align: center; margin: 10px 0;"> <p><b>View with intake air duct removed</b></p>  <p>Brake fluid reservoir</p> <p>EVAP service port</p> </div> <p style="text-align: right; margin-right: 20px;">SEF850X</p> <ol style="list-style-type: none"> <li>4. Start engine and let it idle for at least 80 seconds.</li> <li>5. Check vacuum gauge indication when revving engine up to 2,000 rpm.<br/><b>Vacuum should exist.</b></li> <li>6. Release the accelerator pedal fully and let idle.<br/><b>Vacuum should not exist.</b></li> </ol> <p style="text-align: center; margin-top: 10px;"><b>OK or NG</b></p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 7.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 4.</td> </tr> </table> | OK | ▶ | GO TO 7. | NG | ▶ | GO TO 4. | <p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p><b>EC</b></p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> |
| OK       | ▶                       | GO TO 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |    |   |          |    |   |          |                                                                                                  |
| NG       | ▶                       | GO TO 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |    |   |          |    |   |          |                                                                                                  |

|          |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |   |          |    |   |            |                                                                                                      |
|----------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|----------|----|---|------------|------------------------------------------------------------------------------------------------------|
| <b>4</b> | <b>CHECK EVAP PURGE LINE</b> | <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Check EVAP purge line for improper connection or disconnection.<br/>Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.</li> </ol> <p style="text-align: center; margin-top: 10px;"><b>OK or NG</b></p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair it.</td> </tr> </table> | OK | ▶ | GO TO 5. | NG | ▶ | Repair it. | <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p> |
| OK       | ▶                            | GO TO 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |   |          |    |   |            |                                                                                                      |
| NG       | ▶                            | Repair it.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |   |          |    |   |            |                                                                                                      |

# DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

|                                                                                                                                          |                                             |
|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>5</b>                                                                                                                                 | <b>CHECK EVAP PURGE HOSE AND PURGE PORT</b> |
| <p>1. Disconnect purge hoses connected to EVAP service port <b>A</b> and EVAP canister purge volume control solenoid valve <b>B</b>.</p> |                                             |
|                                                        |                                             |
| <p>2. Blow air into each hose and EVAP purge port <b>C</b>.</p> <p>3. Check that air flows freely.</p>                                   |                                             |
|                                                        |                                             |
| <b>OK or NG</b>                                                                                                                          |                                             |
| OK (With CONSULT-II)                                                                                                                     | ▶ GO TO 6.                                  |
| OK (Without CONSULT-II)                                                                                                                  | ▶ GO TO 7.                                  |
| NG                                                                                                                                       | ▶ Repair or clean hoses and/or purge port.  |

SEF367U

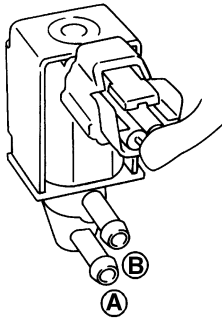
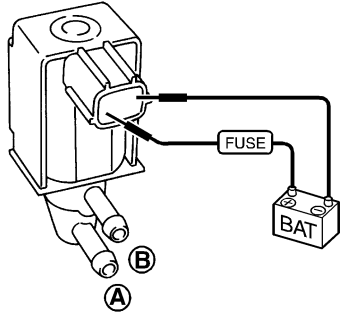
SEF368U

| <b>6</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE</b> |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------|--|-----------------|-------|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">PURG VOL CONT/V</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B1)</td> <td style="text-align: center;">LEAN</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> |                                                                | ACTIVE TEST |  | PURG VOL CONT/V | XXX % | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | LEAN | THRTL POS SEN | XXX V |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| PURG VOL CONT/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | XXX %                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | XXX rpm                                                        |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | XXX %                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | LEAN                                                           |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | XXX V                                                          |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶ GO TO 8.                                                     |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶ GO TO 7.                                                     |             |  |                 |       |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |

SEF801Y

# DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

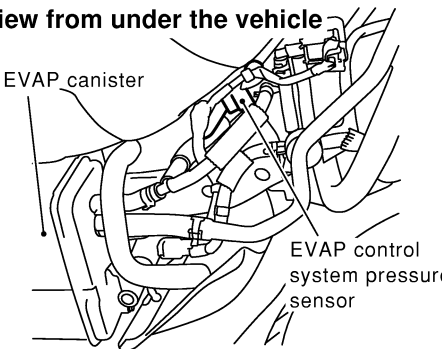
|                                                                                                                                                          |                                                                |                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------|
| <b>7</b>                                                                                                                                                 | <b>CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE</b> |                                                            |
| <p><b>Ⓟ With CONSULT-II</b><br/>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>    |                                                                |                                                            |
|                                                                         |                                                                |                                                            |
| SEF334X                                                                                                                                                  |                                                                |                                                            |
| <p><b>ⓧ Without CONSULT-II</b><br/>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p> |                                                                |                                                            |
|                                                                        |                                                                |                                                            |
| SEF335X                                                                                                                                                  |                                                                |                                                            |
| <b>OK or NG</b>                                                                                                                                          |                                                                |                                                            |
| OK                                                                                                                                                       | ▶                                                              | GO TO 8.                                                   |
| NG                                                                                                                                                       | ▶                                                              | Replace EVAP canister purge volume control solenoid valve. |

GI  
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|                                                                                                                                                   |                                                       |            |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------|
| <b>8</b>                                                                                                                                          | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE</b> |            |
| <p>1. Turn ignition switch "OFF".<br/>2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.</p> |                                                       |            |
| <b>OK or NG</b>                                                                                                                                   |                                                       |            |
| OK                                                                                                                                                | ▶                                                     | GO TO 9.   |
| NG                                                                                                                                                | ▶                                                     | Repair it. |

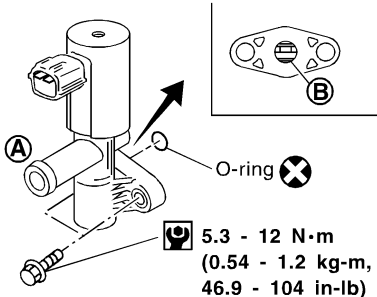


# DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                            |                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------|
| <b>9</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR</b> |                                              |
| <p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <p style="text-align: center;"><b>View from under the vehicle</b></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>EVAP canister</p> <p>EVAP control system pressure sensor</p> </div> <div style="text-align: right;">SEF860X</div> </div> <p>2. Check connectors for water.<br/><b>Water should not exist.</b></p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                            |                                              |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶                                                          | GO TO 10.                                    |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶                                                          | Replace EVAP control system pressure sensor. |

|                                                                                                                        |                                                           |                                              |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------|
| <b>10</b>                                                                                                              | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION</b> |                                              |
| <p>Refer to "DTC Confirmation Procedure" for DTC P0450, EC-384.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                           |                                              |
| OK                                                                                                                     | ▶                                                         | GO TO 11.                                    |
| NG                                                                                                                     | ▶                                                         | Replace EVAP control system pressure sensor. |

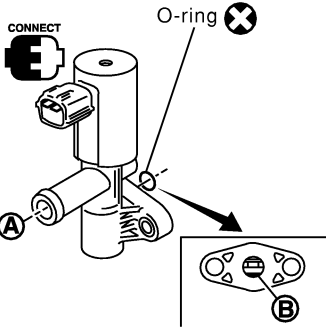
|                                                                                                                                                                                  |                                       |                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------|
| <b>11</b>                                                                                                                                                                        | <b>CHECK RUBBER TUBE FOR CLOGGING</b> |                                            |
| <p>1. Disconnect rubber tube connected to EVAP canister vent control valve.</p> <p>2. Check the rubber tube for clogging.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                       |                                            |
| OK                                                                                                                                                                               | ▶                                     | GO TO 12.                                  |
| NG                                                                                                                                                                               | ▶                                     | Clean the rubber tube using an air blower. |

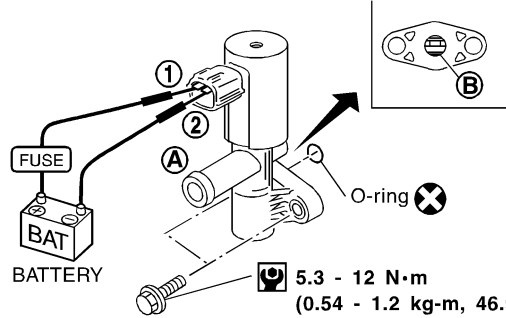
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                 |                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------|
| <b>12</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-I</b> |                                           |
| <p>1. Remove EVAP canister vent control valve from EVAP canister.</p> <p>2. Check portion <b>B</b> of EVAP canister vent control valve for being rusted.</p> <div style="display: flex; justify-content: center; align-items: center;">  <div style="margin-left: 20px;"> <p>O-ring </p> <p> <b>5.3 - 12 N·m</b><br/><b>(0.54 - 1.2 kg-m,</b><br/><b>46.9 - 104 in-lb)</b></p> </div> </div> <p style="text-align: center;"><b>OK or NG</b></p> |                                                 |                                           |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶                                               | GO TO 13.                                 |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶                                               | Replace EVAP canister vent control valve. |



# DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

| <b>13</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-II</b> |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------|--|----------------|-----|---------|--|-----------|---------|--------------|-------|------------|-------|---------------|-------|--|--|--|--|--|--|-----------------------------|-------------------------------------------|----|----|-----|-----|
| <p><b>Ⓟ With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Reconnect harness connectors disconnected.</li> <li>2. Turn ignition switch "ON".</li> <li>3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.</li> <li>4. Check air passage continuity and operation delay time.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 30%;">  </div> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VENT CONTROL/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 (B1)</td> <td>XXX V</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <div style="width: 35%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Condition<br/>VENT CONTROL/V</th> <th>Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p><b>Operation takes less than 1 second.</b></p> </div> </div> |                                                  | ACTIVE TEST |  | VENT CONTROL/V | OFF | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 (B1) | XXX V | THRTL POS SEN | XXX V |  |  |  |  |  |  | Condition<br>VENT CONTROL/V | Air passage continuity<br>between A and B | ON | No | OFF | Yes |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | OFF                                              |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | XXX rpm                                          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | XXX %                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| HO2S1 (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | XXX V                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | XXX V                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| Condition<br>VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Air passage continuity<br>between A and B        |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | No                                               |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Yes                                              |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| SEF803Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |

| <p><b>⊗ Without CONSULT-II</b></p> <p>Check air passage continuity and operation delay time under the following conditions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                           |           |                                           |                                                        |    |     |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------|-------------------------------------------|--------------------------------------------------------|----|-----|-----|
| <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 30%;">  </div> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between<br/>terminals 1 and 2</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p><b>Operation takes less than 1 second.</b></p> </div> </div> |                                           | Condition | Air passage continuity<br>between A and B | 12V direct current supply between<br>terminals 1 and 2 | No | OFF | Yes |
| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Air passage continuity<br>between A and B |           |                                           |                                                        |    |     |     |
| 12V direct current supply between<br>terminals 1 and 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | No                                        |           |                                           |                                                        |    |     |     |
| OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                                       |           |                                           |                                                        |    |     |     |
| SEF339X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                           |           |                                           |                                                        |    |     |     |
| <p><b>Make sure new O-ring is installed properly.</b></p> <p><b>5.3 - 12 N·m</b><br/>(0.54 - 1.2 kg-m, 46.9 - 104 in-lb)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |           |                                           |                                                        |    |     |     |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                           |           |                                           |                                                        |    |     |     |
| OK (With CONSULT-II) ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GO TO 15.                                 |           |                                           |                                                        |    |     |     |
| OK (Without CONSULT-II) ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | GO TO 16.                                 |           |                                           |                                                        |    |     |     |
| NG ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | GO TO 14.                                 |           |                                           |                                                        |    |     |     |

|                                                                                                                                                                                             |                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>14</b>                                                                                                                                                                                   | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-III</b> |
| <ol style="list-style-type: none"> <li>1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower.</li> <li>2. Perform Test No. 13 again.</li> </ol> |                                                   |
| <b>OK or NG</b>                                                                                                                                                                             |                                                   |
| OK (With CONSULT-II) ▶                                                                                                                                                                      | GO TO 15.                                         |
| OK (Without CONSULT-II) ▶                                                                                                                                                                   | GO TO 16.                                         |
| NG ▶                                                                                                                                                                                        | Replace EVAP canister vent control valve.         |

GI  
MA  
EM  
LC  
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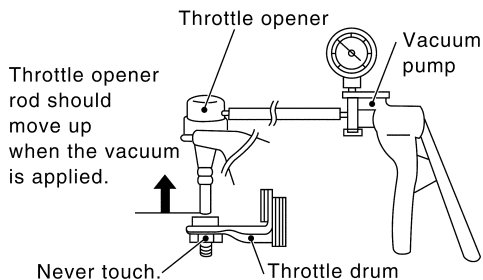
# DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

## 15 CHECK THROTTLE POSITION SWITCH

**With CONSULT-II**

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF".
4. Remove vacuum hose connected to throttle opener.
5. Connect suitable vacuum hose to vacuum pump and the throttle opener.
6. Apply vacuum [more than  $-40.0$  kPa ( $-300$  mmHg,  $-11.81$  inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

7. Turn ignition switch "ON".
8. Select "DATA MONITOR" mode with CONSULT-II.
9. Check indication of "CLSD THL/P SW" under the following conditions.  
Measurement must be made with throttle position switch installed in vehicle.

| Throttle valve conditions         | CLSD THL/P SW |
|-----------------------------------|---------------|
| Completely closed                 | ON            |
| Partially open or completely open | OFF           |

MTBL0355

**OK or NG**

|    |   |           |
|----|---|-----------|
| OK | ▶ | GO TO 18. |
| NG | ▶ | GO TO 17. |

# DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

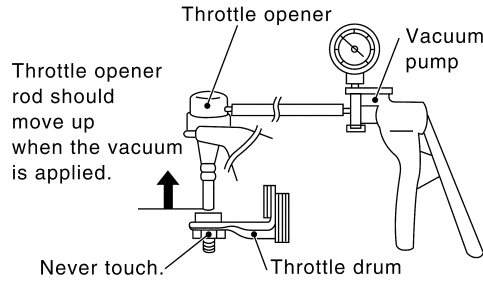
Diagnostic Procedure (Cont'd)

GI  
MA  
EM  
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IDX

## 16 CHECK THROTTLE POSITION SWITCH

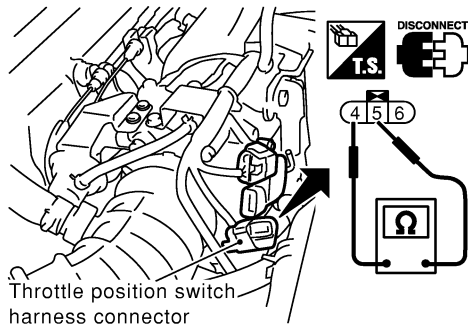
⊗ Without CONSULT-II

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF".
4. Remove vacuum hose connected to throttle opener.
5. Connect suitable vacuum hose to vacuum pump and the throttle opener.
6. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

7. Disconnect closed throttle position switch harness connector.
8. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions. Resistance measurement must be made with throttle position switch installed in vehicle.



| Throttle valve conditions         | Continuity |
|-----------------------------------|------------|
| Completely closed                 | Yes        |
| Partially open or completely open | No         |

SEF940X

OK or NG

- OK ► GO TO 18.  
NG ► GO TO 17.

## 17 ADJUST THROTTLE POSITION SWITCH

Check the following items. Refer to "Basic Inspection", EC-107.

| Items                                                    | Specifications                                                                                     |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Ignition timing                                          | 15°±2° BTDC                                                                                        |
| Closed throttle position switch idle position adjustment | Feeler gauge thickness and switch condition<br>0.05 mm (0.0020 in): ON<br>0.15 mm (0.0059 in): OFF |
| Target idle speed                                        | M/T: 800±50<br>A/T: 800±50 rpm (in "P" or "N" position)                                            |

MTBL0518

Is it possible to adjust closed throttle position switch?

Yes or No

- Yes ► GO TO 18.  
No ► Replace throttle position switch.

# DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

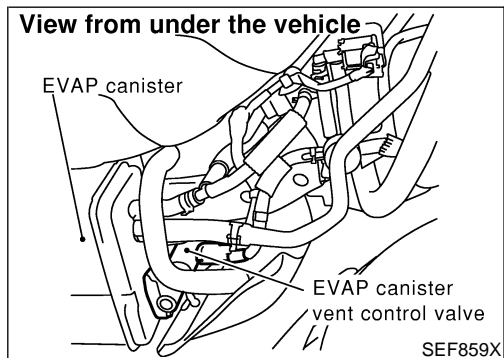
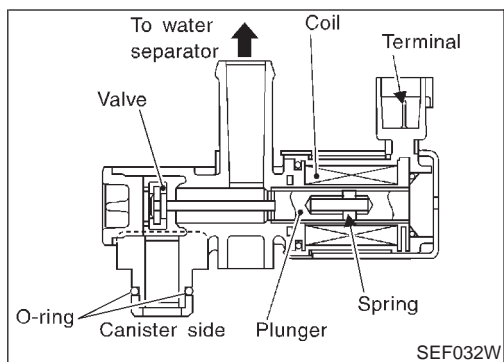
|                                                                                                                                      |                              |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>18</b>                                                                                                                            | <b>CHECK EVAP PURGE LINE</b> |
| Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.<br>Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37. |                              |
| <b>OK or NG</b>                                                                                                                      |                              |
| OK                                                                                                                                   | ▶ GO TO 19.                  |
| NG                                                                                                                                   | ▶ Replace it.                |

|                                                                |                              |
|----------------------------------------------------------------|------------------------------|
| <b>19</b>                                                      | <b>CLEAN EVAP PURGE LINE</b> |
| Clean EVAP purge line (pipe and rubber tube) using air blower. |                              |
|                                                                | ▶ GO TO 20.                  |

|                                                                 |                                    |
|-----------------------------------------------------------------|------------------------------------|
| <b>20</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
|                                                                 | ▶ <b>INSPECTION END</b>            |

# DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Component Description



## Component Description

NCEC0609

### NOTE:

If DTC P1448 is displayed with P0440, perform trouble diagnosis for DTC P1448 first.

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.

GI

MA

EM

LC

EC

FE

CL

MT

AT

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0610

Specification data are reference values.

| MONITOR ITEM | CONDITION             | SPECIFICATION |
|--------------|-----------------------|---------------|
| VENT CONT/V  | ● Ignition switch: ON | OFF           |

AX

SU

## ECM Terminals and Reference Value

NCEC0659

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TER-MINAL NO. | WIRE COLOR | ITEM                             | CONDITION              | DATA (DC Voltage)          |
|---------------|------------|----------------------------------|------------------------|----------------------------|
| 102           | PU/W       | EVAP canister vent control valve | [Ignition switch "ON"] | BATTERY VOLTAGE (11 - 14V) |

BR

ST

RS

BT

HA

## On Board Diagnosis Logic

NCEC0611

Malfunction is detected when EVAP canister vent control valve remains opened under specified driving conditions.

SC

EL

IDX

# DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Possible Cause

## Possible Cause

NCEC0612

- EVAP canister vent control valve
- EVAP control system pressure sensor and circuit
- Blocked rubber tube to EVAP canister vent control valve
- Water separator
- EVAP canister is saturated with water.
- Vacuum cut valve

## DTC Confirmation Procedure

NCEC0613

### NOTE:

- If DTC P1448 is displayed with P0440 or P1440, perform trouble diagnosis for DTC P1448 first.
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**EVAP SML LEAK P0440/P1440**

1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.  
 -FUEL LEVEL: 1/4-3/4  
 -AMBIENT TEMP: 0-30 C(32-86F)  
 -OPEN ENGINE HOOD.  
 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.  
 3)TOUCH START.

SEF565X

**EVAP SML LEAK P0440/P1440**

WAIT  
2 TO 10 MINUTES.  
KEEP ENGINE RUNNING  
AT IDLE SPEED.

SEF566X

**EVAP SML LEAK P0440/P1440**

OK

---

SELF-DIAG RESULTS

---

NO DTC DETECTED.  
FURTHER TESTING  
MAY BE REQUIRED.

SEF567X

## WITH CONSULT-II

NCEC0613S01

### TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
  - Always perform test at a temperature of 0 to 30°C (32 to 86°F).
- 1) Turn ignition switch “ON”.
  - 2) Turn ignition switch “OFF” and wait at least 10 seconds.
  - 3) Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
  - 4) Make sure that the following conditions are met.

|               |                       |
|---------------|-----------------------|
| COOLAN TEMP/S | 0 - 70°C (32 - 158°F) |
| INT/A TEMP SE | 0 - 30°C (32 - 86°F)  |

- 5) Select “EVAP SML LEAK P0440/P1440” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.  
Follow the instruction displayed.  
If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to “Basic Inspection”, EC-107.
- 6) Make sure that “OK” is displayed.  
If “NG” is displayed, go to the following step.

### NOTE:

**Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.**

- 7) Stop engine and wait at least 5 seconds, then turn “ON”.
- 8) Disconnect hose from water separator.
- 9) Select “VENT CONTROL/V” of “ACTIVE TEST” mode with CONSULT-II.
- 10) Touch “ON” and “OFF” alternately.

# DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

DTC Confirmation Procedure (Cont'd)

|    |                |         |
|----|----------------|---------|
| 11 | ACTIVE TEST    |         |
|    | VENT CONTROL/V | OFF     |
|    | MONITOR        |         |
|    | ENG SPEED      | XXX rpm |
|    | A/F ALPHA-B1   | XXX %   |
|    | HO2S1 (B1)     | XXX V   |
|    | THRTL POS SEN  | XXX V   |

SEF805Y

11) Make sure the following.

| Condition<br>VENT CONTROL/V | Air passage continuity<br>between A and B |
|-----------------------------|-------------------------------------------|
| ON                          | No                                        |
| OFF                         | Yes                                       |

If the result is NG, go to "Diagnostic Procedure", EC-529.  
If the result is OK, go to "Diagnostic Procedure" for DTC P0440, EC-357.

AEC783A

## Overall Function Check

Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a DTC might not be confirmed.

### WITH GST

- 1) Disconnect hose from water separator.
- 2) Disconnect EVAP canister vent control valve harness connector.
- 3) Verify the following.

| Condition                                           | Air passage continuity |
|-----------------------------------------------------|------------------------|
| 12V direct current supply between terminals 1 and 2 | No                     |
| No supply                                           | Yes                    |

If the result is NG, go to "Diagnostic Procedure", EC-529.  
If the result is OK, go to "Diagnostic Procedure" for DTC P0440, EC-357.

GI  
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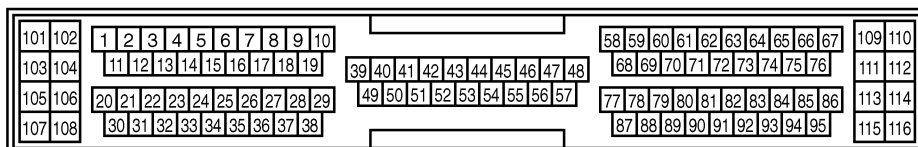
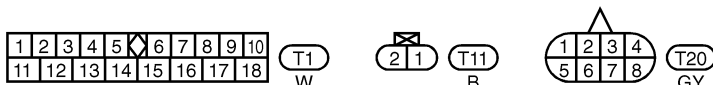
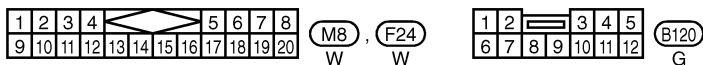
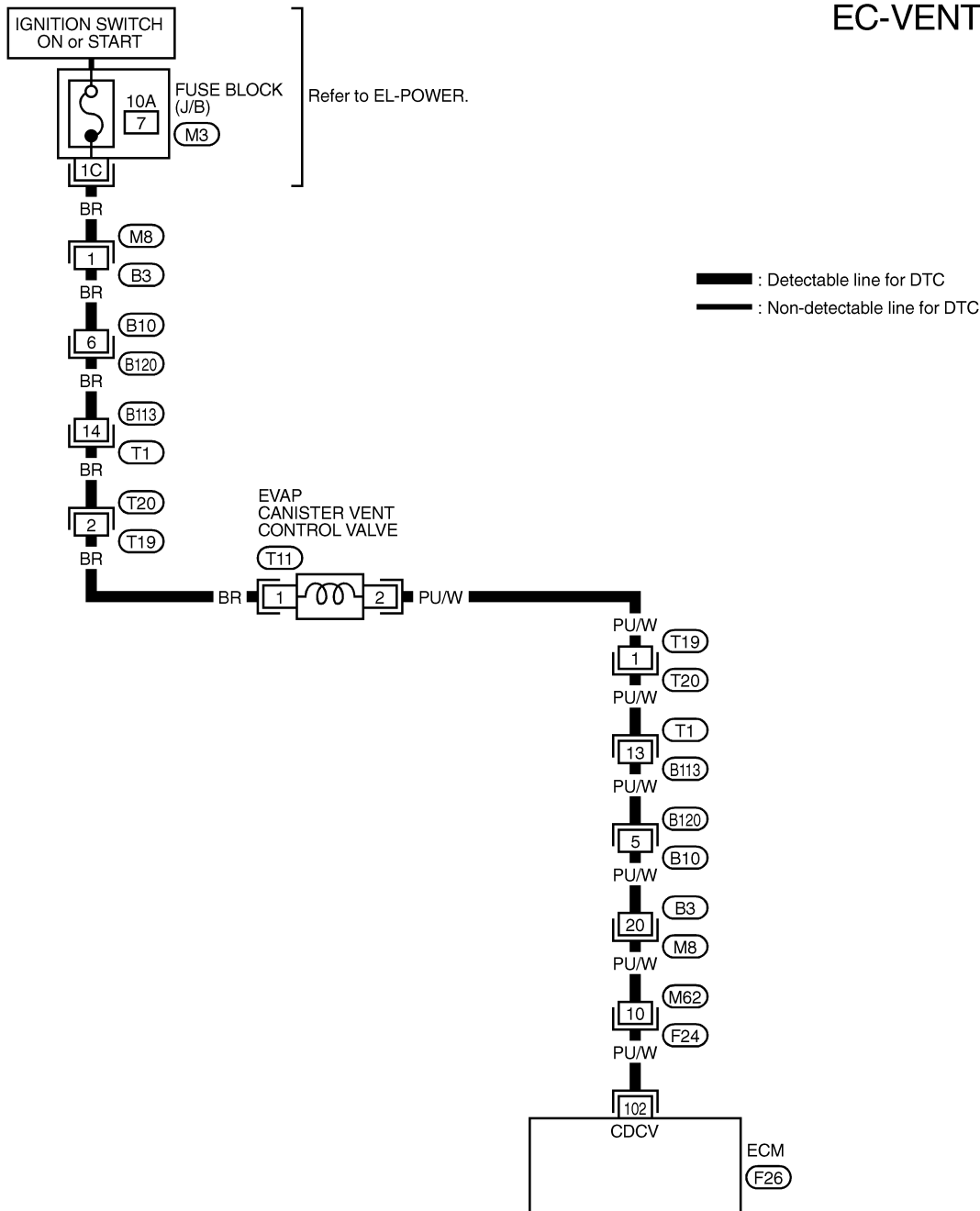
# DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Wiring Diagram

## Wiring Diagram

NCEC0615

EC-VENT/V-01



REFER TO THE FOLLOWING.  
 M3 - FUSE BLOCK-JUNCTION BOX (J/B)

TEC712

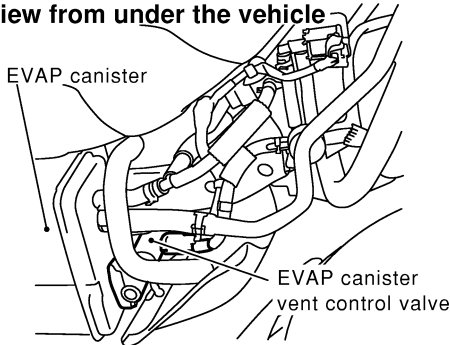


# DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Diagnostic Procedure

## Diagnostic Procedure

NCEC0616

|                                                                                                                                                                                                                    |                          |                                        |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------------|--|
| <b>1</b>                                                                                                                                                                                                           | <b>CHECK RUBBER TUBE</b> |                                        |  |
| <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Disconnect rubber tube connected to EVAP canister vent control valve.</li> <li>3. Check the rubber tube for clogging.</li> </ol> |                          |                                        |  |
| <p><b>View from under the vehicle</b></p>                                                                                        |                          |                                        |  |
| SEF859X                                                                                                                                                                                                            |                          |                                        |  |
| <b>OK or NG</b>                                                                                                                                                                                                    |                          |                                        |  |
| OK                                                                                                                                                                                                                 | ▶                        | GO TO 2.                               |  |
| NG                                                                                                                                                                                                                 | ▶                        | Clean rubber tube using an air blower. |  |

GI

MA

EM

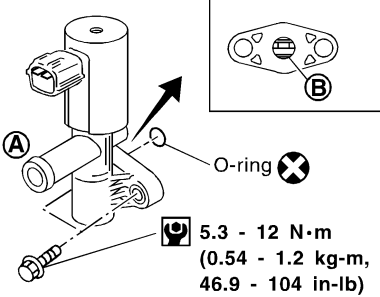
LC

**EC**

FE

CL

MT

|                                                                                                                                                                                                           |                                                 |                                           |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------|--|
| <b>2</b>                                                                                                                                                                                                  | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-I</b> |                                           |  |
| <ol style="list-style-type: none"> <li>1. Remove EVAP canister vent control valve from EVAP canister.</li> <li>2. Check portion <b>B</b> of EVAP canister vent control valve for being rusted.</li> </ol> |                                                 |                                           |  |
|                                                                                                                        |                                                 |                                           |  |
| SEF337X                                                                                                                                                                                                   |                                                 |                                           |  |
| <b>OK or NG</b>                                                                                                                                                                                           |                                                 |                                           |  |
| OK                                                                                                                                                                                                        | ▶                                               | GO TO 3.                                  |  |
| NG                                                                                                                                                                                                        | ▶                                               | Replace EVAP canister vent control valve. |  |

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

# DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Diagnostic Procedure (Cont'd)

| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-II</b> |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------|--|----------------|-----|---------|--|-----------|---------|--------------|-------|------------|-------|---------------|-------|--|--|--|--|--|--|-----------------------------|-------------------------------------------|----|----|-----|-----|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch ON.</li> <li>2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.</li> <li>3. Check air passage continuity and operation delay time.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 30%;"> </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VENT CONTROL/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 (B1)</td> <td>XXX V</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <div style="width: 35%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Condition<br/>VENT CONTROL/V</th> <th>Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p><b>Operation takes less than 1 second.</b></p> </div> </div> |                                                  | ACTIVE TEST |  | VENT CONTROL/V | OFF | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 (B1) | XXX V | THRTL POS SEN | XXX V |  |  |  |  |  |  | Condition<br>VENT CONTROL/V | Air passage continuity<br>between A and B | ON | No | OFF | Yes |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | OFF                                              |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | XXX rpm                                          |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | XXX %                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| HO2S1 (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | XXX V                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | XXX V                                            |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| Condition<br>VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Air passage continuity<br>between A and B        |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | No                                               |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Yes                                              |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |
| SEF803Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |             |  |                |     |         |  |           |         |              |       |            |       |               |       |  |  |  |  |  |  |                             |                                           |    |    |     |     |

| <p> <b>Without CONSULT-II</b></p> <p>Check air passage continuity and operation delay time under the following conditions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                           |           |                                           |                                                     |    |     |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------|-------------------------------------------|-----------------------------------------------------|----|-----|-----|
| <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40%;"> <p style="margin-top: 10px;"> <b>5.3 - 12 N·m</b><br/>(0.54 - 1.2 kg-m, 46.9 - 104 in-lb)</p> </div> <div style="width: 55%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p><b>Operation takes less than 1 second.</b></p> </div> </div> |                                           | Condition | Air passage continuity<br>between A and B | 12V direct current supply between terminals 1 and 2 | No | OFF | Yes |
| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Air passage continuity<br>between A and B |           |                                           |                                                     |    |     |     |
| 12V direct current supply between terminals 1 and 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | No                                        |           |                                           |                                                     |    |     |     |
| OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                                       |           |                                           |                                                     |    |     |     |
| SEF339X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                           |           |                                           |                                                     |    |     |     |
| <b>Make sure new O-ring is installed properly.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |           |                                           |                                                     |    |     |     |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                           |           |                                           |                                                     |    |     |     |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                         | GO TO 5.  |                                           |                                                     |    |     |     |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ▶                                         | GO TO 4.  |                                           |                                                     |    |     |     |

|                                                                                                                                                                                                          |                                                   |                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------|
| <b>4</b>                                                                                                                                                                                                 | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-III</b> |                                           |
| <ol style="list-style-type: none"> <li>1. Clean the air passage (Portion <b>A</b> to <b>B</b>) of EVAP canister vent control valve using an air blower.</li> <li>2. Perform Test No. 3 again.</li> </ol> |                                                   |                                           |
| <b>OK or NG</b>                                                                                                                                                                                          |                                                   |                                           |
| OK                                                                                                                                                                                                       | ▶                                                 | GO TO 5.                                  |
| NG                                                                                                                                                                                                       | ▶                                                 | Replace EVAP canister vent control valve. |

# DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Diagnostic Procedure (Cont'd)

|          |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                           |
|----------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>5</b> | <b>CHECK VACUUM CUT VALVE</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                           |
|          |                               | <ol style="list-style-type: none"> <li>1. Turn ignition switch OFF.</li> <li>2. Remove vacuum cut valve.</li> <li>3. Check vacuum cut valve as follows:</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GI<br>MA<br>EM<br>LC<br><b>EC</b><br>FE<br>CL<br>MT<br>AT |
|          |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SEF379Q                                                   |
|          |                               | <ol style="list-style-type: none"> <li>a. Plug port <b>C</b> and <b>D</b> with fingers.</li> <li>b. Apply vacuum to port <b>A</b> and check that there is no suction from port <b>B</b>.</li> <li>c. Apply vacuum to port <b>B</b> and check that there is suction from port <b>A</b>.</li> <li>d. Blow air in port <b>B</b> and check that there is a resistance to flow out of port <b>A</b>.</li> <li>e. Open port <b>C</b> and <b>D</b>.</li> <li>f. Blow air in port <b>A</b> check that air flows freely out of port <b>C</b>.</li> <li>g. Blow air in port <b>B</b> check that air flows freely out of port <b>D</b>.</li> </ol> |                                                           |
|          |                               | <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                           |
| OK       | ▶                             | GO TO 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | AX                                                        |
| NG       | ▶                             | Replace vacuum cut valve.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SU<br>BR<br>ST<br>RS<br>BT<br>HA<br>SC                    |

|          |                                                    |                                                                                                                                                                                         |                                        |
|----------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>6</b> | <b>CHECK IF EVAP CANISTER SATURATED WITH WATER</b> |                                                                                                                                                                                         |                                        |
|          |                                                    | <ol style="list-style-type: none"> <li>1. Remove EVAP canister with EVAP canister vent control valve attached.</li> <li>2. Check if water will drain from the EVAP canister.</li> </ol> | SU<br>BR<br>ST<br>RS<br>BT<br>HA<br>SC |
|          |                                                    |                                                                                                                                                                                         | SEF596U                                |
|          |                                                    | <b>Yes or No</b>                                                                                                                                                                        |                                        |
| Yes      | ▶                                                  | GO TO 7.                                                                                                                                                                                | EL                                     |
| No       | ▶                                                  | GO TO 9.                                                                                                                                                                                | IDX                                    |

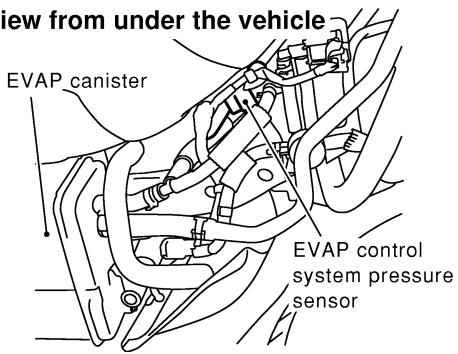
|          |                            |                                                                                                                                       |           |
|----------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>7</b> | <b>CHECK EVAP CANISTER</b> |                                                                                                                                       |           |
|          |                            | Weigh the EVAP canister with the EVAP canister vent control valve attached.<br><b>The weight should be less than 1.8 kg (4.0 lb).</b> | EL<br>IDX |
|          |                            | <b>OK or NG</b>                                                                                                                       |           |
| OK       | ▶                          | GO TO 9.                                                                                                                              |           |
| NG       | ▶                          | GO TO 8.                                                                                                                              |           |

# DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                               |                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>8</b>                                                                                                                                                                                      | <b>DETECT MALFUNCTIONING PART</b>       |
| Check the following. <ul style="list-style-type: none"><li>● EVAP canister for damage</li><li>● EVAP hose between EVAP canister and water separator for clogging or poor connection</li></ul> |                                         |
|                                                                                                                                                                                               | ▶ Repair hose or replace EVAP canister. |

|                                                                                                      |                                                       |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <b>9</b>                                                                                             | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE</b> |
| Check disconnection or improper connection of hose connected to EVAP control system pressure sensor. |                                                       |
| <b>OK or NG</b>                                                                                      |                                                       |
| OK                                                                                                   | ▶ GO TO 10.                                           |
| NG                                                                                                   | ▶ Repair it.                                          |

|                                                                                     |                                                            |
|-------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>10</b>                                                                           | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR</b> |
| 1. Disconnect EVAP control system pressure sensor harness connector.                |                                                            |
| <b>View from under the vehicle</b>                                                  |                                                            |
|  |                                                            |
| 2. Check connectors for water.<br><b>Water should not exist.</b>                    |                                                            |
| SEF860X                                                                             |                                                            |
| <b>OK or NG</b>                                                                     |                                                            |
| OK                                                                                  | ▶ GO TO 11.                                                |
| NG                                                                                  | ▶ Replace EVAP control system pressure sensor.             |

# DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Diagnostic Procedure (Cont'd)

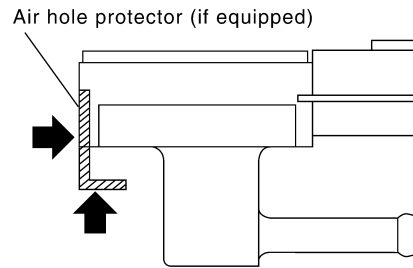
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## 11 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

**CAUTION:**

- Never apply force to the air hole protector of the sensor if equipped.



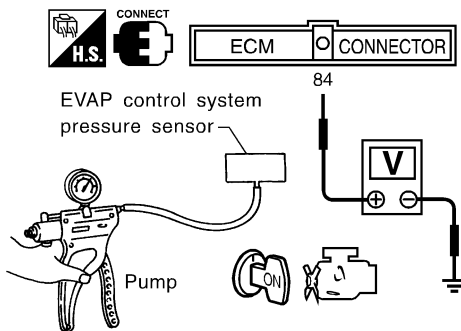
SEF799W

2. Remove hose from EVAP control system pressure sensor.
3. Turn ignition switch "ON".
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below  $-20$  kPa ( $-150$  mmHg,  $-5.91$  inHg) or over  $20$  kPa ( $150$  mmHg,  $5.91$  inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



| Pressure (Relative to atmospheric pressure) | Voltage V |
|---------------------------------------------|-----------|
| 0 kPa (0 mmHg, 0 inHg)                      | 3.0 - 3.6 |
| -9.3 kPa (-70 mmHg, -2.76 inHg)             | 0.4 - 0.6 |

SEF342X

**CAUTION:**

- Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

|    |   |                                              |
|----|---|----------------------------------------------|
| OK | ▶ | GO TO 12.                                    |
| NG | ▶ | Replace EVAP control system pressure sensor. |

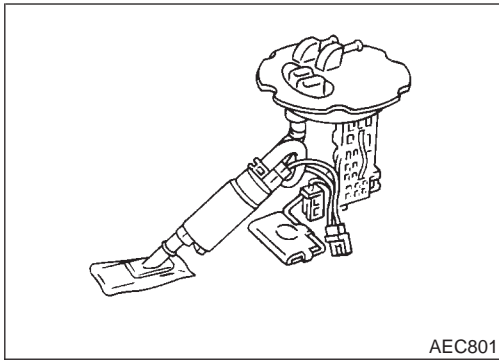
## 12 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.

▶ INSPECTION END

# DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

## Component Description



## Component Description

NCEC0617

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

## ECM Terminals and Reference Value

NCEC0660

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                     | CONDITION              | DATA (DC Voltage)                                                |
|----------------------|---------------|--------------------------|------------------------|------------------------------------------------------------------|
| 83                   | G/R           | Fuel level sensor        | [Ignition switch "ON"] | Approximately 0 - 4.8V<br>Output voltage varies with fuel level. |
| 90                   | B             | Fuel level sensor ground | [Engine is running]    | Approximately 0V                                                 |

## On Board Diagnostic Logic

NCEC0618

ECM receives two signals from the fuel level sensor.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the latter to detect open circuit malfunction. Malfunction is detected when a high voltage from the sensor is sent to ECM.

## Possible Cause

NCEC0619

- Fuel level sensor circuit  
(The fuel level sensor circuit is open or shorted.)

# DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

DTC Confirmation Procedure

## DTC Confirmation Procedure

NCEC0620

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

GI

MA

EM

LC

| DATA MONITOR  |        |
|---------------|--------|
| MONITOR       | NO DTC |
| FUEL T/TMP SE | XXX °C |
| FUEL LEVEL SE | XXX V  |

SEF195Y

### WITH CONSULT-II

NCEC0620S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-537.

EC

FE

### WITH GST

NCEC0620S02

Follow the procedure "WITH CONSULT-II" above.

CL

MT

AT

AX

SU

BR

ST

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HA

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IDX

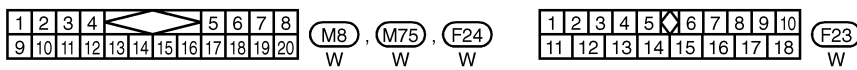
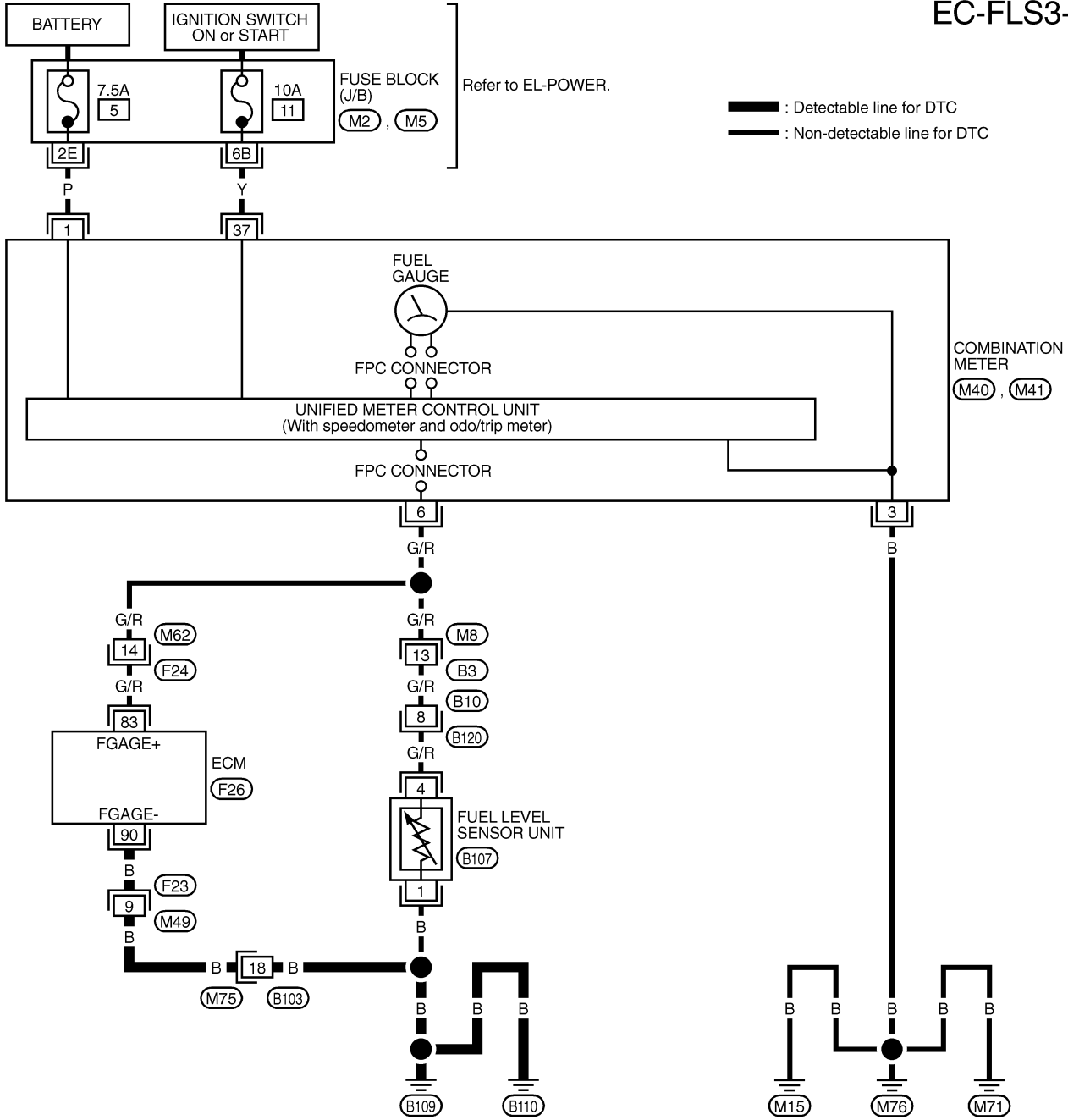
# DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

Wiring Diagram

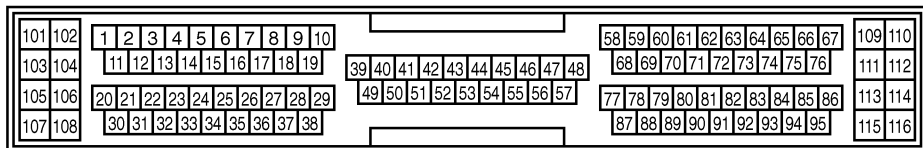
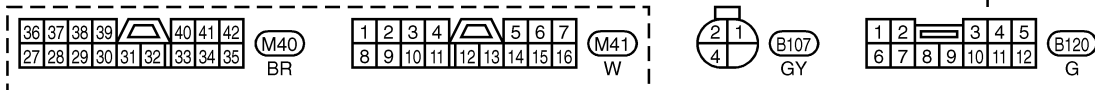
## Wiring Diagram

NCEC0621

EC-FLS3-01



REFER TO THE FOLLOWING.  
 (M2), (M5) - FUSE BLOCK-JUNCTION BOX (J/B)



TEC754



# DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

Diagnostic Procedure

## Diagnostic Procedure

=NCEC0622

| 1                                                                                                                                                                                                                                                       | CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 1. Turn ignition switch "OFF".<br>2. Disconnect ECM harness connector.<br>3. Check harness continuity between ECM terminal 90 and body ground. Refer to Wiring Diagram.<br><b>Continuity should exist.</b><br>4. Also check harness for short to power. |                                                           |
| <b>OK or NG</b>                                                                                                                                                                                                                                         |                                                           |
| OK                                                                                                                                                                                                                                                      | ▶ GO TO 3.                                                |
| NG                                                                                                                                                                                                                                                      | ▶ GO TO 2.                                                |

GI  
MA  
EM  
LC

| 2                                                                                                                                                                                                             | DETECT MALFUNCTIONING PART                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| 1. Check the following. <ul style="list-style-type: none"><li>● Harness connectors F23, M49</li><li>● Harness connectors M75, B103</li><li>● Harness for open and short between ECM and body ground</li></ul> |                                                                  |
| ▶                                                                                                                                                                                                             | Replace open circuit or short to power in harness or connectors. |

**EC**  
FE  
CL

| 3                                               | CHECK FUEL LEVEL SENSOR           |
|-------------------------------------------------|-----------------------------------|
| Refer to EL-96, "Fuel Level Sensor Unit Check". |                                   |
| <b>OK or NG</b>                                 |                                   |
| OK                                              | ▶ GO TO 4.                        |
| NG                                              | ▶ Replace fuel level sensor unit. |

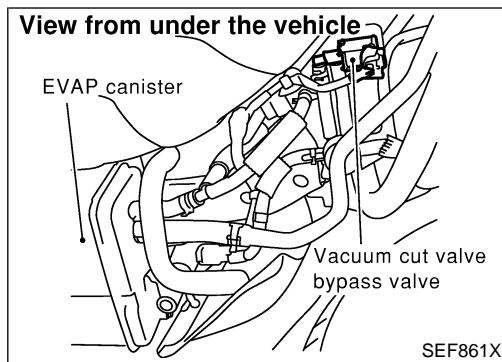
MT  
AT  
AX

| 4                                                              | CHECK INTERMITTENT INCIDENT |
|----------------------------------------------------------------|-----------------------------|
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146 |                             |
| <b>OK or NG</b>                                                |                             |
| ▶                                                              | <b>INSPECTION END</b>       |

SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

# DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

## Description



## Description

### COMPONENT DESCRIPTION

=NCEC0623

NCEC0623S01

The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

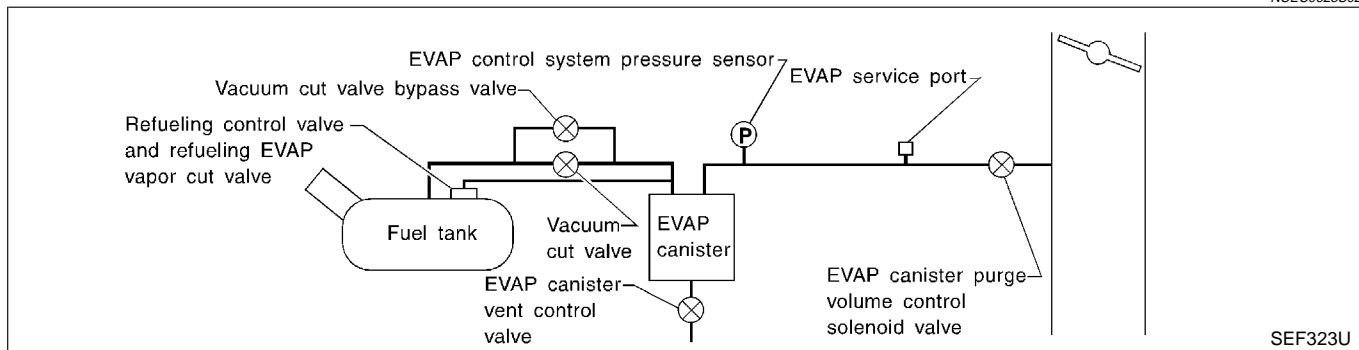
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.

### EVAPORATIVE EMISSION SYSTEM DIAGRAM

NCEC0623S02



## CONSULT-II Reference Value in Data Monitor Mode

NCEC0624

Specification data are reference values.

| MONITOR ITEM  | CONDITION             | SPECIFICATION |
|---------------|-----------------------|---------------|
| VC/V BYPASS/V | ● Ignition switch: ON | OFF           |

## ECM Terminals and Reference Value

NCEC0661

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TER-MINAL NO. | WIRE COLOR | ITEM                          | CONDITION              | DATA (DC Voltage)          |
|---------------|------------|-------------------------------|------------------------|----------------------------|
| 2             | PU/R       | Vacuum cut valve bypass valve | [Ignition switch "ON"] | BATTERY VOLTAGE (11 - 14V) |

# DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

On Board Diagnosis Logic

## On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal is sent to ECM through vacuum cut valve bypass valve.

NCEC0625

GI

MA

EM

LC

## Possible Cause

- Harness or connectors  
(The vacuum cut valve bypass valve circuit is open or shorted.)
- Vacuum cut valve bypass valve

NCEC0626

EC

FE

CL

MT

## DTC Confirmation Procedure

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle speed.

NCEC0627

AT

AX

SU

BR

|   |              |         |
|---|--------------|---------|
| 3 | DATA MONITOR |         |
|   | MONITOR      | NO DTC  |
|   | ENG SPEED    | XXX rpm |

SEF058Y

### WITH CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-541.

NCEC0627S01

ST

RS

### WITH GST

Follow the procedure "WITH CONSULT-II" above.

NCEC0627S02

BT

HA

SC

EL

IDX



# DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)


Diagnostic Procedure

## Diagnostic Procedure

NCEC0629

|                         |                         |          |
|-------------------------|-------------------------|----------|
| <b>1</b>                | <b>INSPECTION START</b> |          |
| Do you have CONSULT-II? |                         |          |
| <b>Yes or No</b>        |                         |          |
| Yes                     | ▶                       | GO TO 2. |
| No                      | ▶                       | GO TO 3. |

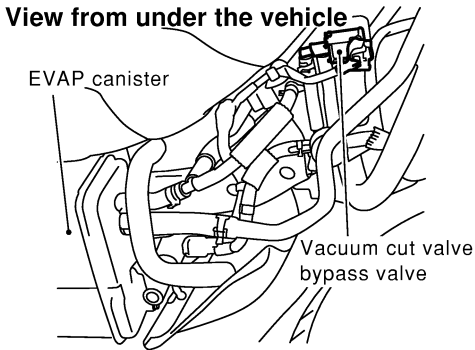
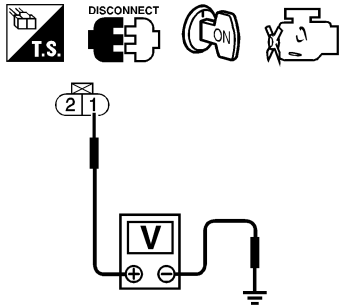
GI  
MA  
EM

| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>CHECK VACUUM CUT VALVE BYPASS VALVE CIRCUIT</b> |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------|-------------|--|---------------|-----|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Turn ignition switch "OFF" and then "ON".</li> <li>Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II.</li> <li>Touch "ON/OFF" on CONSULT-II screen.</li> </ol>                                                                                                                                                          |                                                    |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <table border="1" style="margin: auto;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>VC/V BYPASS/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>RICH</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table> |                                                    |          | ACTIVE TEST |  | VC/V BYPASS/V | OFF | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | RICH | THRTL POS SEN | XXX V |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                    |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| VC/V BYPASS/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | OFF                                                |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | XXX rpm                                            |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | XXX %                                              |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RICH                                               |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | XXX V                                              |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                    |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                    |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                    |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| SEF806Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| 4. Make sure that clicking sound is heard from the vacuum cut valve bypass valve.                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                    |          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶                                                  | GO TO 7. |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶                                                  | GO TO 3. |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |

LC  
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# DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>CHECK VACUUM CUT VALVE BYPASS VALVE POWER SUPPLY CIRCUIT</b> |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect vacuum cut valve bypass valve harness connector.</p> <p style="text-align: center;"><b>View from under the vehicle</b></p>  <p style="text-align: right;">SEF861X</p> <p>3. Turn ignition switch "ON".<br/>                 4. Check voltage between vacuum cut valve bypass valve terminal 1 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;"><b>Voltage: Battery voltage</b></p> <p style="text-align: center;">OK or NG</p> <p style="text-align: right;">SEF356X</p> |                                                                 |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶ GO TO 5.                                                      |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ▶ GO TO 4.                                                      |


|                                                                                                                                                                                                                                                                                                                                                                                  |                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                                                         | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M8, B3</li> <li>● Harness connectors B10, B120</li> <li>● Harness connectors B113, T1</li> <li>● Harness connectors T20, T19</li> <li>● Fuse block (J/B) connector M3</li> <li>● 10A fuse</li> <li>● Harness for open or short between vacuum cut valve bypass valve and fuse</li> </ul> |                                   |
| ▶                                                                                                                                                                                                                                                                                                                                                                                | Repair harness or connectors.     |


|                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                           | <b>CHECK VACUUM CUT VALVE BYPASS VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect ECM harness connector.<br/>                 3. Check harness continuity between ECM terminal 2 and vacuum cut valve bypass valve terminal 2. Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b><br/>                 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> |                                                                                     |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶ GO TO 7.                                                                          |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                 | ▶ GO TO 6.                                                                          |

# DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                           |                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>6</b>                                                                                                                                                                                                                                                                                                                                                  | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors T19, T20</li> <li>● Harness connectors T1, B113</li> <li>● Harness connectors B120, B10</li> <li>● Harness connectors B3, M8</li> <li>● Harness connectors M49, F23</li> <li>● Harness for open or short between vacuum cut valve bypass valve and ECM</li> </ul> |                                                                                    |
| ▶                                                                                                                                                                                                                                                                                                                                                         | Repair open circuit or short to ground or short to power in harness or connectors. |

| <b>7</b>                                                                                                                                                                                                                                                                                                                         | <b>CHECK VACUUM CUT VALVE BYPASS VALVE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--|---------------|-----|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|----------------------------|-------------------------------------------|----|-----|-----|----|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Reconnect harness disconnected connectors.</li> <li>2. Turn ignition switch ON.</li> <li>3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.</li> <li>4. Check air passage continuity and operation delay time under the following conditions.</li> </ol> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
|                                                                                                                                                                                                                                                | <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> <tr> <td style="text-align: center;">VC/V BYPASS/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B1)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="text-align: center;">Condition<br/>VC/V BYPASS/V</th> <th style="text-align: center;">Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">ON</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> <p style="text-align: center;"><b>Operation takes less than 1 second.</b></p> | ACTIVE TEST |  | VC/V BYPASS/V | OFF | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | RICH | THRTL POS SEN | XXX V |  |  |  |  |  |  | Condition<br>VC/V BYPASS/V | Air passage continuity<br>between A and B | ON | Yes | OFF | No |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
| VC/V BYPASS/V                                                                                                                                                                                                                                                                                                                    | OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
| MONITOR                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
| ENG SPEED                                                                                                                                                                                                                                                                                                                        | XXX rpm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                     | XXX %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                  | RICH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                    | XXX V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
|                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
|                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
|                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
| Condition<br>VC/V BYPASS/V                                                                                                                                                                                                                                                                                                       | Air passage continuity<br>between A and B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
| ON                                                                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
| OFF                                                                                                                                                                                                                                                                                                                              | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |
| SEF807Y                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |                            |                                           |    |     |     |    |

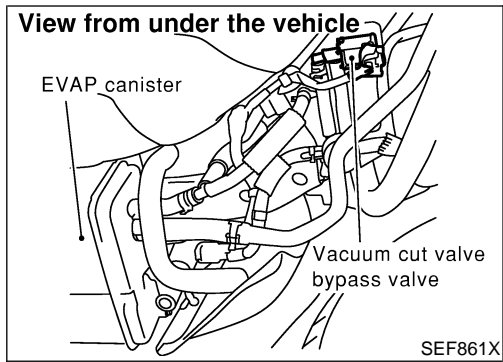
| <p> <b>Without CONSULT-II</b></p> <p>Check air passage continuity and operation delay time under the following conditions.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                                           |                                                     |     |           |    |
|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------|-----------------------------------------------------|-----|-----------|----|
|                                             | <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity<br/>between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">No supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> <p style="text-align: center;"><b>Operation takes less than 1 second.</b></p> | Condition | Air passage continuity<br>between A and B | 12V direct current supply between terminals 1 and 2 | Yes | No supply | No |
| Condition                                                                                                                      | Air passage continuity<br>between A and B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |                                           |                                                     |     |           |    |
| 12V direct current supply between terminals 1 and 2                                                                            | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |                                           |                                                     |     |           |    |
| No supply                                                                                                                      | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |                                           |                                                     |     |           |    |
| <b>OK or NG</b>                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                                           |                                                     |     |           |    |
| OK                                                                                                                             | ▶ GO TO 8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                                           |                                                     |     |           |    |
| NG                                                                                                                             | ▶ Replace vacuum cut valve bypass valve.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |                                           |                                                     |     |           |    |
| SEF557Y                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                                           |                                                     |     |           |    |

|                                                                 |                                    |
|-----------------------------------------------------------------|------------------------------------|
| <b>8</b>                                                        | <b>CHECK INTERMITTENT INCIDENT</b> |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
| ▶                                                               | <b>INSPECTION END</b>              |

GI  
 MA  
 EM  
 LC  
 EC  
 FE  
 CL  
 MT  
 AT  
 AX  
 SU  
 BR  
 ST  
 RS  
 BT  
 HA  
 SC  
 EL  
 IDX

# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

## Description



## Description

### COMPONENT DESCRIPTION

NCEC0630

NCEC0630S01

The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

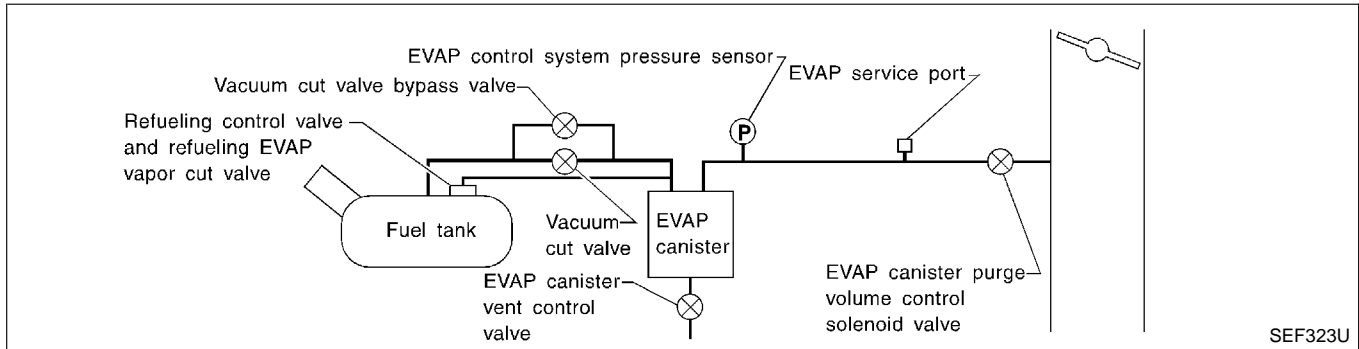
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.

### EVAPORATIVE EMISSION SYSTEM DIAGRAM

NCEC0630S02



## CONSULT-II Reference Value in Data Monitor Mode

NCEC0631

Specification data are reference values.

| MONITOR ITEM  | CONDITION             | SPECIFICATION |
|---------------|-----------------------|---------------|
| VC/V BYPASS/V | ● Ignition switch: ON | OFF           |

## ECM Terminals and Reference Value

NCEC0662

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TER-MINAL NO. | WIRE COLOR | ITEM                          | CONDITION              | DATA (DC Voltage)          |
|---------------|------------|-------------------------------|------------------------|----------------------------|
| 2             | PU/R       | Vacuum cut valve bypass valve | [Ignition switch "ON"] | BATTERY VOLTAGE (11 - 14V) |



## On Board Diagnosis Logic

Malfunction is detected when vacuum cut valve bypass valve does not operate properly.

NCEC0632

GI

MA

EM

LC

## Possible Cause

- Vacuum cut valve bypass valve
- Vacuum cut valve
- Bypass hoses for clogging
- EVAP control system pressure sensor and circuit
- EVAP canister vent control valve
- Hose between fuel tank and vacuum cut valve clogged
- Hose between vacuum cut valve and EVAP canister clogged
- EVAP canister
- EVAP purge port of fuel tank for clogging

NCEC0633

EC

FE

CL

MT

## DTC Confirmation Procedure

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Always perform test at a temperature of 5 to 30°C (41 to 86°F).

NCEC0634

AT

AX

SU

BR

NCEC0634S01

### WITH CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and let it idle for at least 70 seconds.
- 5) Select "VC CUT/V BP/V P1491" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 6) Touch "START".
- 7) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 30 seconds.)

ST

RS

BT

HA

SC

EL

IDX

|   |                     |          |
|---|---------------------|----------|
| 7 | VC CUT/V BP/V P1491 |          |
|   | OUT OF CONDITION    |          |
|   | MONITOR             |          |
|   | ENG SPEED           | XXX rpm  |
|   | VHCL SPEED SE       | XXX km/h |
|   | B/FUEL SCHDL        | XXX msec |

SEF210Y

|   |                     |          |
|---|---------------------|----------|
| 7 | VC CUT/V BP/V P1491 |          |
|   | TESTING             |          |
|   | MONITOR             |          |
|   | ENG SPEED           | XXX rpm  |
|   | VHCL SPEED SE       | XXX km/h |
|   | B/FUEL SCHDL        | XXX msec |

SEF211Y

|   |                     |  |
|---|---------------------|--|
| 7 | VC CUT/V BP/V P1491 |  |
|   | COMPLETED           |  |

SEF239Y

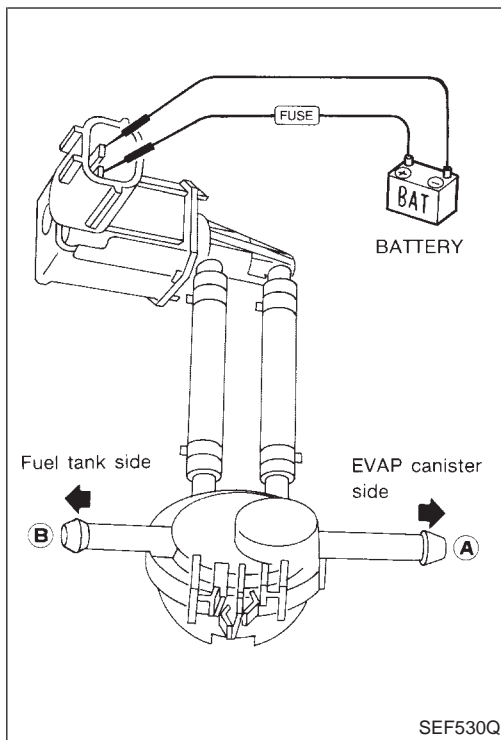
|                |                            |
|----------------|----------------------------|
| ENG SPEED      | More than 1,000 rpm        |
| Selector lever | Suitable position          |
| Vehicle speed  | More than 37 km/h (23 MPH) |
| B/FUEL SCHDL   | 1.0 – 8.9 msec             |

If "TESTING" is not displayed after 5 minutes, retry from step 3.

- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-548.

# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

## Overall Function Check



## Overall Function Check

NCEC0635

Use this procedure to check the overall function of vacuum cut valve bypass valve. During this check, the 1st trip DTC might not be confirmed.

### WITH GST

NCEC0635S01

- 1) Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
- 2) Apply vacuum to port **A** and check that there is no suction from port **B**.
- 3) Apply vacuum to port **B** and check that there is suction from port **A**.
- 4) Blow air in port **B** and check that there is a resistance to flow out of port **A**.
- 5) Supply battery voltage to the terminal.
- 6) Blow air in port **A** and check that air flows freely out of port **B**.
- 7) Blow air in port **B** and check that air flows freely out of port **A**.
- 8) If NG, go to "Diagnostic Procedure", EC-548.

# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Wiring Diagram

## Wiring Diagram

NCEC0636

EC-BYPS/V-01

GI

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

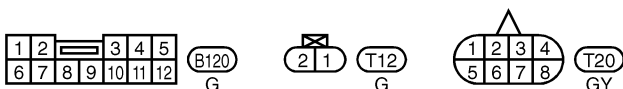
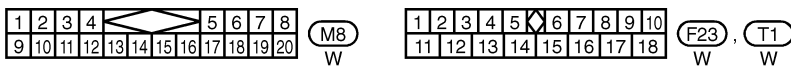
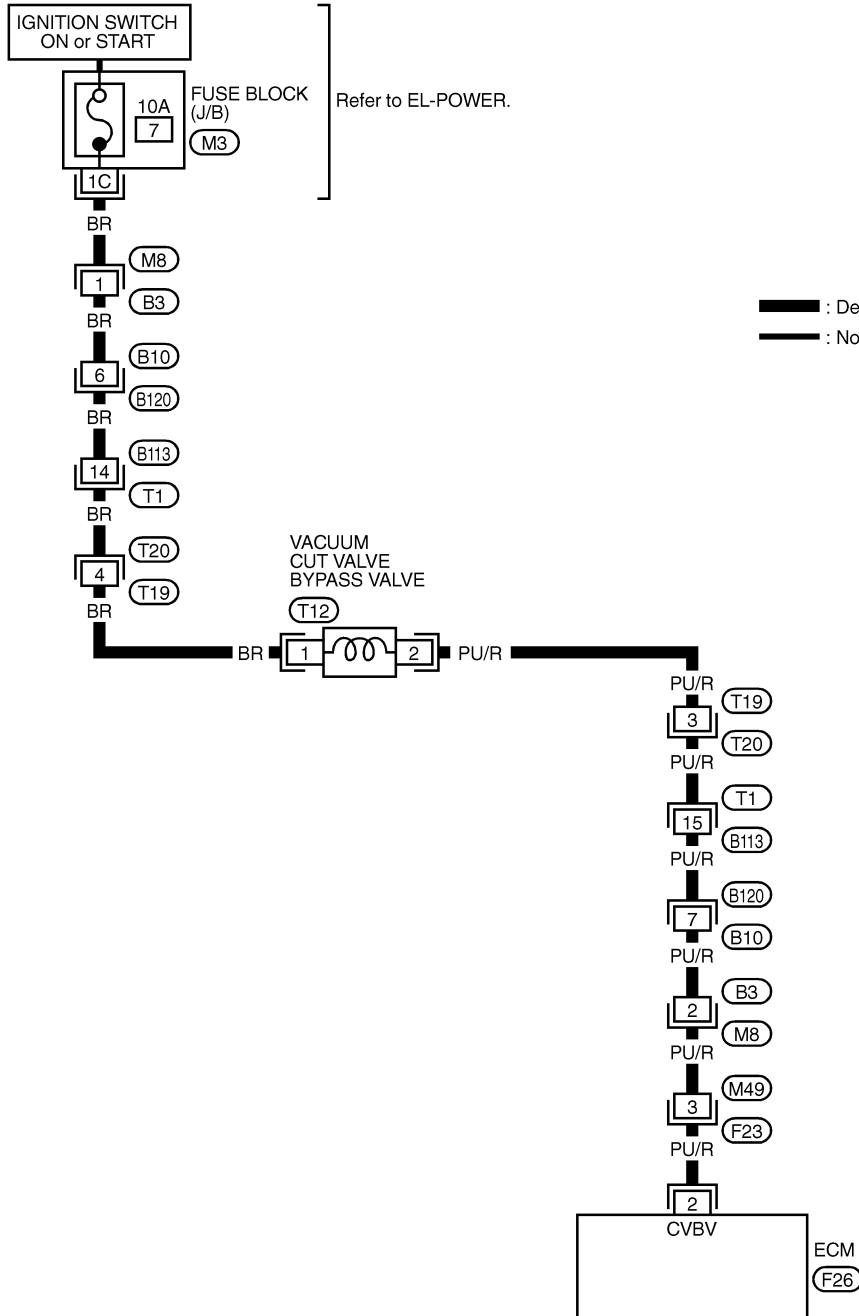
BT

HA

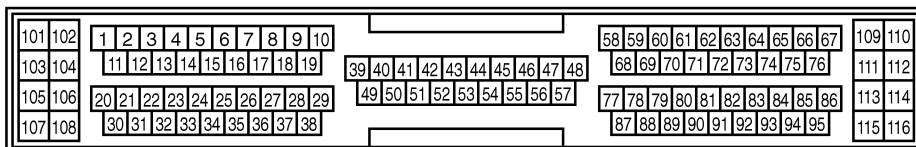
SC

EL

IDX



REFER TO THE FOLLOWING.  
 M3 - FUSE BLOCK-JUNCTION BOX (J/B)



TEC720


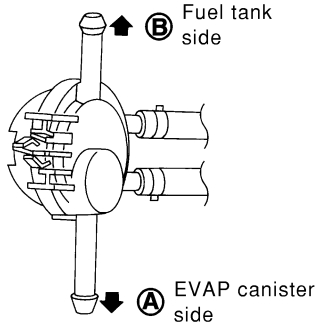
# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure

## Diagnostic Procedure

NCEC0637

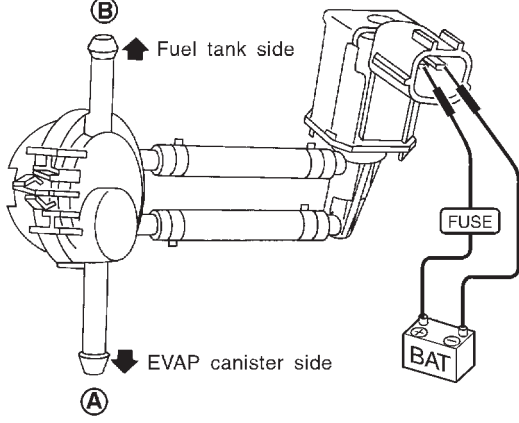
|                         |                         |          |  |
|-------------------------|-------------------------|----------|--|
| <b>1</b>                | <b>INSPECTION START</b> |          |  |
| Do you have CONSULT-II? |                         |          |  |
| Yes or No               |                         |          |  |
| Yes                     | ▶                       | GO TO 2. |  |
| No                      | ▶                       | GO TO 3. |  |

| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------|--|---------------|-----|---------|--|-----------|---------|--------------|-------|-----------------|------|---------------|-------|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.</li> <li>3. Apply vacuum to port A and check that there is no suction from port B.</li> <li>4. Apply vacuum to port B and check that there is suction from port A.</li> <li>5. Blow air in port B and check that there is a resistance to flow out of port A.</li> <li>6. Turn ignition switch "ON".</li> <li>7. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II and touch "ON".</li> <li>8. Blow air in port A and check that air flows freely out of port B.</li> <li>9. Blow air in port B and check that air flows freely out of port A.</li> </ol> |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                      | <table border="1"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VC/V BYPASS/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>RICH</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> |  | ACTIVE TEST |  | VC/V BYPASS/V | OFF | MONITOR |  | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 MNTR (B1) | RICH | THRTL POS SEN | XXX V |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| VC/V BYPASS/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | OFF                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | XXX rpm                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | XXX %                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| HO2S1 MNTR (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | RICH                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | XXX V                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                                                    | GO TO 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                                                    | GO TO 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |             |  |               |     |         |  |           |         |              |       |                 |      |               |       |  |  |  |  |  |  |

SEF808Y

# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION</b> |
| <p>⊗ <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.</li> <li>3. Apply vacuum to port A and check that there is no suction from port B.</li> <li>4. Apply vacuum to port B and check that there is suction from port A.</li> <li>5. Blow air in port B and check that there is a resistance to flow out of port A.</li> <li>6. Disconnect vacuum cut valve bypass valve harness connector.</li> <li>7. Supply battery voltage to the terminal.</li> <li>8. Blow air in port A and check that air flows freely out of port B.</li> <li>9. Blow air in port B and check that air flows freely out of port A.</li> </ol> |                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                      |
| SEF914U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                      |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                      |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ GO TO 4.                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ GO TO 7.                                           |

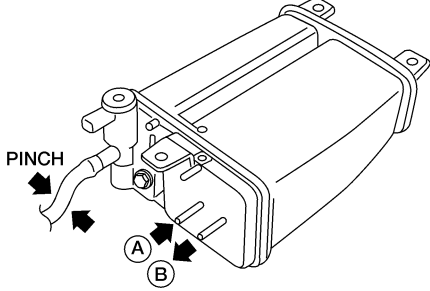
|                                                                                          |                              |
|------------------------------------------------------------------------------------------|------------------------------|
| <b>4</b>                                                                                 | <b>CHECK EVAP PURGE LINE</b> |
| Check EVAP purge line between EVAP canister and fuel tank for clogging or disconnection. |                              |
| <b>OK or NG</b>                                                                          |                              |
| OK                                                                                       | ▶ GO TO 5.                   |
| NG                                                                                       | ▶ Repair it.                 |

|                                                  |                              |
|--------------------------------------------------|------------------------------|
| <b>5</b>                                         | <b>CHECK EVAP PURGE PORT</b> |
| Check EVAP purge port of fuel tank for clogging. |                              |
| <b>OK or NG</b>                                  |                              |
| OK                                               | ▶ GO TO 6.                   |
| NG                                               | ▶ Clean EVAP purge port.     |

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# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

| 6                                                                                                                    |   | CHECK EVAP CANISTER    |
|----------------------------------------------------------------------------------------------------------------------|---|------------------------|
| 1. Pinch the fresh air hose.<br>2. Blow air into port <b>A</b> and check that it flows freely out of port <b>B</b> . |   |                        |
|                                    |   |                        |
| AEC630A                                                                                                              |   |                        |
| <b>OK or NG</b>                                                                                                      |   |                        |
| OK                                                                                                                   | ▶ | GO TO 12.              |
| NG                                                                                                                   | ▶ | Replace EVAP canister. |

| 7                                |   | CHECK BYPASS HOSE        |
|----------------------------------|---|--------------------------|
| Check bypass hoses for clogging. |   |                          |
| <b>OK or NG</b>                  |   |                          |
| OK                               | ▶ | GO TO 8.                 |
| NG                               | ▶ | Repair or replace hoses. |

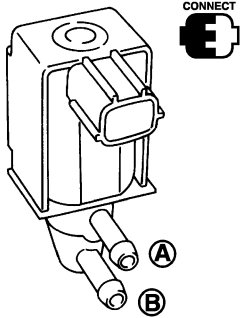
# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

## 8 CHECK VACUUM CUT VALVE BYPASS VALVE

### With CONSULT-II

1. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.
2. Check air passage continuity and operation delay time under the following conditions.



| ACTIVE TEST     |         |
|-----------------|---------|
| VC/V BYPASS/V   | OFF     |
| MONITOR         |         |
| ENG SPEED       | XXX rpm |
| A/F ALPHA-B1    | XXX %   |
| HO2S1 MNTR (B1) | RICH    |
| THRRTL POS SEN  | XXX V   |
|                 |         |
|                 |         |
|                 |         |

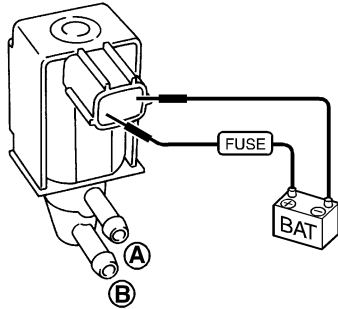
| Condition<br>VC/V BYPASS/V | Air passage continuity<br>between A and B |
|----------------------------|-------------------------------------------|
| ON                         | Yes                                       |
| OFF                        | No                                        |

Operation takes less than 1 second.

SEF807Y

### Without CONSULT-II

- Check air passage continuity and operation delay time under the following conditions.



| Condition                                           | Air passage continuity<br>between A and B |
|-----------------------------------------------------|-------------------------------------------|
| 12V direct current supply between terminals 1 and 2 | Yes                                       |
| No supply                                           | No                                        |

Operation takes less than 1 second.

SEF557Y

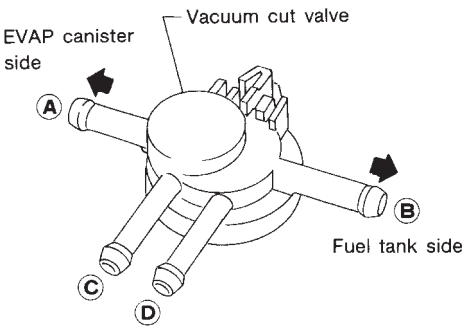
OK or NG

|    |   |                                        |
|----|---|----------------------------------------|
| OK | ▶ | GO TO 9.                               |
| NG | ▶ | Replace vacuum cut valve bypass valve. |

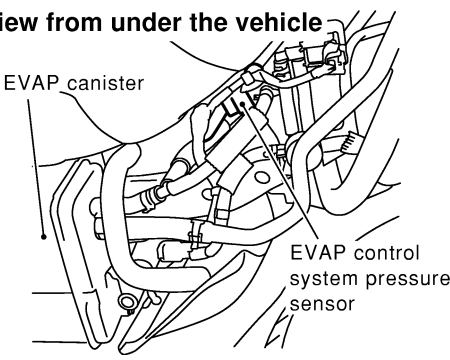
GI  
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IDX

# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>9</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK VACUUM CUT VALVE</b> |
| <p>Check vacuum cut valve as follows:</p> <div style="text-align: center;">  </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                               |
| SEF379Q                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                               |
| <ol style="list-style-type: none"> <li>a. Plug port <b>C</b> and <b>D</b> with fingers.</li> <li>b. Apply vacuum to port <b>A</b> and check that there is no suction from port <b>B</b>.</li> <li>c. Apply vacuum to port <b>B</b> and check that there is suction from port <b>A</b>.</li> <li>d. Blow air in port <b>B</b> and check that there is a resistance to flow out of port <b>A</b>.</li> <li>e. Open port <b>C</b> and <b>D</b>.</li> <li>f. Blow air in port <b>A</b> check that air flows freely out of port <b>C</b>.</li> <li>g. Blow air in port <b>B</b> check that air flows freely out of port <b>D</b>.</li> </ol> |                               |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶ GO TO 10.                   |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶ Replace vacuum cut valve.   |

|                                                                                                                                                                                                   |                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <b>10</b>                                                                                                                                                                                         | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE</b> |
| <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.</li> </ol> |                                                       |
| <b>OK or NG</b>                                                                                                                                                                                   |                                                       |
| OK                                                                                                                                                                                                | ▶ GO TO 11.                                           |
| NG                                                                                                                                                                                                | ▶ Repair or replace.                                  |

|                                                                                                                                                                                                                                                                                                |                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>11</b>                                                                                                                                                                                                                                                                                      | <b>CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR</b> |
| <ol style="list-style-type: none"> <li>1. Disconnect EVAP control system pressure sensor harness connector.</li> </ol> <div style="text-align: center;"> <p><b>View from under the vehicle</b></p>  </div> |                                                            |
| SEF860X                                                                                                                                                                                                                                                                                        |                                                            |
| <ol style="list-style-type: none"> <li>2. Check connectors for water.<br/><b>Water should not exist.</b></li> </ol>                                                                                                                                                                            |                                                            |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                |                                                            |
| OK                                                                                                                                                                                                                                                                                             | ▶ GO TO 12.                                                |
| NG                                                                                                                                                                                                                                                                                             | ▶ Replace EVAP control system pressure sensor.             |



# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

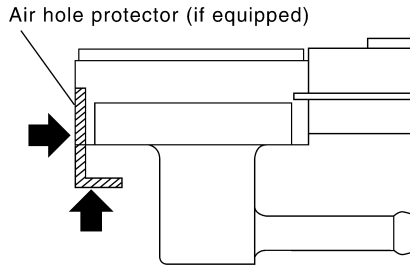
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HA  
SC  
EL  
IDX

## 12 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

**CAUTION:**

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

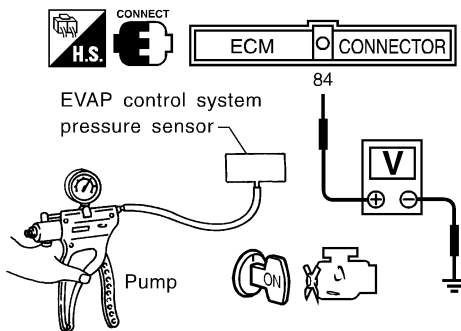
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below  $-20$  kPa ( $-150$  mmHg,  $-5.91$  inHg) or over  $20$  kPa ( $150$  mmHg,  $5.91$  inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



| Pressure (Relative to atmospheric pressure) | Voltage V |
|---------------------------------------------|-----------|
| 0 kPa (0 mmHg, 0 inHg)                      | 3.0 - 3.6 |
| -9.3 kPa (-70 mmHg, -2.76 inHg)             | 0.4 - 0.6 |

SEF342X

**CAUTION:**

- Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK ► GO TO 13.

NG ► Replace EVAP control system pressure sensor.

## 13 CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.

2. Check the rubber tube for clogging.

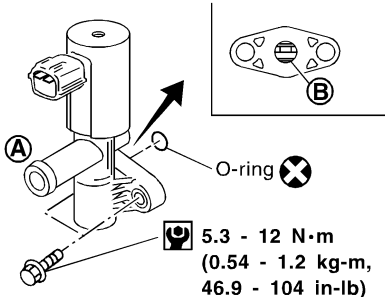
OK or NG


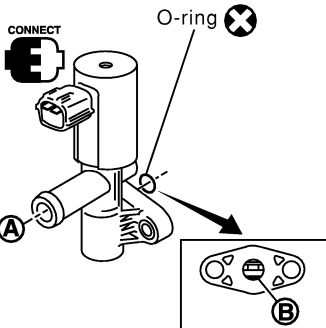
OK ► GO TO 14.


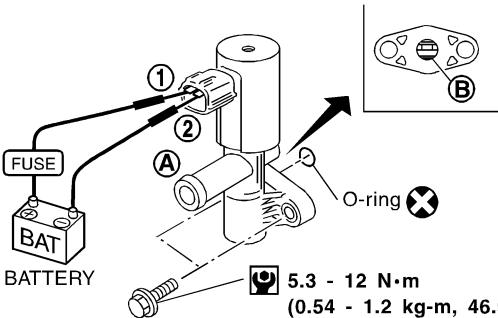
NG ► Clean the rubber tube using an air blower.

# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                           |                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>14</b>                                                                                                                                                                                                 | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-I</b> |
| <ol style="list-style-type: none"> <li>1. Remove EVAP canister vent control valve from EVAP canister.</li> <li>2. Check portion <b>B</b> of EVAP canister vent control valve for being rusted.</li> </ol> |                                                 |
|                                                                                                                         |                                                 |
| SEF337X                                                                                                                                                                                                   |                                                 |
| <b>OK or NG</b>                                                                                                                                                                                           |                                                 |
| OK                                                                                                                                                                                                        | ▶ GO TO 15.                                     |
| NG                                                                                                                                                                                                        | ▶ Replace EVAP canister vent control valve.     |

| <b>15</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-II</b> |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------|----------------------------------------|----------------|-----|---------|-----|-----------|---------|--------------|-------|------------|-------|---------------|-------|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Reconnect harness disconnected connectors.</li> <li>2. Turn ignition switch ON.</li> <li>3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.</li> <li>4. Check air passage continuity and operation delay time.</li> </ol>                                                                                                                                                                          |                                                  |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| <table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VENT CONTROL/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 (B1)</td> <td>XXX V</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> |                                                  | ACTIVE TEST              |                                        | VENT CONTROL/V | OFF | MONITOR |     | ENG SPEED | XXX rpm | A/F ALPHA-B1 | XXX % | HO2S1 (B1) | XXX V | THRTL POS SEN | XXX V |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | OFF                                              |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | XXX rpm                                          |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| A/F ALPHA-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | XXX %                                            |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| HO2S1 (B1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | XXX V                                            |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| THRTL POS SEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | XXX V                                            |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| <table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th>Condition VENT CONTROL/V</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p><b>Operation takes less than 1 second.</b></p>                                                                                                                                                                                                               |                                                  | Condition VENT CONTROL/V | Air passage continuity between A and B | ON             | No  | OFF     | Yes |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| Condition VENT CONTROL/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Air passage continuity between A and B           |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | No                                               |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Yes                                              |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |
| SEF803Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |                          |                                        |                |     |         |     |           |         |              |       |            |       |               |       |  |  |  |  |  |  |

| <p> <b>Without CONSULT-II</b></p> <p>Check air passage continuity and operation delay time under the following conditions.</p>                                                                                                                                                                |                                        |           |                                        |                                                     |    |     |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-----------|----------------------------------------|-----------------------------------------------------|----|-----|-----|
|                                                                                                                                                                                                                                                                                               |                                        |           |                                        |                                                     |    |     |     |
| <table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p><b>Operation takes less than 1 second.</b></p> |                                        | Condition | Air passage continuity between A and B | 12V direct current supply between terminals 1 and 2 | No | OFF | Yes |
| Condition                                                                                                                                                                                                                                                                                                                                                                        | Air passage continuity between A and B |           |                                        |                                                     |    |     |     |
| 12V direct current supply between terminals 1 and 2                                                                                                                                                                                                                                                                                                                              | No                                     |           |                                        |                                                     |    |     |     |
| OFF                                                                                                                                                                                                                                                                                                                                                                              | Yes                                    |           |                                        |                                                     |    |     |     |
| SEF339X                                                                                                                                                                                                                                                                                                                                                                          |                                        |           |                                        |                                                     |    |     |     |
| <b>Make sure new O-ring is installed properly.</b>                                                                                                                                                                                                                                                                                                                               |                                        |           |                                        |                                                     |    |     |     |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                  |                                        |           |                                        |                                                     |    |     |     |
| OK                                                                                                                                                                                                                                                                                                                                                                               | ▶ GO TO 17.                            |           |                                        |                                                     |    |     |     |
| NG                                                                                                                                                                                                                                                                                                                                                                               | ▶ GO TO 16.                            |           |                                        |                                                     |    |     |     |

# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

|                                                                                                                                                        |                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>16</b>                                                                                                                                              | <b>CHECK EVAP CANISTER VENT CONTROL VALVE-III</b> |
| 1. Clean the air passage (Portion <b>A</b> to <b>B</b> ) of EVAP canister vent control valve using an air blower.<br>2. Perform the Test No. 15 again. |                                                   |
| <b>OK or NG</b>                                                                                                                                        |                                                   |
| OK                                                                                                                                                     | ▶ GO TO 17.                                       |
| NG                                                                                                                                                     | ▶ Replace EVAP canister vent control valve.       |

|                                                                 |                                    |
|-----------------------------------------------------------------|------------------------------------|
| <b>17</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
|                                                                 | ▶ <b>INSPECTION END</b>            |

GI

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

# DTC P1605 A/T DIAGNOSIS COMMUNICATION LINE

System Description

## System Description

The malfunction information related to A/T (Automatic Transaxle) is transferred through the line (circuit) from TCM (Transmission Control Module) to ECM. Therefore, be sure to erase the malfunction information such as DTC not only in TCM (Transmission Control Module) but also ECM after the A/T related repair. NCEC0418

## ECM Terminals and Reference Value

Specification data are reference values and are measured between each terminal and ground. NCEC0419

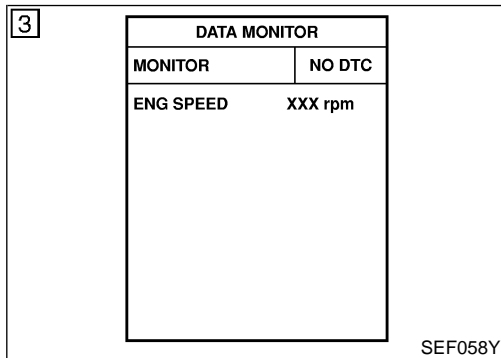
### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM             | CONDITION              | DATA (DC Voltage)    |
|----------------------|---------------|------------------|------------------------|----------------------|
| 91                   | PU            | A/T check signal | [Ignition switch "ON"] | 0 - Approximately 5V |

## On Board Diagnosis Logic

| DTC No. | Malfunction is detected when ...                                                                                             | Check Items (Possible Cause)                                                                                                                                                                                                                               |
|---------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P1605   | <ul style="list-style-type: none"> <li>An incorrect signal from TCM (Transmission Control Module) is sent to ECM.</li> </ul> | <ul style="list-style-type: none"> <li>Harness or connectors<br/>[The communication line circuit between ECM and TCM (Transmission Control Module) is open or shorted.]</li> <li>Dead (Weak) battery</li> <li>TCM (Transmission Control Module)</li> </ul> |



## DTC Confirmation Procedure

NCEC0421

### NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### With CONSULT

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Start engine and let it idle for at least 40 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-558.

#### With GST

Follow the procedure "With CONSULT-II" above.

## Wiring Diagram

NCEC0422

EC-ATDIAG-01 **GI**

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

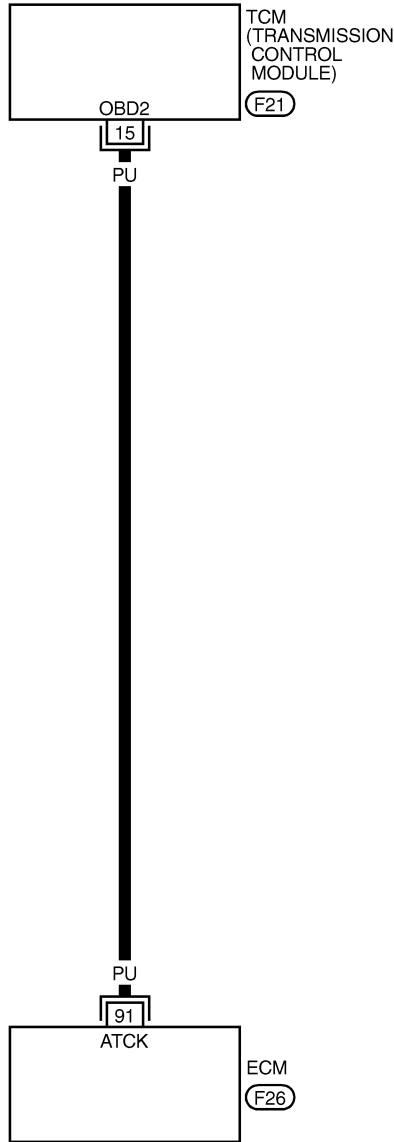
BT

HA

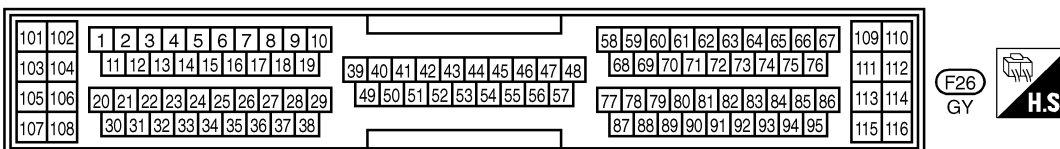
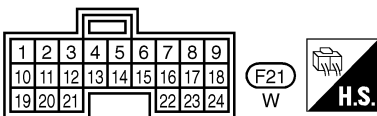
SC

EL

IDX



: Detectable line for DTC  
 : Non-detectable line for DTC

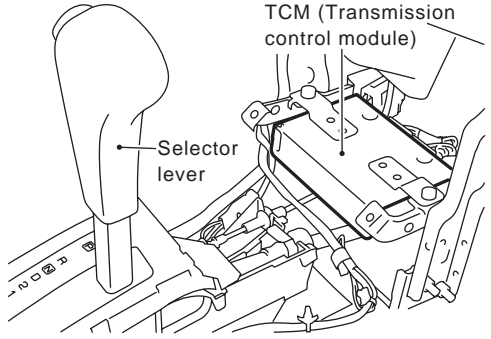


# DTC P1605 A/T DIAGNOSIS COMMUNICATION LINE

Diagnostic Procedure

## Diagnostic Procedure

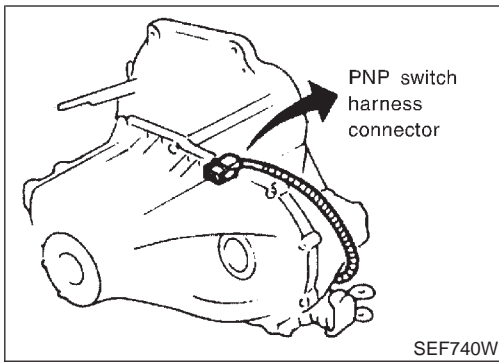
NCEC0423

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>CHECK INPUT SIGNAL CIRCUIT</b>                                                    |
| <p>1. Turn ignition switch "OFF".<br/>2. Disconnect ECM harness connector and TCM harness connector.</p>  <p>The diagram shows a top-down view of the transmission area. A selector lever is on the left. To its right is the TCM (Transmission control module), which is a rectangular electronic component with several connectors. Labels with leader lines point to the 'Selector lever' and the 'TCM (Transmission control module)'.</p> |                                                                                      |
| <p>3. Check harness continuity between ECM terminal 91 and TCM terminal 15.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                                                                                        |                                                                                      |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ GO TO 2.                                                                           |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>CHECK INTERMITTENT INCIDENT</b>                                                   |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                      |
| ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>INSPECTION END</b>                                                                |

SEF313W

# DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

Component Description



## Component Description

NCEC0424

When the gear position is "P" (A/T models only) or "N", park/neutral position (PNP) switch is "ON". ECM detects the park/neutral position when continuity with ground exists.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0425

Specification data are reference values.

| MONITOR ITEM | CONDITION             | SPECIFICATION                 |
|--------------|-----------------------|-------------------------------|
| P/N POSI SW  | ● Ignition switch: ON | Shift lever: "P" or "N"<br>ON |
|              |                       | Except above<br>OFF           |

## ECM Terminals and Reference Value

NCEC0426

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

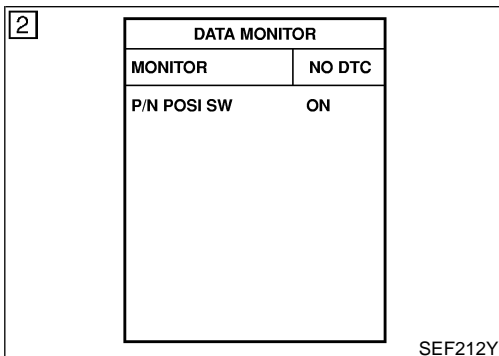
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM       | CONDITION                                                                                                                  | DATA (DC Voltage)             |
|----------------------|---------------|------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 42                   | G/OR          | PNP switch | [Ignition switch "ON"]<br>● Gear position is "Neutral position" (M/T models)<br>● Gear position is "N" or "P" (A/T models) | Approximately 0V              |
|                      |               |            | [Ignition switch "ON"]<br>● Except the above gear position                                                                 | BATTERY VOLTAGE<br>(11 - 14V) |

## On Board Diagnosis Logic

NCEC0427

| DTC No. | Malfunction is detected when ...                                                             | Check Items (Possible Cause)                                                            |
|---------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| P1706   | ● The signal of the PNP switch is not changed in the process of engine starting and driving. | ● Harness or connectors<br>(The PNP switch circuit is open or shorted.)<br>● PNP switch |



## DTC Confirmation Procedure

NCEC0428

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".

# DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

DTC Confirmation Procedure (Cont'd)

|   |               |          |
|---|---------------|----------|
| 5 | DATA MONITOR  |          |
|   | MONITOR       | NO DTC   |
|   | ENG SPEED     | XXX rpm  |
|   | COOLAN TEMP/S | XXX °C   |
|   | VHCL SPEED SE | XXX km/h |
|   | P/N POSI SW   | OFF      |
|   | B/FUEL SCHDL  | XXX msec |

SEF213Y

- 2) Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT-II. Then check the "P/N POSI SW" signal under the following conditions.

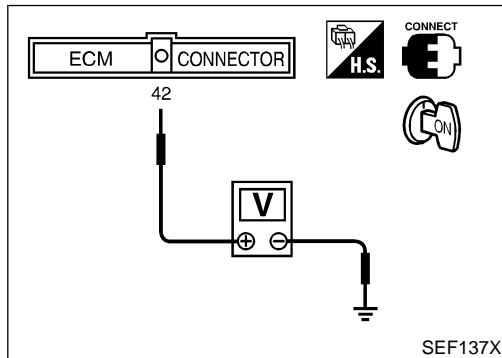
| Position (Selector lever)       | Known-good signal |
|---------------------------------|-------------------|
| "N" and "P" (A/T only) position | ON                |
| Except the above position       | OFF               |

If NG, go to "Diagnostic Procedure", EC-562.  
If OK, go to following step.

- 3) Select "DATA MONITOR" mode with CONSULT-II.
- 4) Start engine and warm it up to normal operating temperature.
- 5) Maintain the following conditions for at least 50 consecutive seconds.

|                |                            |
|----------------|----------------------------|
| ENG SPEED      | 1,500 - 3,400 rpm          |
| COOLAN TEMP/S  | More than 70°C (158°F)     |
| B/FUEL SCHDL   | 2.4 - 12 msec              |
| VHCL SPEED SE  | More than 64 km/h (40 MPH) |
| Selector lever | Suitable position          |

- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-562.



## Overall Function Check

Use this procedure to check the overall function of the park/neutral position switch circuit. During this check, a 1st trip DTC might not be confirmed.

### ⊗ Without CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Check voltage between ECM terminal 42 (PNP switch signal) and body ground under the following conditions.

| Condition (Gear position)       | Voltage (V) (Known-good data) |
|---------------------------------|-------------------------------|
| "P" (A/T only) and "N" position | Approx. 0                     |
| Except the above position       | BATTERY VOLTAGE<br>(11 - 14V) |

- 3) If NG, go to "Diagnostic Procedure", EC-562.



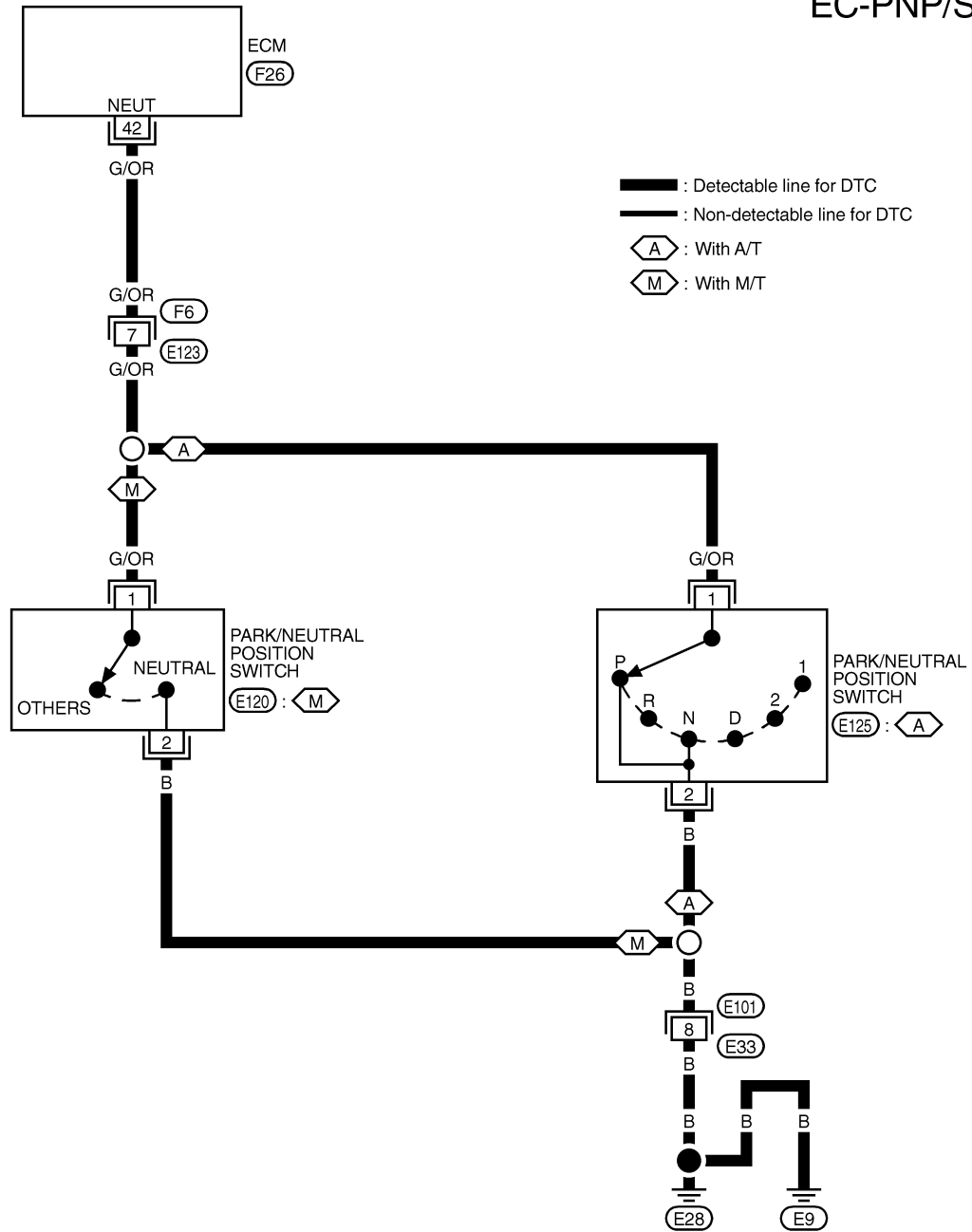
# DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

Wiring Diagram

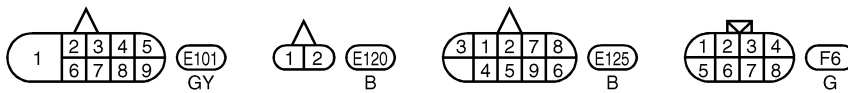
## Wiring Diagram

NCEC0430

EC-PNP/SW-01



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|     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |
|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|
| 101 | 102 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |    |    |    |    | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67  | 109 | 110 |
| 103 | 104 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |    | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |    |    |    |     | 111 | 112 |
| 105 | 106 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 |    |    |    |    | 113 | 114 |     |
| 107 | 108 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 115 | 116 |     |
|     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |



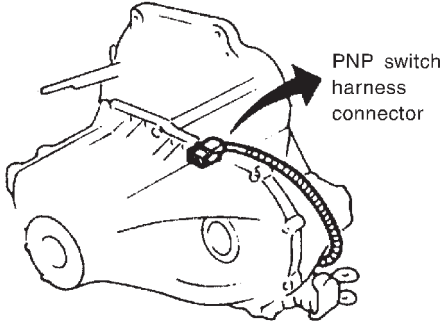
TEC722

# DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

Diagnostic Procedure For M/T Models

## Diagnostic Procedure For M/T Models

NCEC0431

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>CHECK GROUND CIRCUIT</b> |          |
| <p>1. Turn ignition switch "OFF".<br/>2. Disconnect PNP switch harness connector.</p> <div style="text-align: center;">  <p>PNP switch harness connector</p> </div> <p>3. Check harness continuity between PNP switch terminal 2 and body ground.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b><br/>4. Also check harness for short to power.</p> <p style="text-align: right;">SEF740W</p> |                             |          |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |          |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                           | GO TO 3. |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ▶                           | GO TO 2. |

|                                                                                                                                                                                      |                                   |                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------|
| <b>2</b>                                                                                                                                                                             | <b>DETECT MALFUNCTIONING PART</b> |                                                                 |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E101, E33</li> <li>● Harness for open or short between PNP switch and body ground</li> </ul> |                                   |                                                                 |
| ▶                                                                                                                                                                                    |                                   | Repair open circuit or short to power in harness or connectors. |

|                                                                                                                                                                                                                                                                                                                      |                                   |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------|
| <b>3</b>                                                                                                                                                                                                                                                                                                             | <b>CHECK INPUT SIGNAL CIRCUIT</b> |          |
| <p>1. Disconnect ECM harness connector.<br/>2. Check harness continuity between ECM terminal 42 and PNP switch terminal 1.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b><br/>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                   |          |
| OK                                                                                                                                                                                                                                                                                                                   | ▶                                 | GO TO 5. |
| NG                                                                                                                                                                                                                                                                                                                   | ▶                                 | GO TO 4. |

|                                                                                                                                                                             |                                   |                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                    | <b>DETECT MALFUNCTIONING PART</b> |                                                                                    |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors F6, E123</li> <li>● Harness for open or short between ECM and PNP switch</li> </ul> |                                   |                                                                                    |
| ▶                                                                                                                                                                           |                                   | Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                                                                    |                         |                     |
|----------------------------------------------------------------------------------------------------|-------------------------|---------------------|
| <b>5</b>                                                                                           | <b>CHECK PNP SWITCH</b> |                     |
| <p>Refer to MT-10, "Position Switch Check".</p> <p style="text-align: center;"><b>OK or NG</b></p> |                         |                     |
| OK                                                                                                 | ▶                       | GO TO 6.            |
| NG                                                                                                 | ▶                       | Replace PNP switch. |

# DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

*Diagnostic Procedure For M/T Models (Cont'd)*

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>6</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
| ▶                                                              | <b>INSPECTION END</b>              |

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# DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

Diagnostic Procedure For A/T Models

## Diagnostic Procedure For A/T Models

=NCEC0432

|                                                                                                                                                                                                                     |                             |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|
| <b>1</b>                                                                                                                                                                                                            | <b>CHECK GROUND CIRCUIT</b> |          |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect PNP switch harness connector.<br/>                 3. Check continuity between PNP switch terminal 2 and ground with CONSULT-II or tester.</p> |                             |          |
|                                                                                                                                                                                                                     |                             |          |
| <p><b>Continuity should exist.</b></p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                          |                             |          |
| OK                                                                                                                                                                                                                  | ▶                           | GO TO 3. |
| NG                                                                                                                                                                                                                  | ▶                           | GO TO 2. |

SEF269W

|                                                                                                                                                                                      |                                   |                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------|
| <b>2</b>                                                                                                                                                                             | <b>DETECT MALFUNCTIONING PART</b> |                                                                   |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E101, E33</li> <li>● Harness for open or short between PNP switch and body ground</li> </ul> |                                   |                                                                   |
|                                                                                                                                                                                      |                                   | ▶ Repair open circuit or short to power in harness or connectors. |

|                                                                                                                                                                                                                                                                                                                                                            |                                   |          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------|
| <b>3</b>                                                                                                                                                                                                                                                                                                                                                   | <b>CHECK INPUT SIGNAL CIRCUIT</b> |          |
| <p>1. Disconnect ECM harness connector.<br/>                 2. Check harness continuity between ECM terminal 42 and PNP switch terminal 1.<br/>                 Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b></p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                   |          |
| OK                                                                                                                                                                                                                                                                                                                                                         | ▶                                 | GO TO 5. |
| NG                                                                                                                                                                                                                                                                                                                                                         | ▶                                 | GO TO 4. |

|                                                                                                                                                                             |                                   |                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                    | <b>DETECT MALFUNCTIONING PART</b> |                                                                                      |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors F6, E123</li> <li>● Harness for open or short between PNP switch and ECM</li> </ul> |                                   |                                                                                      |
|                                                                                                                                                                             |                                   | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                                                                    |                         |                     |
|----------------------------------------------------------------------------------------------------|-------------------------|---------------------|
| <b>5</b>                                                                                           | <b>CHECK PNP SWITCH</b> |                     |
| <p>Refer to AT-110, "Diagnostic Procedure".</p> <p style="text-align: center;"><b>OK or NG</b></p> |                         |                     |
| OK                                                                                                 | ▶                       | GO TO 6.            |
| NG                                                                                                 | ▶                       | Replace PNP switch. |

# DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

Diagnostic Procedure For A/T Models (Cont'd)

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>6</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
| ▶                                                              | <b>INSPECTION END</b>              |

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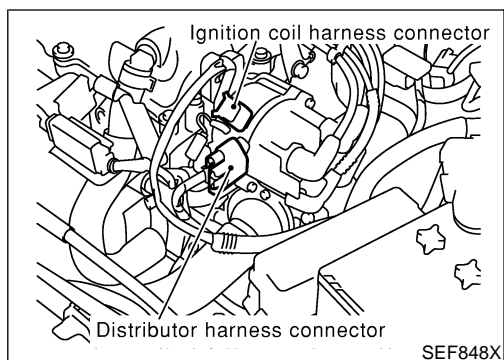
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# IGNITION SIGNAL

## Component Description



## Component Description

### IGNITION COIL & POWER TRANSISTOR (BUILT INTO DISTRIBUTOR)

NCEC0319

NCEC0319S01

The ignition coil is built into distributor. The ignition signal from the ECM is sent to the power transistor. The power transistor switches on and off the ignition coil primary circuit. As the primary circuit is turned on and off, the proper high voltage is induced in the coil secondary circuit.

The distributor is not repairable and must be replaced as an assembly except distributor cap and rotor head.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0320

| MONITOR ITEM | CONDITION                                                                                                                                                  |           | SPECIFICATION      |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------|
| IGN TIMING   | <ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Air conditioner switch: OFF</li> <li>Shift lever: "N"</li> <li>No-load</li> </ul> | Idle      | 15°±2° BTDC        |
|              |                                                                                                                                                            | 2,000 rpm | More than 25° BTDC |

## ECM Terminals and Reference Value

NCEC0321

Specification data are reference values and are measured between each terminal and ground.

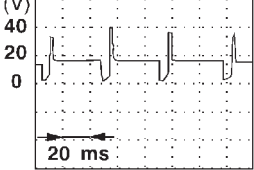
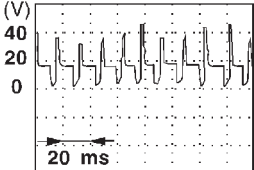
### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-NAL NO. | WIRE COLOR | ITEM            | CONDITION                                                                                                          | DATA (DC Voltage)         |
|---------------|------------|-----------------|--------------------------------------------------------------------------------------------------------------------|---------------------------|
| 35            | W/B        | Ignition signal | <p>[Engine is running]</p> <ul style="list-style-type: none"> <li>Warm-up condition</li> <li>Idle speed</li> </ul> | <p>Approximately 0.3V</p> |
|               |            |                 | <p>[Engine is running]</p> <ul style="list-style-type: none"> <li>Engine speed is 2,000 rpm</li> </ul>             | <p>Approximately 0.5V</p> |

# IGNITION SIGNAL

ECM Terminals and Reference Value (Cont'd)

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM           | CONDITION                                                                                                                     | DATA (DC Voltage)                                                                                                           |
|----------------------|---------------|----------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 36                   | G             | Ignition check | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Idle speed</li> </ul> | <p>Approximately 13V</p>  <p>SEF998V</p> |
|                      |               |                | <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>• Engine speed is 2,000 rpm</li> </ul>               | <p>Approximately 13V</p>  <p>SEF999V</p> |

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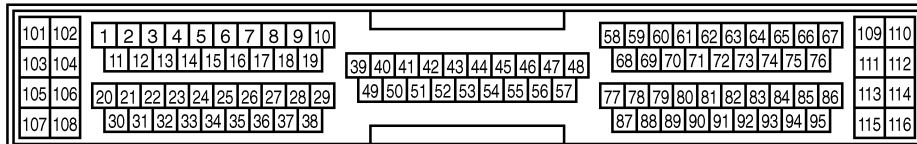
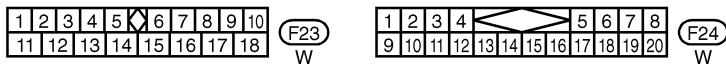
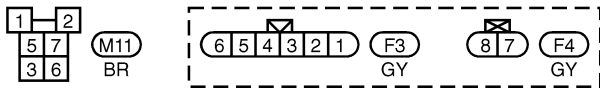
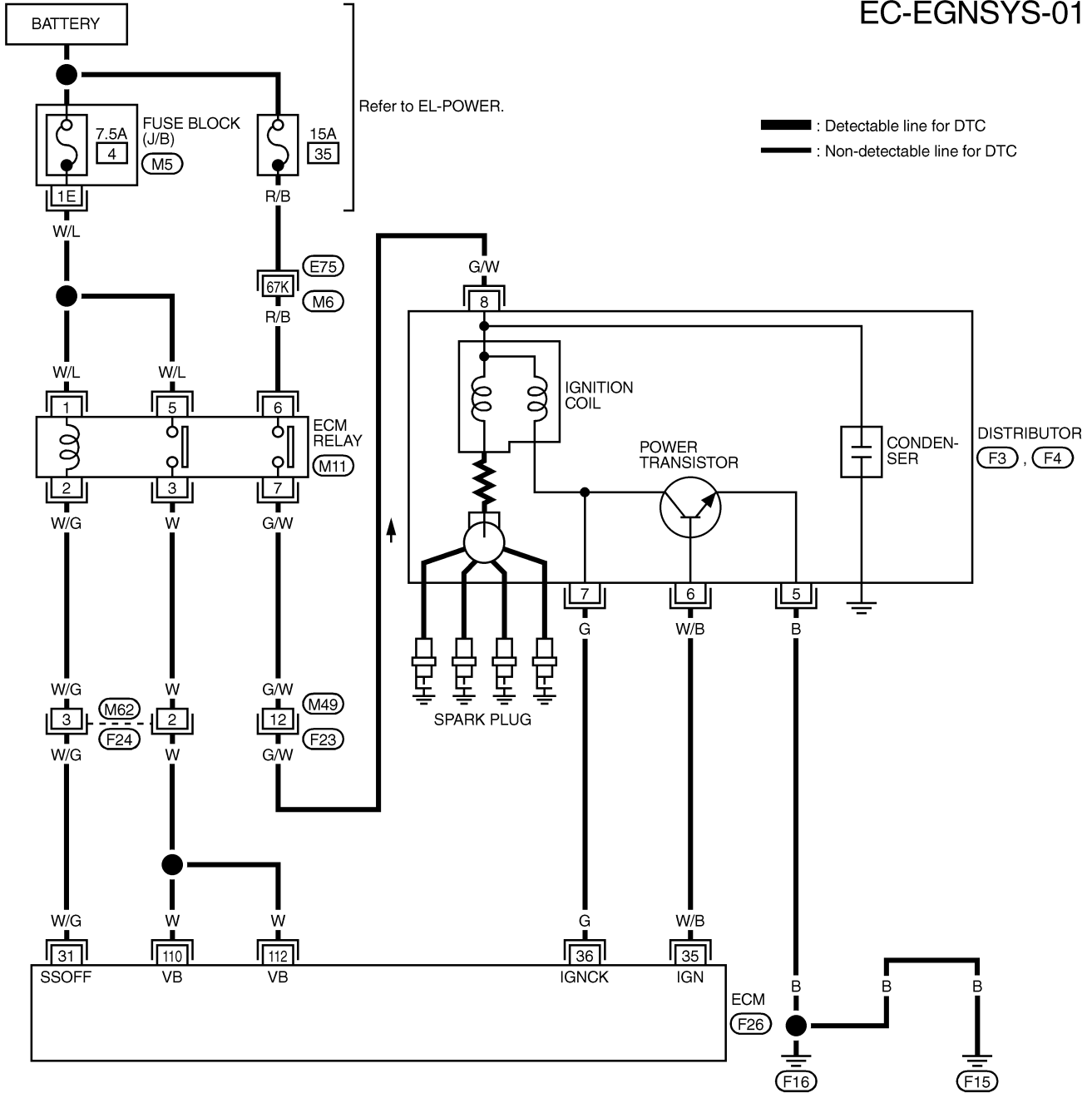
# IGNITION SIGNAL

Wiring Diagram

## Wiring Diagram

NCEC0324

EC-EGNSYS-01



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(M5) -FUSE BLOCK-JUNCTION BOX (J/B)



TEC796



# IGNITION SIGNAL


Diagnostic Procedure

## Diagnostic Procedure


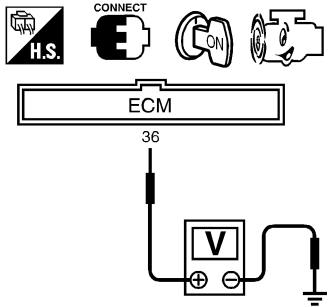
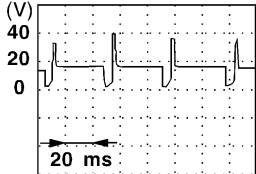
NCEC0325

|                                                                              |                         |  |
|------------------------------------------------------------------------------|-------------------------|--|
| <b>1</b>                                                                     | <b>INSPECTION START</b> |  |
| Turn ignition switch "OFF", and restart engine.<br><b>Is engine running?</b> |                         |  |
| Yes or No                                                                    |                         |  |
| Yes (With CONSULT-II) ▶                                                      | GO TO 2.                |  |
| Yes (Without CONSULT-II) ▶                                                   | GO TO 3.                |  |
| No ▶                                                                         | GO TO 4.                |  |

GI  
MA  
EM  
LC

| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>CHECK OVERALL FUNCTION</b> |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--|-------------|--|---------------|--|---------|--|-----------|---------|---------------|-------|------------|----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p> <b>With CONSULT-II</b></p> <p>1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.<br/>2. Make sure that all circuits do not produce a momentary engine speed drop.</p>                                                                                                                                                                                                                                                                                                                                                                    |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>POWER BALANCE</th> <th></th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>MAS AIF SE-B1</th> <th>XXX V</th> </tr> <tr> <th>IACV-AAC/V</th> <th>XXX step</th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> |                               |  | ACTIVE TEST |  | POWER BALANCE |  | MONITOR |  | ENG SPEED | XXX rpm | MAS AIF SE-B1 | XXX V | IACV-AAC/V | XXX step |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ACTIVE TEST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| POWER BALANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ENG SPEED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | XXX rpm                       |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MAS AIF SE-B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | XXX V                         |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| IACV-AAC/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | XXX step                      |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SEF070Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK or NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                               |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OK ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>INSPECTION END</b>         |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NG ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | GO TO 9.                      |  |             |  |               |  |         |  |           |         |               |       |            |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

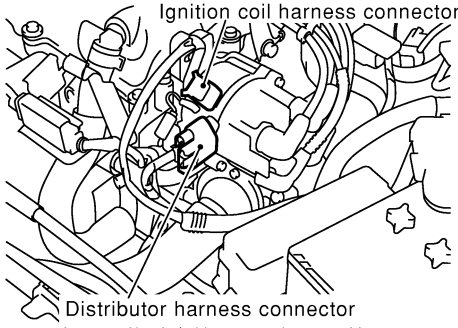
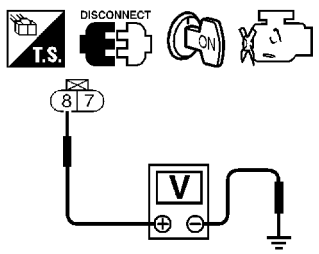
EC  
FE  
CL  
MT  
AT  
AX

|                                                                                                                                                                                                                                                                                                                          |                               |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--|
| <b>3</b>                                                                                                                                                                                                                                                                                                                 | <b>CHECK OVERALL FUNCTION</b> |  |
| <p> <b>Without CONSULT-II</b></p> <p>1. Let engine idle.<br/>2. Read the voltage signal between ECM terminal 36 and ground with an oscilloscope.<br/>3. Verify that the oscilloscope screen shows the signal wave as shown below.</p> |                               |  |
|                                                                                                                                                                                                                                       |                               |  |
|                                                                                                                                                                                                                                      |                               |  |
| SEF920Z                                                                                                                                                                                                                                                                                                                  |                               |  |
| OK or NG                                                                                                                                                                                                                                                                                                                 |                               |  |
| OK ▶                                                                                                                                                                                                                                                                                                                     | <b>INSPECTION END</b>         |  |
| NG ▶                                                                                                                                                                                                                                                                                                                     | GO TO 9.                      |  |

BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

# IGNITION SIGNAL

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>CHECK POWER SUPPLY</b> |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect ignition coil harness connector.</p> <div style="text-align: center;">  <p>Ignition coil harness connector</p> <p>Distributor harness connector</p> </div> <p>3. Turn ignition switch "ON".<br/>                 4. Check voltage between terminal 8 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p><b>Voltage: Battery voltage</b></p> <p style="text-align: center;"><b>OK or NG</b></p> |                           |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶ GO TO 6.                |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ▶ GO TO 5.                |

SEF848X

SEF257W

|                                                                                                                                                                                                                                                                |                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>5</b>                                                                                                                                                                                                                                                       | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M49, F23</li> <li>● Harness connectors E75, M6</li> <li>● ECM relay</li> <li>● 15A fuse</li> <li>● Harness for open or short between ignition coil and fuse</li> </ul> |                                   |
| ▶                                                                                                                                                                                                                                                              | Repair harness or connectors.     |

# IGNITION SIGNAL

Diagnostic Procedure (Cont'd)

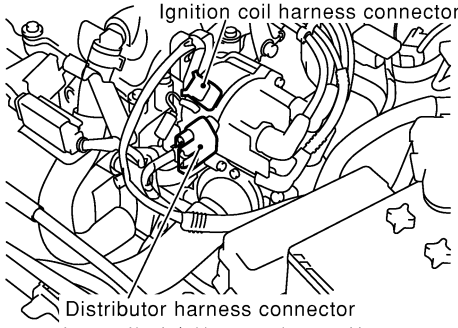
|          |                             |                                                                                                                                                                                                                   |                                                                |
|----------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| <b>6</b> | <b>CHECK GROUND CIRCUIT</b> |                                                                                                                                                                                                                   |                                                                |
|          |                             | <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Disconnect distributor harness connector.</li> <li>3. Check harness continuity between terminal 5 and engine ground.</li> </ol> | GI<br><br>MA<br><br>EM<br><br>LC<br><br>EC<br><br>FE<br><br>CL |
|          |                             |                                                                                                                                                                                                                   | SEF258W                                                        |
|          |                             | <p><b>Continuity should exist.</b></p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                        |                                                                |
|          |                             | OK                   ▶           GO TO 7.                                                                                                                                                                         |                                                                |
|          |                             | NG                   ▶           Repair open circuit or short to power in harness or connectors.                                                                                                                  |                                                                |

|          |                                     |                                                                                                                                                                                                                                                                                     |                                  |
|----------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>7</b> | <b>CHECK INPUT SIGNAL CIRCUIT-I</b> |                                                                                                                                                                                                                                                                                     |                                  |
|          |                                     | <ol style="list-style-type: none"> <li>1. Disconnect ECM harness connector.</li> <li>2. Check harness continuity between ECM terminal 35 and distributor terminal 6.<br/>Refer to Wiring Diagram.</li> <li>3. Also check harness for short to ground and short to power.</li> </ol> | MT<br><br>AT<br><br>AX<br><br>SU |
|          |                                     | <p><b>Continuity should exist.</b></p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                           |                                  |
|          |                                     | OK                   ▶           GO TO 8.                                                                                                                                                                                                                                           |                                  |
|          |                                     | NG                   ▶           Repair open circuit or short to ground or short to power in harness or connectors.                                                                                                                                                                 |                                  |

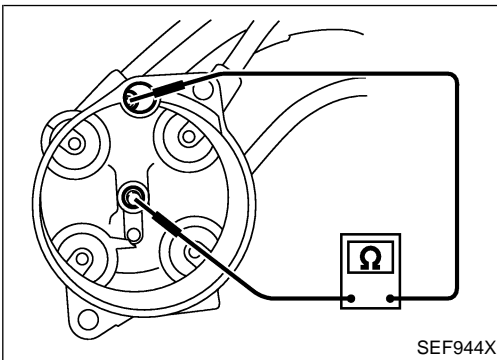
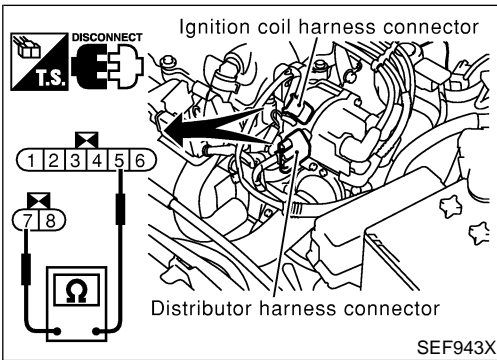
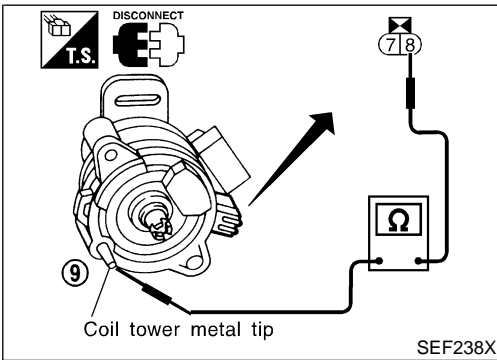
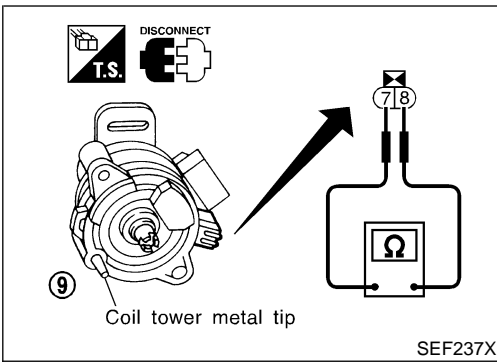
|          |                                                        |                                                                       |                                                                           |
|----------|--------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------|
| <b>8</b> | <b>CHECK IGNITION COIL, POWER TRANSISTOR, RESISTOR</b> |                                                                       |                                                                           |
|          |                                                        | Refer to "Component Inspection", EC-573.                              | BR<br><br>ST<br><br>RS<br><br>BT<br><br>HA<br><br>SC<br><br>EL<br><br>IDX |
|          |                                                        | <p style="text-align: center;"><b>OK or NG</b></p>                    |                                                                           |
|          |                                                        | OK                   ▶           GO TO 9.                             |                                                                           |
|          |                                                        | NG                   ▶           Replace malfunctioning component(s). |                                                                           |

# IGNITION SIGNAL

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>9</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>CHECK INPUT SIGNAL CIRCUIT-II</b>                                                 |
| <p>1. Stop engine.<br/>2. Disconnect ignition coil harness connector.</p>  <p>Ignition coil harness connector</p> <p>Distributor harness connector</p> <p>SEF848X</p> <p>3. Disconnect ECM harness connector.<br/>4. Check harness continuity between ignition coil terminal 7 and ECM terminal 36.<br/>Refer to Wiring Diagram.<br/><b>Continuity should exist.</b><br/>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p> |                                                                                      |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ GO TO 10.                                                                          |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>10</b>                                                      | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
|                                                                | ▶ <b>INSPECTION END</b>            |



## Component Inspection

=NCEC0326

### IGNITION COIL

NCEC0326S01

1. Disconnect ignition coil harness connector.
2. Check resistance as shown in the figure.

GI

MA

EM

LC

3. For checking secondary coil, remove distributor cap.
4. Check resistance between ignition coil harness connector terminal 8 and coil tower metal tip 9 (secondary terminal) on the distributor head.

EC

| Terminal                                                    | Resistance [at 25°C (77°F)] |
|-------------------------------------------------------------|-----------------------------|
| 7 - 8 (Primary coil)                                        | Approximately 0.8Ω          |
| 8 - secondary terminal on distributor head (Secondary coil) | Approximately 16 kΩ         |

FE

CL

If NG, replace distributor.

MT

### POWER TRANSISTOR

NCEC0326S02

1. Disconnect distributor harness connector.
2. Check power transistor resistance between terminals 5 and 7.

AT

| Terminals | Resistance | Result |
|-----------|------------|--------|
| 5 and 7   | Except 0Ω  | OK     |
|           | 0Ω         | NG     |

AX

SU

If NG, replace distributor.

BR

### RESISTOR

NCEC0326S03

1. Disconnect resistor harness connector.
2. Check resistance as shown in the figure.

ST

**Resistance: 4 - 8 kΩ [at 25°C (77°F)]**

RS

If NG, replace distributor cap.

BT

HA

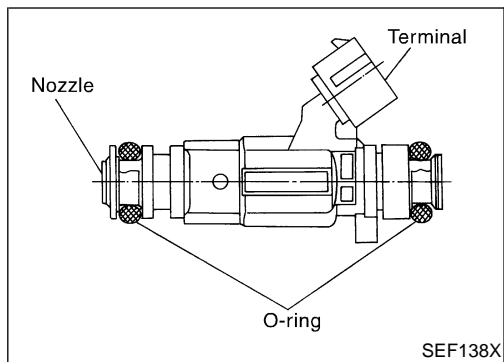
SC

EL

IDX

# INJECTOR

## Component Description



## Component Description

NCEC0435

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0436

| MONITOR ITEM | CONDITION                                                                                              | SPECIFICATION  |
|--------------|--------------------------------------------------------------------------------------------------------|----------------|
| INJ PULSE-B1 | ● Engine: After warming up<br>● Air conditioner switch: OFF<br>● Shift lever: "N"<br>● No-load<br>Idle | 2.4 - 3.2 msec |
|              | 2,000 rpm                                                                                              | 1.9 - 2.8 msec |
| B/FUEL SCHDL | ● Engine: After warming up<br>● Air conditioner switch: OFF<br>● Shift lever: "N"<br>● No-load<br>Idle | 1.0 - 1.6 msec |
|              | 2,000 rpm                                                                                              | 0.7 - 1.3 msec |

## ECM Terminals and Reference Value

NCEC0437

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-NAL NO.            | WIRE COLOR | ITEM           | CONDITION                                                                 | DATA (DC Voltage)                            |
|--------------------------|------------|----------------|---------------------------------------------------------------------------|----------------------------------------------|
| 101<br>103<br>105<br>107 | R/B        | Injector No. 1 | [Engine is running]<br>● Warm-up condition<br>● Idle speed                | BATTERY VOLTAGE<br>(11 - 14V)<br><br>SEF011W |
|                          | Y/B        | Injector No. 2 |                                                                           |                                              |
|                          | G/B        | Injector No. 3 | [Engine is running]<br>● Warm-up condition<br>● Engine speed is 2,000 rpm | BATTERY VOLTAGE<br>(11 - 14V)<br><br>SEF012W |
|                          | L/B        | Injector No. 4 |                                                                           |                                              |

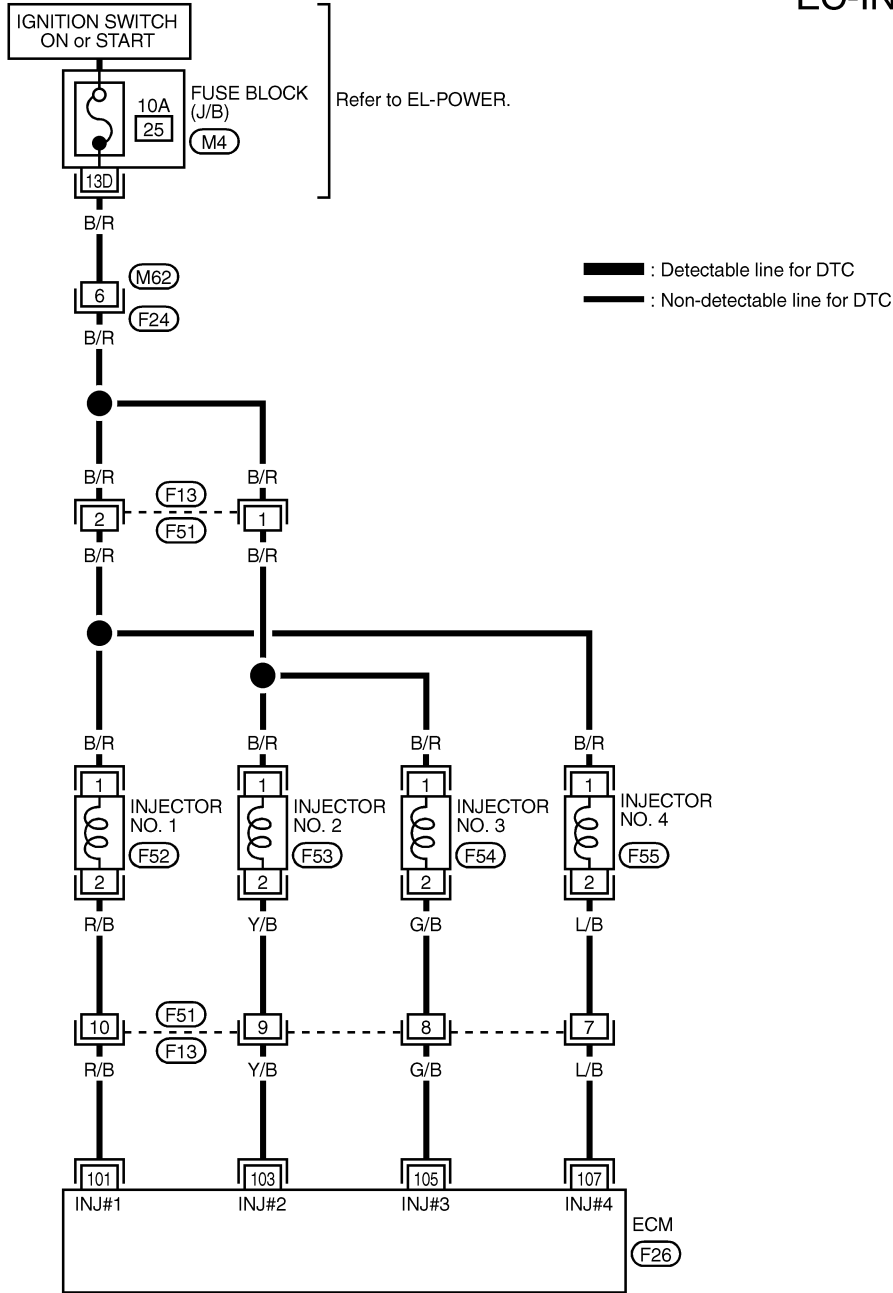
# INJECTOR

Wiring Diagram

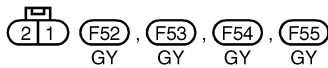
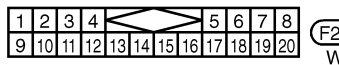
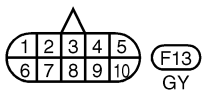
## Wiring Diagram

NCEC0434

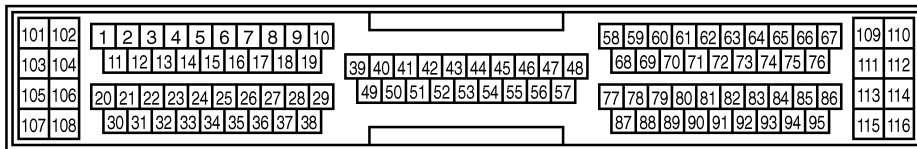
### EC-INJECT-01



GI  
MA  
EM  
LC  
**EC**  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX



REFER TO THE FOLLOWING.  
 (M4) - FUSE BLOCK-JUNCTION BOX (J/B)



TEC724

# INJECTOR

## Diagnostic Procedure

NCEC0438

### 1 CHECK OVERALL FUNCTION

 **With CONSULT-II**

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

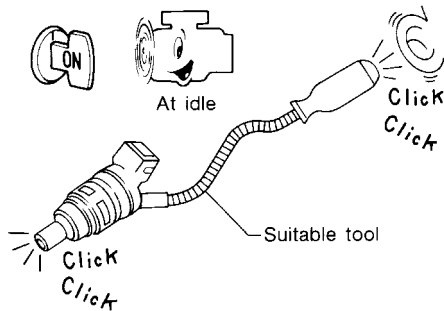
| ACTIVE TEST   |          |
|---------------|----------|
| POWER BALANCE |          |
| MONITOR       |          |
| ENG SPEED     | XXX rpm  |
| MAS A/F SE-B1 | XXX V    |
| IACV-AAC/V    | XXX step |
|               |          |
|               |          |

SEF190Y

3. Make sure that each circuit produces a momentary engine speed drop.

 **Without CONSULT-II**

1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

OK or NG

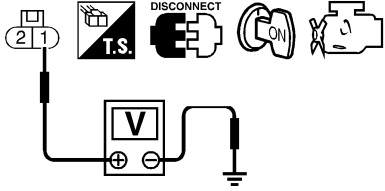
OK ► INSPECTION END

NG ► GO TO 2.



# INJECTOR

Diagnostic Procedure (Cont'd)

|          |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |
|----------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>2</b> | <b>CHECK POWER SUPPLY</b> | <ol style="list-style-type: none"> <li>1. Stop engine.</li> <li>2. Disconnect injector harness connector.</li> <li>3. Turn ignition switch "ON".</li> <li>4. Check voltage between injector terminal 1 and ground with CONSULT-II or tester.</li> </ol> <div style="text-align: center; margin: 10px 0;">  <p><b>Voltage: Battery voltage</b></p> </div> <p style="text-align: right; margin-right: 20px;">SEF949X</p> <p style="text-align: center; margin-top: 10px;"><b>OK or NG</b></p> | GI<br>MA<br>EM<br>LC<br><b>EC</b><br>FE |
| OK       | ▶                         | GO TO 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CL                                      |
| NG       | ▶                         | GO TO 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MT                                      |

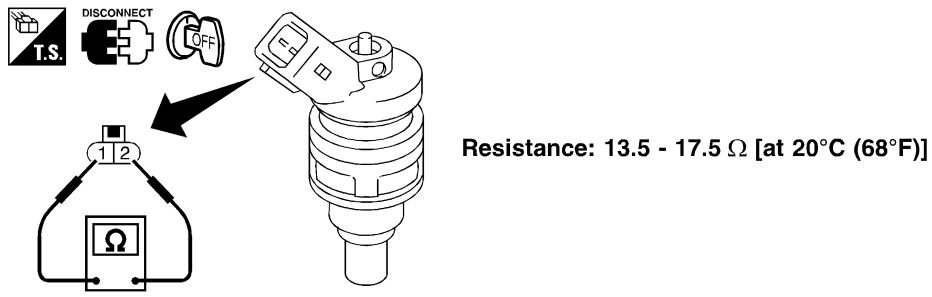
|          |                                   |                                                                                                                                                                                                                                       |          |
|----------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>3</b> | <b>DETECT MALFUNCTIONING PART</b> | <p>Check the following.</p> <ul style="list-style-type: none"> <li>● 10A fuse</li> <li>● Harness connectors M62, F24</li> <li>● Harness connectors F13, F51</li> <li>● Harness for open or short between injector and fuse</li> </ul> | AT<br>AX |
|          | ▶                                 | Repair harness or connectors.                                                                                                                                                                                                         | SU       |

|          |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |
|----------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>4</b> | <b>CHECK OUTPUT SIGNAL CIRCUIT</b> | <ol style="list-style-type: none"> <li>1. Turn ignition switch "OFF".</li> <li>2. Disconnect ECM harness connector.</li> <li>3. Check harness continuity between injector harness connector terminal 2 and ECM terminals 101, 103, 105, 107. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></li> <li>4. Also check harness for short to ground and short to power.</li> </ol> <p style="text-align: center; margin-top: 10px;"><b>OK or NG</b></p> | BR<br>ST<br>RS |
| OK       | ▶                                  | GO TO 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                         | BT             |
| NG       | ▶                                  | GO TO 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                         | HA             |

|          |                                   |                                                                                                                                                                           |          |
|----------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>5</b> | <b>DETECT MALFUNCTIONING PART</b> | <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors F51, F13</li> <li>● Harness for open or short between ECM and injector</li> </ul> | SC<br>EL |
|          | ▶                                 | Repair open circuit or short to ground or short to power in harness or connectors.                                                                                        | IDX      |

# INJECTOR

Diagnostic Procedure (Cont'd)

|                                                                                                                                                      |                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>6</b>                                                                                                                                             | <b>CHECK INJECTOR</b> |
| 1. Disconnect injector harness connector.<br>2. Check resistance between terminals as shown in the figure.                                           |                       |
|  <p>Resistance: 13.5 - 17.5 Ω [at 20°C (68°F)]</p> <p>SEF964XA</p> |                       |
| <b>OK or NG</b>                                                                                                                                      |                       |
| OK                                                                                                                                                   | ▶ GO TO 7.            |
| NG                                                                                                                                                   | ▶ Replace injector.   |

|                                                                |                                    |
|----------------------------------------------------------------|------------------------------------|
| <b>7</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
|                                                                | ▶ <b>INSPECTION END</b>            |

# START SIGNAL

CONSULT-II Reference Value in Data Monitor Mode

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0441

Specification data are reference values.

| MONITOR ITEM | CONDITION                          | SPECIFICATION  |
|--------------|------------------------------------|----------------|
| START SIGNAL | ● Ignition switch: ON → START → ON | OFF → ON → OFF |

## ECM Terminals and Reference Value

NCEC0442

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM         | CONDITION                 | DATA (DC Voltage) |
|----------------------|---------------|--------------|---------------------------|-------------------|
| 41                   | B/Y           | Start signal | [Ignition switch "ON"]    | Approximately 0V  |
|                      |               |              | [Ignition switch "START"] | 9 - 14V           |

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

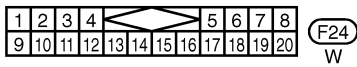
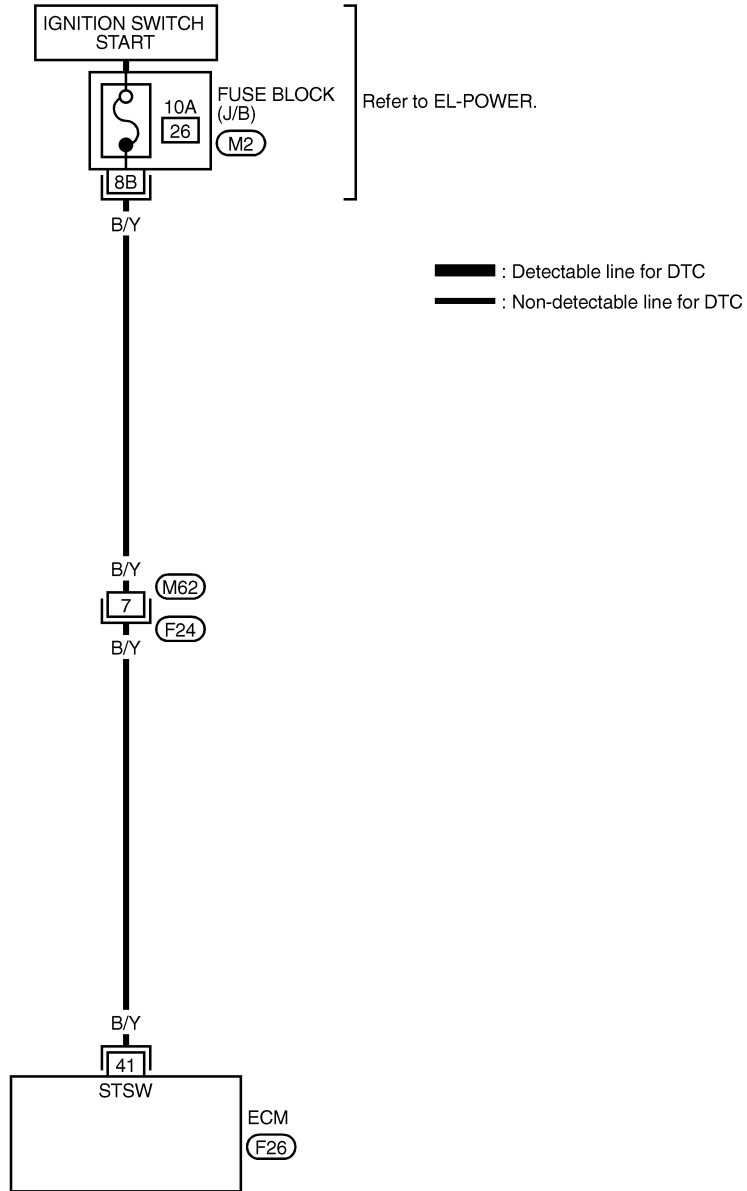
# START SIGNAL

Wiring Diagram

## Wiring Diagram

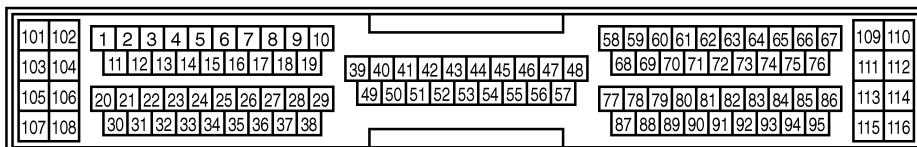
NCEC0440

EC-S/SIG-01



REFER TO THE FOLLOWING.

(M2) - FUSE BLOCK-JUNCTION BOX (J/B)



TEC725

# START SIGNAL


Diagnostic Procedure

## Diagnostic Procedure


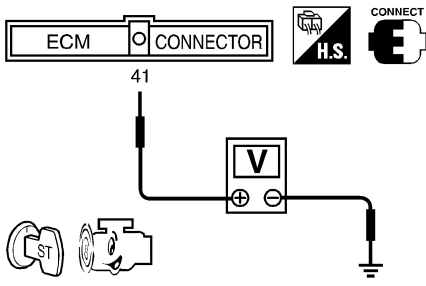
=NCEC0443

|                         |                         |          |
|-------------------------|-------------------------|----------|
| <b>1</b>                | <b>INSPECTION START</b> |          |
| Do you have CONSULT-II? |                         |          |
| Yes or No               |                         |          |
| Yes                     | ▶                       | GO TO 2. |
| No                      | ▶                       | GO TO 3. |

GI  
MA  
EM

| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>CHECK OVERALL FUNCTION</b> |                       |              |  |         |        |              |     |           |                |                      |     |                         |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------|--------------|--|---------|--------|--------------|-----|-----------|----------------|----------------------|-----|-------------------------|----|
| <p> <b>With CONSULT-II</b></p> <p>1. Turn ignition switch "ON".<br/>2. Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>                                                                                                                                                                                                                                      |                               |                       |              |  |         |        |              |     |           |                |                      |     |                         |    |
| <table border="1" style="margin: 10px auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>START SIGNAL</td> <td>OFF</td> </tr> </tbody> </table> <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Condition</th> <th>"START SIGNAL"</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "ON"</td> <td>OFF</td> </tr> <tr> <td>Ignition switch "START"</td> <td>ON</td> </tr> </tbody> </table> |                               |                       | DATA MONITOR |  | MONITOR | NO DTC | START SIGNAL | OFF | Condition | "START SIGNAL" | Ignition switch "ON" | OFF | Ignition switch "START" | ON |
| DATA MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                               |                       |              |  |         |        |              |     |           |                |                      |     |                         |    |
| MONITOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | NO DTC                        |                       |              |  |         |        |              |     |           |                |                      |     |                         |    |
| START SIGNAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | OFF                           |                       |              |  |         |        |              |     |           |                |                      |     |                         |    |
| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | "START SIGNAL"                |                       |              |  |         |        |              |     |           |                |                      |     |                         |    |
| Ignition switch "ON"                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | OFF                           |                       |              |  |         |        |              |     |           |                |                      |     |                         |    |
| Ignition switch "START"                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ON                            |                       |              |  |         |        |              |     |           |                |                      |     |                         |    |
| SEF227Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                               |                       |              |  |         |        |              |     |           |                |                      |     |                         |    |
| OK or NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                               |                       |              |  |         |        |              |     |           |                |                      |     |                         |    |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ▶                             | <b>INSPECTION END</b> |              |  |         |        |              |     |           |                |                      |     |                         |    |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ▶                             | GO TO 4.              |              |  |         |        |              |     |           |                |                      |     |                         |    |

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| <b>3</b>                                                                                                                                                                                                                                                                | <b>CHECK OVERALL FUNCTION</b> |                       |           |         |                         |                 |              |                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------|-----------|---------|-------------------------|-----------------|--------------|------------------|
| <p> <b>Without CONSULT-II</b></p> <p>1. Turn ignition switch to "START".<br/>2. Check voltage between ECM terminal 41 and ground under the following conditions.</p>                 |                               |                       |           |         |                         |                 |              |                  |
|                                                                                                                                                                                     |                               |                       |           |         |                         |                 |              |                  |
| SEF142X                                                                                                                                                                                                                                                                 |                               |                       |           |         |                         |                 |              |                  |
| <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "START"</td> <td>Battery voltage</td> </tr> <tr> <td>Except above</td> <td>Approximately 0V</td> </tr> </tbody> </table> |                               |                       | Condition | Voltage | Ignition switch "START" | Battery voltage | Except above | Approximately 0V |
| Condition                                                                                                                                                                                                                                                               | Voltage                       |                       |           |         |                         |                 |              |                  |
| Ignition switch "START"                                                                                                                                                                                                                                                 | Battery voltage               |                       |           |         |                         |                 |              |                  |
| Except above                                                                                                                                                                                                                                                            | Approximately 0V              |                       |           |         |                         |                 |              |                  |
| MTBL0143                                                                                                                                                                                                                                                                |                               |                       |           |         |                         |                 |              |                  |
| OK or NG                                                                                                                                                                                                                                                                |                               |                       |           |         |                         |                 |              |                  |
| OK                                                                                                                                                                                                                                                                      | ▶                             | <b>INSPECTION END</b> |           |         |                         |                 |              |                  |
| NG                                                                                                                                                                                                                                                                      | ▶                             | GO TO 4.              |           |         |                         |                 |              |                  |

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IDX

# START SIGNAL

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                |                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                       | <b>DETECT MALFUNCTIONING PART</b>                                                    |
| Check the following. <ul style="list-style-type: none"><li>● Harness connectors M62, F24</li><li>● 10A fuse</li><li>● Harness for open or short between ECM and fuse</li></ul> |                                                                                      |
| <b>OK or NG</b>                                                                                                                                                                |                                                                                      |
| OK                                                                                                                                                                             | ▶ GO TO 5.                                                                           |
| NG                                                                                                                                                                             | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |
| <b>5</b>                                                                                                                                                                       | <b>CHECK INTERMITTENT INCIDENT</b>                                                   |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.                                                                                                                 |                                                                                      |
|                                                                                                                                                                                | ▶ <b>INSPECTION END</b>                                                              |

# FUEL PUMP

System Description

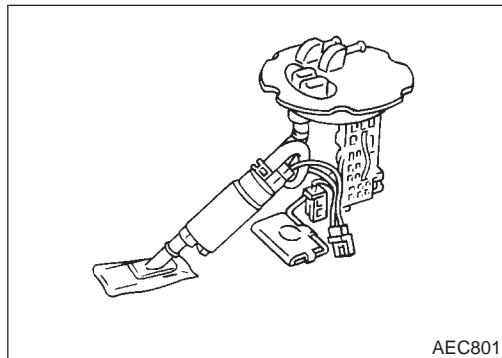
## System Description

NCEC0444

| Sensor                   | Input Signal to ECM | ECM function | Actuator        |
|--------------------------|---------------------|--------------|-----------------|
| Camshaft position sensor | Engine speed        | ECM          | Fuel pump relay |
| Ignition switch          | Start signal        |              |                 |

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a 180° signal from the camshaft position sensor, it knows that the engine is rotating, and causes the pump to perform. If the 180° signal is not received when the ignition switch is on, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

| Condition                        | Fuel pump operation    |
|----------------------------------|------------------------|
| Ignition switch is turned to ON. | Operates for 5 seconds |
| Engine running and cranking      | Operates               |
| When engine is stopped           | Stops in 1 second      |
| Except as shown above            | Stops                  |



## Component Description

A turbine type design fuel pump is used in the fuel tank.

NCEC0501

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0445

| MONITOR ITEM  | CONDITION                                                                                                                                                                                              | SPECIFICATION |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| FUEL PUMP RLY | <ul style="list-style-type: none"> <li>Ignition switch is turned to ON (Operates for 5 seconds)</li> <li>Engine running and cranking</li> <li>When engine is stopped (stops in 1.0 seconds)</li> </ul> | ON            |
|               | <ul style="list-style-type: none"> <li>Except as shown above</li> </ul>                                                                                                                                | OFF           |

# FUEL PUMP

ECM Terminals and Reference Value

## ECM Terminals and Reference Value

=NCEC0446

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM            | CONDITION                                                                                           | DATA (DC Voltage)             |
|----------------------|---------------|-----------------|-----------------------------------------------------------------------------------------------------|-------------------------------|
| 21                   | B/P           | Fuel pump relay | [Ignition switch "ON"]<br>● For 5 seconds after turning ignition switch "ON"<br>[Engine is running] | 0 - 1V                        |
|                      |               |                 | [Ignition switch "ON"]<br>● More than 5 seconds after turning ignition switch "ON"                  | BATTERY VOLTAGE<br>(11 - 14V) |



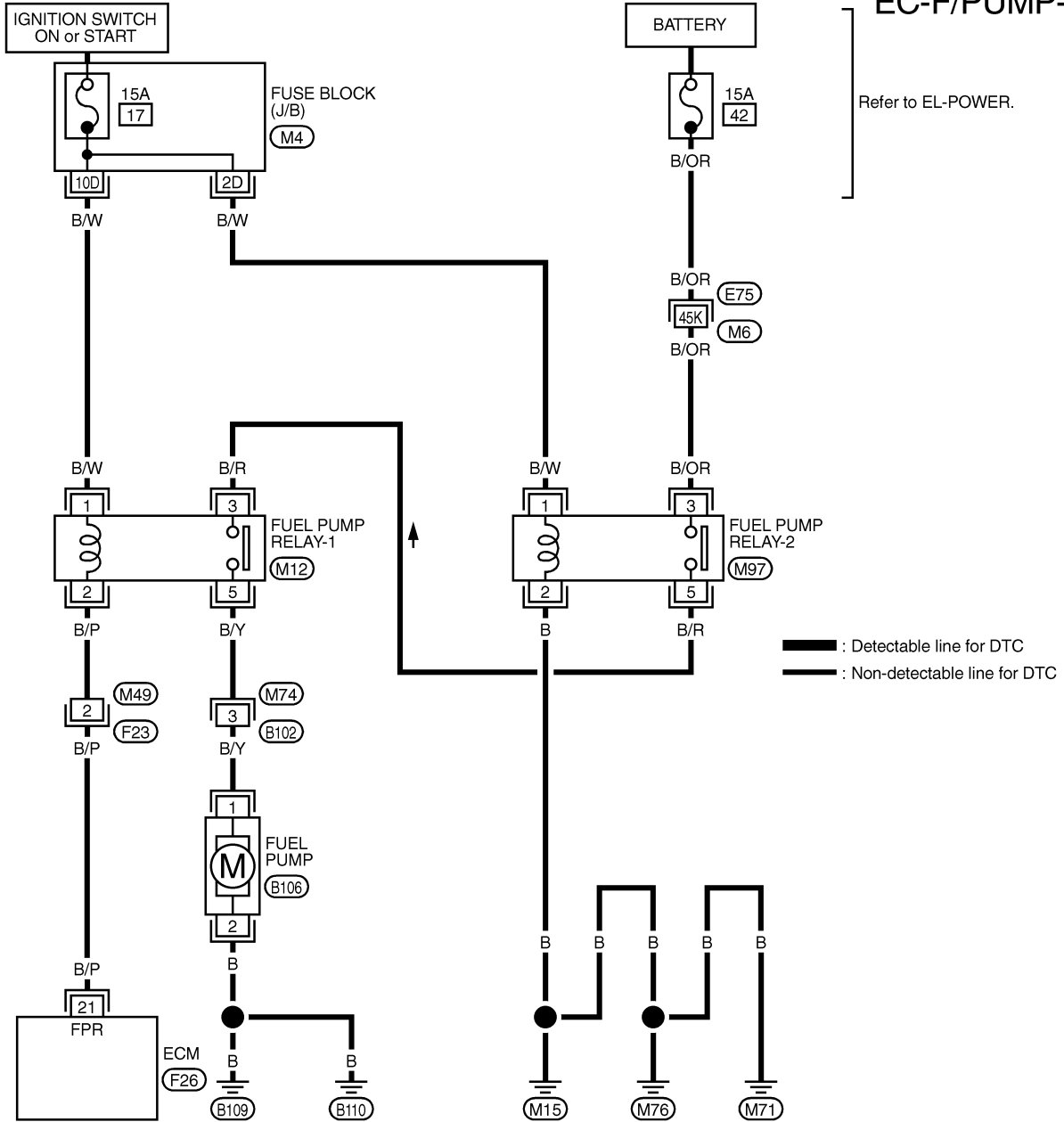
# FUEL PUMP

Wiring Diagram

## Wiring Diagram

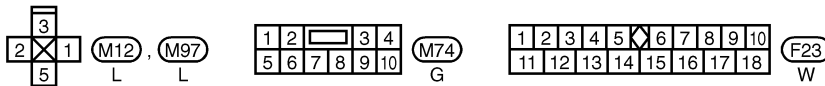
NCEC0447

EC-F/PUMP-01

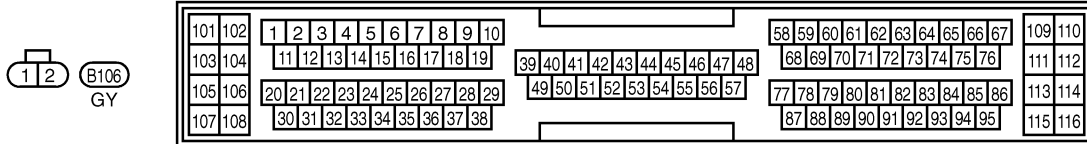


Refer to EL-POWER.

- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX



REFER TO THE FOLLOWING.  
 (E75) -SUPER MULTIPLE JUNCTION (SMJ)  
 (M4) -FUSE BLOCK-JUNCTION BOX (J/B)

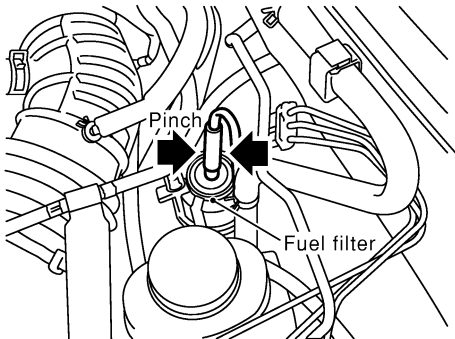


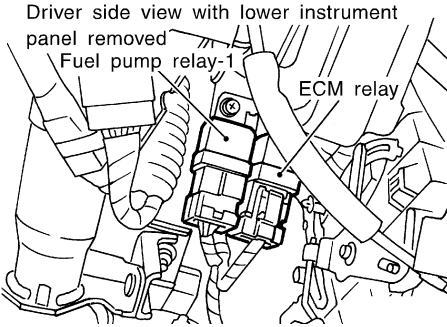
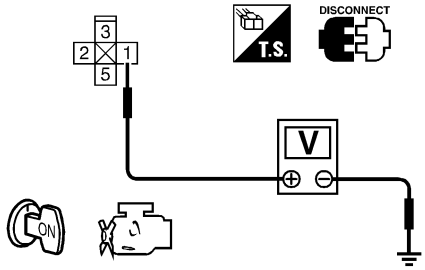
TEC726

# FUEL PUMP

## Diagnostic Procedure

NCEC0448

|          |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | <b>CHECK OVERALL FUNCTION</b> | <p>1. Turn ignition switch "ON".<br/>2. Pinch fuel feed hose with fingers.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF858X</p> <p style="text-align: center;"><b>Fuel pressure pulsation should be felt on the fuel feed hose for 5 seconds after ignition switch is turned "ON".</b></p> <p style="text-align: center;"><b>OK or NG</b></p> |
| OK       | ▶                             | <b>INSPECTION END</b>                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NG       | ▶                             | <b>GO TO 2.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|          |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>2</b> | <b>CHECK POWER SUPPLY-I</b> | <p>1. Turn ignition switch "OFF".<br/>2. Disconnect fuel pump relay-1.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF185XA</p> <p>3. Turn ignition switch "ON".<br/>4. Check voltage between fuel pump relay-1 terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: right;"><b>Voltage: Battery voltage</b></p> <p style="text-align: right;">SEF950X</p> </div> <p style="text-align: center;"><b>OK or NG</b></p> |
| OK       | ▶                           | <b>GO TO 4.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| NG       | ▶                           | <b>GO TO 3.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

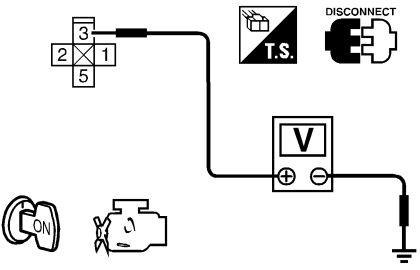
# FUEL PUMP

Diagnostic Procedure (Cont'd)

|                                                                                                                                                           |                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>3</b>                                                                                                                                                  | <b>DETECT MALFUNCTIONING PART</b> |
| Check the following. <ul style="list-style-type: none"> <li>● 15A fuse</li> <li>● Harness for open or short between fuse and fuel pump relay-1</li> </ul> |                                   |
| ▶                                                                                                                                                         | Repair harness or connectors.     |

GI

MA

|                                                                                                                                                                                                                                                                                           |                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                                                  | <b>CHECK POWER SUPPLY-II</b> |
| 1. Check voltage between fuel pump relay-1 terminal 3 and ground with CONSULT-II or tester.                                                                                                                                                                                               |                              |
|  <p style="text-align: right; margin-right: 100px;"><b>Voltage: Battery voltage</b></p> <p style="text-align: right; margin-right: 50px;">SEF951X</p> <p style="text-align: center;"><b>OK or NG</b></p> |                              |
| OK                                                                                                                                                                                                                                                                                        | ▶ GO TO 9.                   |
| NG                                                                                                                                                                                                                                                                                        | ▶ GO TO 5.                   |

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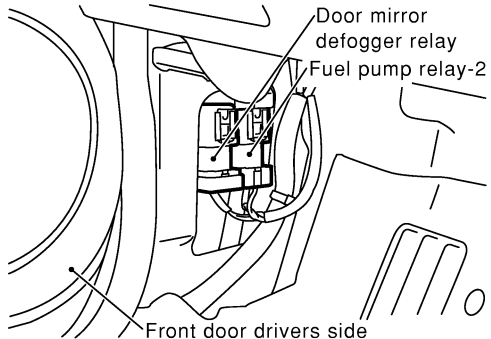
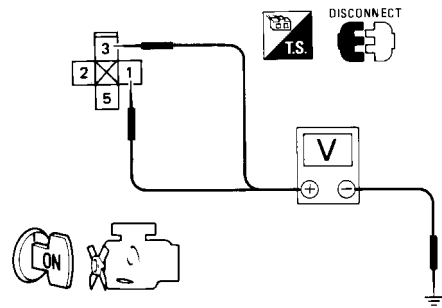
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# FUEL PUMP

Diagnostic Procedure (Cont'd)

|                                                                                                                               |                               |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>5</b>                                                                                                                      | <b>CHECK POWER SUPPLY-III</b> |
| <p>1. Turn ignition switch "OFF".<br/>                 2. Disconnect fuel pump relay-2.</p>                                   |                               |
|  <p style="text-align: right;">SEF291WA</p> |                               |
| <p>3. Check voltage between fuel pump relay-2 terminals 1, 3 and ground with CONSULT-II or tester.</p>                        |                               |
|  <p style="text-align: right;">SEF479P</p>  |                               |
| <b>Voltage: Battery voltage</b>                                                                                               |                               |
| <b>OK or NG</b>                                                                                                               |                               |
| OK                                                                                                                            | ▶ GO TO 7.                    |
| NG                                                                                                                            | ▶ GO TO 6.                    |

|                                                                                                                                                                                                        |                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>6</b>                                                                                                                                                                                               | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E75, M6</li> <li>● 15A fuse</li> <li>● Harness for open or short between fuse and fuel pump relay-2</li> </ul> |                                                                                    |
| ▶                                                                                                                                                                                                      | Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                                                                                                                                                                                                                                                                         |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>7</b>                                                                                                                                                                                                                                                                                                | <b>CHECK POWER SUPPLY-IV</b>                                                         |
| <p>1. Check continuity between fuel pump relay-2 terminal 5 and fuel pump relay-1 terminal 3, fuel pump relay-2 terminal 2 and body ground.<br/>                 Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b></p> <p>2. Also check harness for short to ground and short to power.</p> |                                                                                      |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                         |                                                                                      |
| OK                                                                                                                                                                                                                                                                                                      | ▶ GO TO 8.                                                                           |
| NG                                                                                                                                                                                                                                                                                                      | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

# FUEL PUMP

Diagnostic Procedure (Cont'd)

|                                          |                                        |
|------------------------------------------|----------------------------------------|
| <b>8</b>                                 | <b>CHECK FUEL PUMP RELAY-2</b>         |
| Refer to "Component Inspection", EC-591. |                                        |
| <b>OK or NG</b>                          |                                        |
| OK                                       | ▶ GO TO 15.                            |
| NG                                       | ▶ Repair or replace fuel pump relay-2. |

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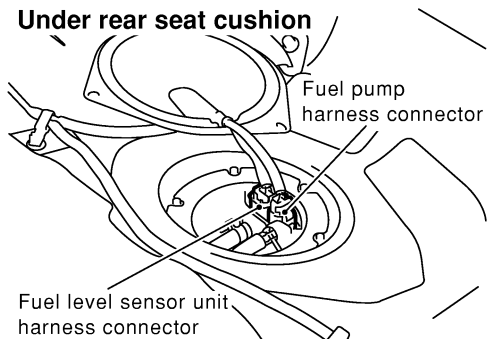
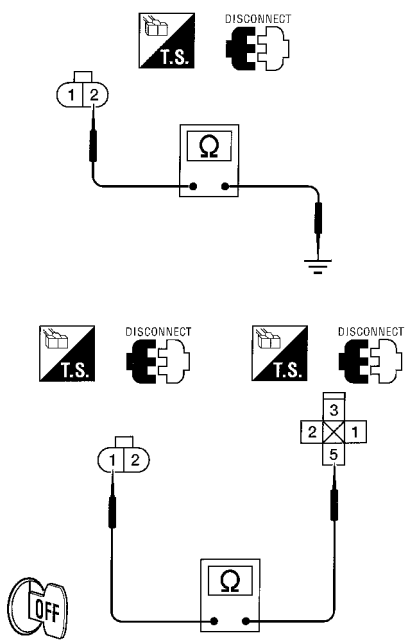
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|                                                                                                                                         |                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>9</b>                                                                                                                                | <b>CHECK POWER GROUND CIRCUIT</b> |
| <p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect fuel pump harness connector.</p>                                                 |                                   |
|  <p style="text-align: right;">SEF299WA</p>           |                                   |
| <p>3. Check harness continuity between fuel pump terminal 2 and body ground, fuel pump terminal 1 and fuel pump relay-1 terminal 5.</p> |                                   |
|                                                      |                                   |
| AEC758                                                                                                                                  |                                   |
| <p><b>Continuity should exist.</b></p> <p>4. Also check harness for short to ground and short to power.</p>                             |                                   |
| <b>OK or NG</b>                                                                                                                         |                                   |
| OK                                                                                                                                      | ▶ GO TO 11.                       |
| NG                                                                                                                                      | ▶ GO TO 10.                       |

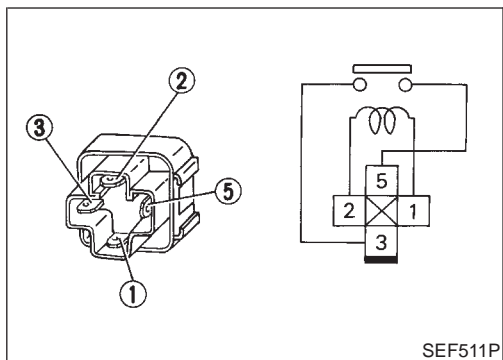
# FUEL PUMP

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                                                                                                                        |                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>10</b>                                                                                                                                                                                                                                                                                                                              | <b>DETECT MALFUNCTIONING PART</b>                                                    |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M74, B102</li> <li>● Harness for open or short between fuel pump and body ground</li> <li>● Harness for open or short between fuel pump and fuel pump relay-1</li> </ul>                                                                       |                                                                                      |
|                                                                                                                                                                                                                                                                                                                                        | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |
| <b>11</b>                                                                                                                                                                                                                                                                                                                              | <b>CHECK OUTPUT SIGNAL CIRCUIT</b>                                                   |
| <p>1. Disconnect ECM harness connector.<br/>                 2. Check harness continuity between ECM terminal 21 and fuel pump relay-1 connector terminal 2.<br/>                 Refer to Wiring Diagram.<br/> <b>Continuity should exist.</b><br/>                 3. Also check harness for short to ground and short to power.</p> |                                                                                      |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                        |                                                                                      |
| OK                                                                                                                                                                                                                                                                                                                                     | ▶ GO TO 13.                                                                          |
| NG                                                                                                                                                                                                                                                                                                                                     | ▶ GO TO 12.                                                                          |
| <b>12</b>                                                                                                                                                                                                                                                                                                                              | <b>DETECT MALFUNCTIONING PART</b>                                                    |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M49, F23</li> <li>● Harness for open or short between ECM and fuel pump relay-1</li> </ul>                                                                                                                                                     |                                                                                      |
| NG                                                                                                                                                                                                                                                                                                                                     | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |
| <b>13</b>                                                                                                                                                                                                                                                                                                                              | <b>CHECK FUEL PUMP RELAY-1</b>                                                       |
| <p>Refer to "Component Inspection", EC-591.</p>                                                                                                                                                                                                                                                                                        |                                                                                      |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                        |                                                                                      |
| OK                                                                                                                                                                                                                                                                                                                                     | ▶ GO TO 14.                                                                          |
| NG                                                                                                                                                                                                                                                                                                                                     | ▶ Replace fuel pump relay-1.                                                         |
| <b>14</b>                                                                                                                                                                                                                                                                                                                              | <b>CHECK FUEL PUMP</b>                                                               |
| <p>Refer to "Component Inspection", EC-591.</p>                                                                                                                                                                                                                                                                                        |                                                                                      |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                        |                                                                                      |
| OK                                                                                                                                                                                                                                                                                                                                     | ▶ GO TO 15.                                                                          |
| NG                                                                                                                                                                                                                                                                                                                                     | ▶ Replace fuel pump.                                                                 |
| <b>15</b>                                                                                                                                                                                                                                                                                                                              | <b>CHECK INTERMITTENT INCIDENT</b>                                                   |
| <p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p>                                                                                                                                                                                                                                                                  |                                                                                      |
|                                                                                                                                                                                                                                                                                                                                        | ▶ <b>INSPECTION END</b>                                                              |

# FUEL PUMP

Component Inspection



## Component Inspection

=NCEC0449

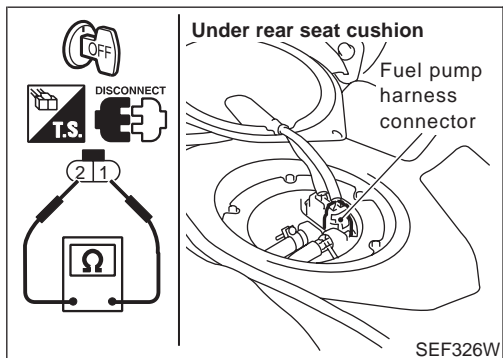
### FUEL PUMP RELAY-1 AND -2

NCEC0449S01

Check continuity between terminals 3 and 5.

| Conditions                                          | Continuity |
|-----------------------------------------------------|------------|
| 12V direct current supply between terminals 1 and 2 | Yes        |
| No current supply                                   | No         |

If NG, replace relay.



## FUEL PUMP

NCEC0449S02

1. Disconnect fuel pump harness connector.
2. Check resistance between terminals 1 and 2.

**Resistance: 0.2 - 5.0Ω [at 25°C (77°F)]**

If NG, replace fuel pump.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

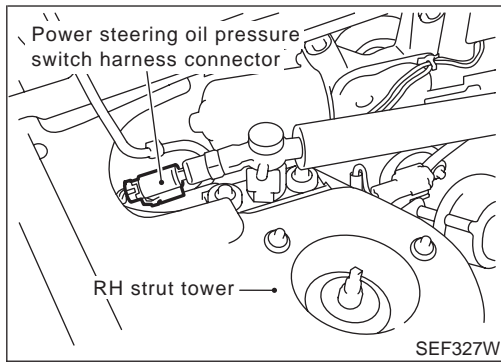
SC

EL

IDX

# POWER STEERING OIL PRESSURE SWITCH

## Component Description



## Component Description

NCEC0451

The power steering oil pressure switch is attached to the power steering high-pressure tube and detects a power steering load. When a power steering load is detected, it signals the ECM. The ECM adjusts the IACV-AAC valve to increase the idle speed and adjust for the increased load.

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0452

Specification data are reference values.

| MONITOR ITEM | CONDITION                                                                                   |                                                        | SPECIFICATION |
|--------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------|---------------|
| PW/ST SIGNAL | <ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> </ul> | Steering wheel in neutral position (forward direction) | OFF           |
|              |                                                                                             | The steering wheel is fully turned                     | ON            |

## ECM Terminals and Reference Value

NCEC0453

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TERMI-NAL NO. | WIRE COLOR | ITEM                               | CONDITION                                                                                                   | DATA (DC Voltage) |
|---------------|------------|------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------|
| 46            | SB         | Power steering oil pressure switch | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Steering wheel is fully turned</li> </ul> | Approximately 0V  |
|               |            |                                    | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Steering wheel is not turned</li> </ul>   | Approximately 5V  |



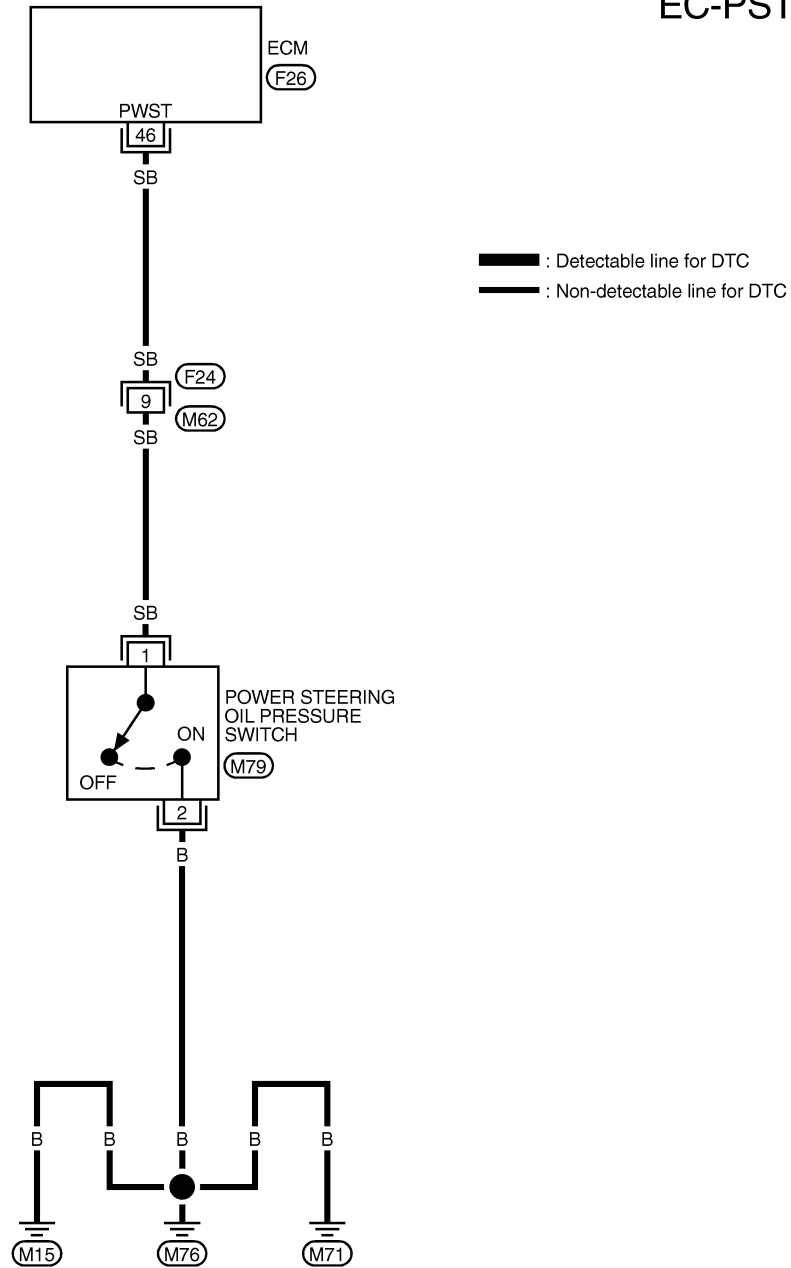
# POWER STEERING OIL PRESSURE SWITCH

Wiring Diagram

## Wiring Diagram

NCEC0450

EC-PST/SW-01



GI

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

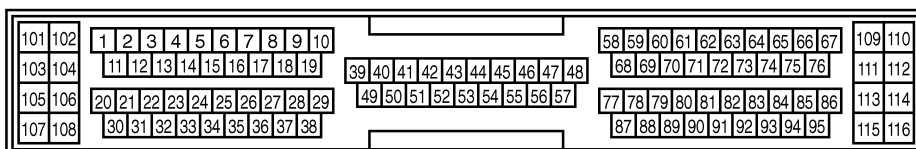
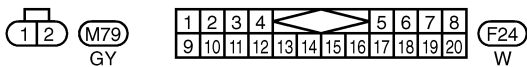
BT

HA

SC

EL

IDX



TEC727


# POWER STEERING OIL PRESSURE SWITCH


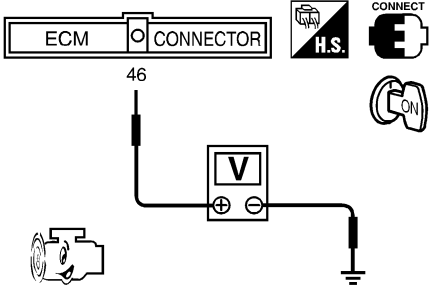
Diagnostic Procedure

## Diagnostic Procedure

=NCEC0454

|                         |                         |          |
|-------------------------|-------------------------|----------|
| <b>1</b>                | <b>INSPECTION START</b> |          |
| Do you have CONSULT-II? |                         |          |
| Yes or No               |                         |          |
| Yes                     | ▶                       | GO TO 2. |
| No                      | ▶                       | GO TO 3. |

| <b>2</b>                                                                                                                                                                                                                                            | <b>CHECK OVERALL FUNCTION</b> |                       |                                 |     |                    |        |              |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------|---------------------------------|-----|--------------------|--------|--------------|-----|
| <p> <b>With CONSULT-II</b></p> <p>1. Start engine.</p> <p>2. Check "PW/ST SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>       |                               |                       |                                 |     |                    |        |              |     |
| <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>PW/ST SIGNAL</td> <td>OFF</td> </tr> </tbody> </table> |                               |                       | DATA MONITOR                    |     | MONITOR            | NO DTC | PW/ST SIGNAL | OFF |
| DATA MONITOR                                                                                                                                                                                                                                        |                               |                       |                                 |     |                    |        |              |     |
| MONITOR                                                                                                                                                                                                                                             | NO DTC                        |                       |                                 |     |                    |        |              |     |
| PW/ST SIGNAL                                                                                                                                                                                                                                        | OFF                           |                       |                                 |     |                    |        |              |     |
| <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Steering is in neutral position</td> <td>OFF</td> </tr> <tr> <td>Steering is turned</td> <td>ON</td> </tr> </table>                                                      |                               |                       | Steering is in neutral position | OFF | Steering is turned | ON     |              |     |
| Steering is in neutral position                                                                                                                                                                                                                     | OFF                           |                       |                                 |     |                    |        |              |     |
| Steering is turned                                                                                                                                                                                                                                  | ON                            |                       |                                 |     |                    |        |              |     |
| SEF228Y                                                                                                                                                                                                                                             |                               |                       |                                 |     |                    |        |              |     |
| <b>OK or NG</b>                                                                                                                                                                                                                                     |                               |                       |                                 |     |                    |        |              |     |
| OK                                                                                                                                                                                                                                                  | ▶                             | <b>INSPECTION END</b> |                                 |     |                    |        |              |     |
| NG                                                                                                                                                                                                                                                  | ▶                             | GO TO 4.              |                                 |     |                    |        |              |     |

| <b>3</b>                                                                                                                                                                                                                                                                                                   | <b>CHECK OVERALL FUNCTION</b> |                       |           |         |                                       |                  |              |                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------|-----------|---------|---------------------------------------|------------------|--------------|------------------|
| <p> <b>Without CONSULT-II</b></p> <p>1. Start engine.</p> <p>2. Check voltage between ECM terminal 46 and ground under the following conditions.</p>                                                                    |                               |                       |           |         |                                       |                  |              |                  |
|                                                                                                                                                                                                                        |                               |                       |           |         |                                       |                  |              |                  |
| SEF148X                                                                                                                                                                                                                                                                                                    |                               |                       |           |         |                                       |                  |              |                  |
| <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>When steering wheel is turned quickly</td> <td>Approximately 0V</td> </tr> <tr> <td>Except above</td> <td>Approximately 5V</td> </tr> </tbody> </table> |                               |                       | Condition | Voltage | When steering wheel is turned quickly | Approximately 0V | Except above | Approximately 5V |
| Condition                                                                                                                                                                                                                                                                                                  | Voltage                       |                       |           |         |                                       |                  |              |                  |
| When steering wheel is turned quickly                                                                                                                                                                                                                                                                      | Approximately 0V              |                       |           |         |                                       |                  |              |                  |
| Except above                                                                                                                                                                                                                                                                                               | Approximately 5V              |                       |           |         |                                       |                  |              |                  |
| MTBL0142                                                                                                                                                                                                                                                                                                   |                               |                       |           |         |                                       |                  |              |                  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                            |                               |                       |           |         |                                       |                  |              |                  |
| OK                                                                                                                                                                                                                                                                                                         | ▶                             | <b>INSPECTION END</b> |           |         |                                       |                  |              |                  |
| NG                                                                                                                                                                                                                                                                                                         | ▶                             | GO TO 4.              |           |         |                                       |                  |              |                  |

# POWER STEERING OIL PRESSURE SWITCH

Diagnostic Procedure (Cont'd)

|          |                             |                                                                                                                                                                                                                                                                    |                                   |
|----------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>4</b> | <b>CHECK GROUND CIRCUIT</b> |                                                                                                                                                                                                                                                                    |                                   |
|          |                             | <ol style="list-style-type: none"> <li>Turn ignition switch "OFF".</li> <li>Disconnect power steering oil pressure switch harness connector.</li> <li>Check harness continuity between power steering oil pressure switch terminal 2 and engine ground.</li> </ol> | GI<br>MA<br>EM<br>LC<br><b>EC</b> |
|          |                             |                                                                                                                                                                                                                                                                    | AEC760                            |
|          |                             | <p><b>Continuity should exist.</b></p> <ol style="list-style-type: none"> <li>Also check harness for short to power.</li> </ol>                                                                                                                                    | FE                                |
|          |                             | <b>OK or NG</b>                                                                                                                                                                                                                                                    |                                   |
|          | OK                          | ▶ GO TO 5.                                                                                                                                                                                                                                                         | CL                                |
|          | NG                          | ▶ Repair open circuit or short to power in harness or connectors.                                                                                                                                                                                                  |                                   |

|          |                                   |                                                                                                                                                                                                                                                                                                                                                |                |
|----------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>5</b> | <b>CHECK INPUT SIGNAL CIRCUIT</b> |                                                                                                                                                                                                                                                                                                                                                |                |
|          |                                   | <ol style="list-style-type: none"> <li>Disconnect ECM harness connector.</li> <li>Check harness continuity between ECM terminal 46 and terminal 1.<br/>Refer to Wiring Diagram.</li> </ol> <p><b>Continuity should exist.</b></p> <ol style="list-style-type: none"> <li>Also check harness for short to ground and short to power.</li> </ol> | MT<br>AT<br>AX |
|          |                                   | <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                |                |
|          | OK                                | ▶ GO TO 7.                                                                                                                                                                                                                                                                                                                                     | SU             |
|          | NG                                | ▶ GO TO 6.                                                                                                                                                                                                                                                                                                                                     |                |

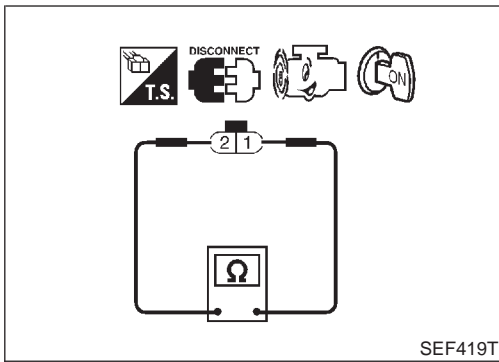
|          |                                   |                                                                                                                                                                                                 |          |
|----------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>6</b> | <b>DETECT MALFUNCTIONING PART</b> |                                                                                                                                                                                                 |          |
|          |                                   | <p>Check the following.</p> <ul style="list-style-type: none"> <li>Harness connectors F24, M62</li> <li>Harness for open or short between ECM and power steering oil pressure switch</li> </ul> | BR<br>ST |
|          |                                   | ▶ Repair open circuit or short to ground or short to power in harness or connectors.                                                                                                            | RS       |

|          |                                                 |                                               |          |
|----------|-------------------------------------------------|-----------------------------------------------|----------|
| <b>7</b> | <b>CHECK POWER STEERING OIL PRESSURE SWITCH</b> |                                               |          |
|          |                                                 | Refer to "Component Inspection", EC-596.      | BT<br>HA |
|          |                                                 | <b>OK or NG</b>                               |          |
|          | OK                                              | ▶ GO TO 8.                                    | SC       |
|          | NG                                              | ▶ Replace power steering oil pressure switch. |          |

|          |                                    |                                                                |     |
|----------|------------------------------------|----------------------------------------------------------------|-----|
| <b>8</b> | <b>CHECK INTERMITTENT INCIDENT</b> |                                                                |     |
|          |                                    | Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. | EL  |
|          |                                    | ▶ <b>INSPECTION END</b>                                        | IDX |

# POWER STEERING OIL PRESSURE SWITCH

Component Inspection



## Component Inspection

### POWER STEERING OIL PRESSURE SWITCH

NCEC0455

NCEC0455S01

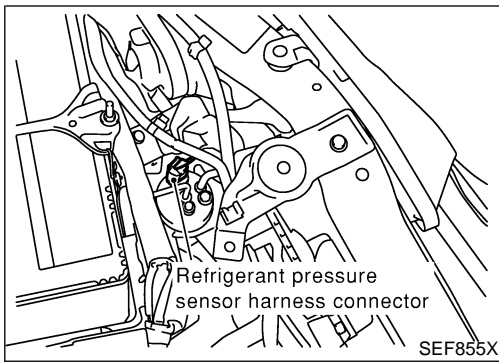
1. Disconnect power steering oil pressure switch harness connector then start engine.
2. Check continuity between terminals 1 and 2.

| Conditions                         | Continuity |
|------------------------------------|------------|
| Steering wheel is being turned     | Yes        |
| Steering wheel is not being turned | No         |

If NG, replace power steering oil pressure switch.

# REFRIGERANT PRESSURE SENSOR

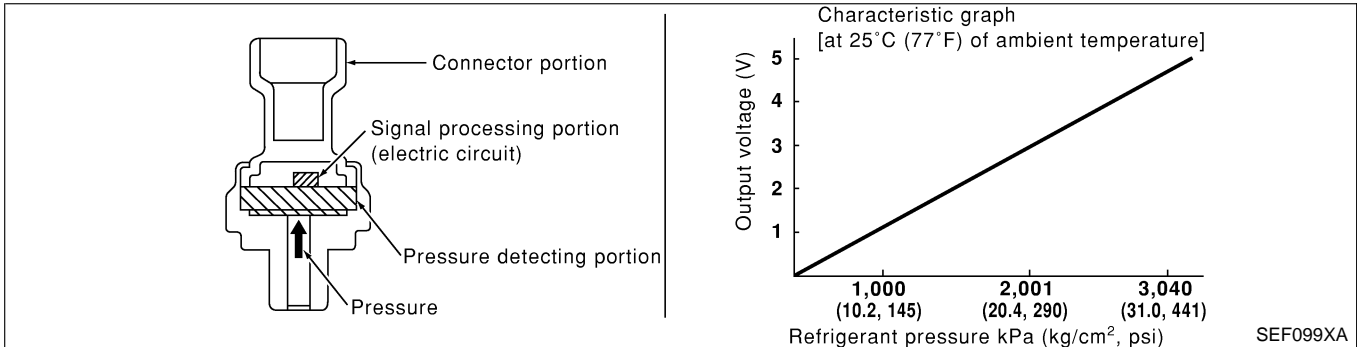
Description



## Description

NCEC0638

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



## ECM Terminals and Reference Value

NCEC0663

Specification data are reference values and are measured between each terminal and ground.

### CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

| TERMI-<br>NAL<br>NO. | WIRE<br>COLOR | ITEM                        | CONDITION                                                                                                            | DATA (DC Voltage) |
|----------------------|---------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------|
| 58                   | B             | Sensor's ground             | [Engine is running]<br>● Warm-up condition<br>● Idle speed                                                           | Approximately 0V  |
| 74                   | R/L           | Refrigerant pressure sensor | [Engine is running]<br>● Warm-up condition<br>● Both A/C switch and blower switch are "ON"<br>(Compressor operates.) | 0.36 - 3.88V      |
| 111                  | P/L           | Sensor's power supply       | [Ignition switch "ON"]                                                                                               | Approximately 5V  |

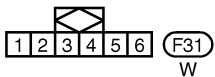
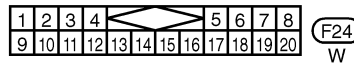
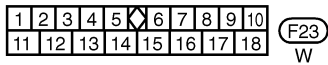
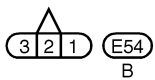
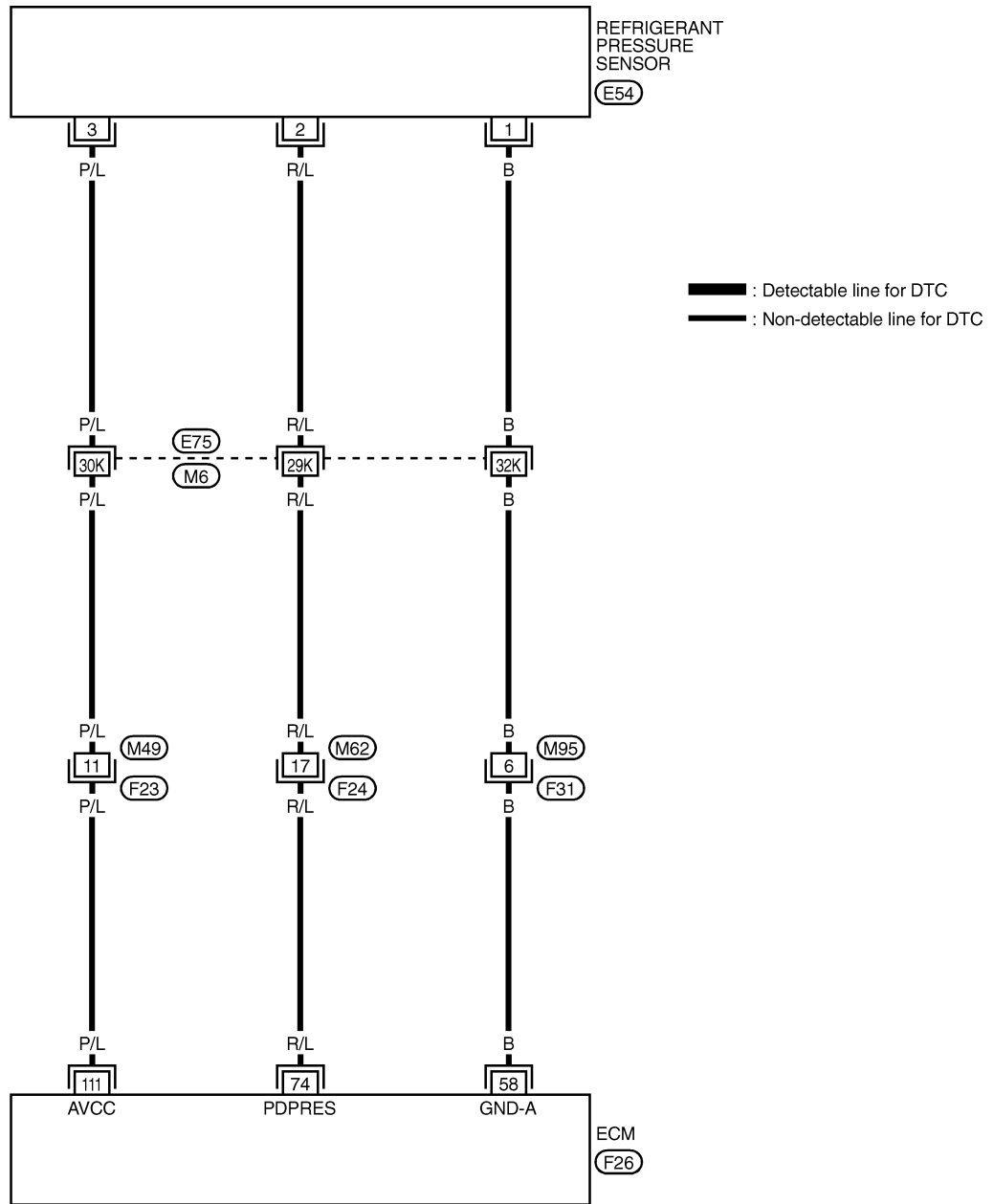
# REFRIGERANT PRESSURE SENSOR

Wiring Diagram

## Wiring Diagram

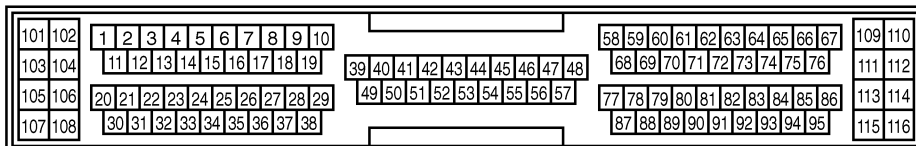
NCEC0639

### EC-RP/SEN-01



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)



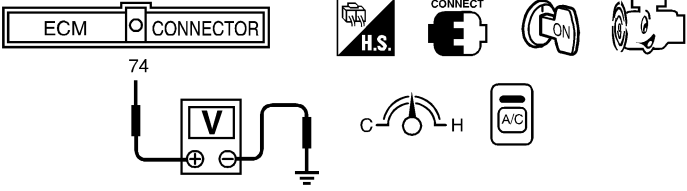
TEC733

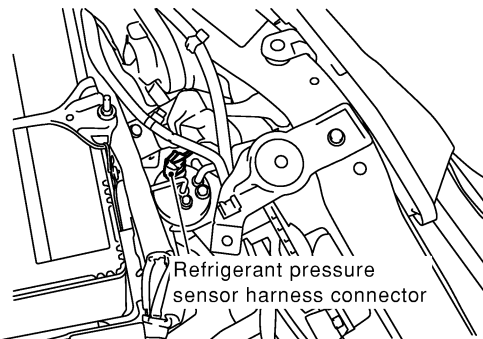
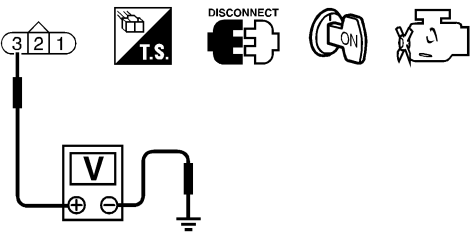
# REFRIGERANT PRESSURE SENSOR

Diagnostic Procedure

## Diagnostic Procedure

NCEC0640

|                                                                                                                                                                                                                                            |                                                           |                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------|
| <b>1</b>                                                                                                                                                                                                                                   | <b>CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION</b> | GI<br>MA<br>EM<br>LC<br><b>EC</b><br>FE |
| <p>1. Start engine and warm it up to normal operating temperature.<br/>                 2. Turn A/C switch and blower switch "ON".<br/>                 3. Check voltage between ECM terminal 74 and ground with CONSULT-II or tester.</p> |                                                           |                                         |
|  <p style="text-align: right;"><b>Voltage: 0.36 - 3.88V</b></p>                                                                                           |                                                           |                                         |
| SEF952X                                                                                                                                                                                                                                    |                                                           |                                         |
| <b>OK or NG</b>                                                                                                                                                                                                                            |                                                           |                                         |
| OK                                                                                                                                                                                                                                         | ▶                                                         | <b>INSPECTION END</b>                   |
| NG                                                                                                                                                                                                                                         | ▶                                                         | GO TO 2.                                |

|                                                                                                                                                                           |                                                               |                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>2</b>                                                                                                                                                                  | <b>CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT</b> | CL<br>MT<br>AT<br>AX<br>SU<br>BR<br>ST<br>RS<br>BT<br>HA<br>SC<br>EL<br>IDX |
| <p>1. Turn A/C switch and blower switch "OFF".<br/>                 2. Stop engine.<br/>                 3. Disconnect refrigerant pressure sensor harness connector.</p> |                                                               |                                                                             |
|  <p style="text-align: center;">Refrigerant pressure sensor harness connector</p>      |                                                               |                                                                             |
| SEF855X                                                                                                                                                                   |                                                               |                                                                             |
| <p>4. Turn ignition switch "ON".<br/>                 5. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.</p>           |                                                               |                                                                             |
|  <p style="text-align: right;"><b>Voltage: Approximately 5V</b></p>                    |                                                               |                                                                             |
| SEF953X                                                                                                                                                                   |                                                               |                                                                             |
| <b>OK or NG</b>                                                                                                                                                           |                                                               |                                                                             |
| OK                                                                                                                                                                        | ▶                                                             | GO TO 4.                                                                    |
| NG                                                                                                                                                                        | ▶                                                             | GO TO 3.                                                                    |

# REFRIGERANT PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

|                                                                                                                                                                                                                                    |                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>3</b>                                                                                                                                                                                                                           | <b>DETECT MALFUNCTIONING PART</b> |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E75, M6</li> <li>● Harness connectors M49, F23</li> <li>● Harness for open or short between ECM and refrigerant pressure sensor</li> </ul> |                                   |
| ▶                                                                                                                                                                                                                                  | Repair harness or connectors.     |

|                                                                                                                                                                                                                                                          |                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>4</b>                                                                                                                                                                                                                                                 | <b>CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT</b> |
| <p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between refrigerant pressure sensor terminal 1 and engine ground. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>3. Also check harness for short to power.</p> |                                                                            |
| <b>OK or NG</b>                                                                                                                                                                                                                                          |                                                                            |
| OK                                                                                                                                                                                                                                                       | ▶ GO TO 6.                                                                 |
| NG                                                                                                                                                                                                                                                       | ▶ GO TO 5.                                                                 |

|                                                                                                                                                                                                                                    |                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>5</b>                                                                                                                                                                                                                           | <b>DETECT MALFUNCTIONING PART</b>                               |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E75, M6</li> <li>● Harness connectors M95, F31</li> <li>● Harness for open or short between ECM and refrigerant pressure sensor</li> </ul> |                                                                 |
| ▶                                                                                                                                                                                                                                  | Repair open circuit or short to power in harness or connectors. |

|                                                                                                                                                                                                                                                                                      |                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <b>6</b>                                                                                                                                                                                                                                                                             | <b>CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT</b> |
| <p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 74 and refrigerant pressure sensor terminal 2. Refer to Wiring Diagram.<br/><b>Continuity should exist.</b></p> <p>3. Also check harness for short to ground and short to power.</p> |                                                                                  |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                      |                                                                                  |
| OK                                                                                                                                                                                                                                                                                   | ▶ GO TO 8.                                                                       |
| NG                                                                                                                                                                                                                                                                                   | ▶ GO TO 7.                                                                       |

|                                                                                                                                                                                                                                    |                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>7</b>                                                                                                                                                                                                                           | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors E75, M6</li> <li>● Harness connectors M62, F24</li> <li>● Harness for open or short between ECM and refrigerant pressure sensor</li> </ul> |                                                                                    |
| ▶                                                                                                                                                                                                                                  | Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                          |                                          |
|----------------------------------------------------------|------------------------------------------|
| <b>8</b>                                                 | <b>CHECK REFRIGERANT PRESSURE SENSOR</b> |
| Refer to HA-79 or HA-181, "Refrigerant pressure sensor". |                                          |
| <b>OK or NG</b>                                          |                                          |
| OK                                                       | ▶ GO TO 9.                               |
| NG                                                       | ▶ Replace refrigerant pressure sensor.   |



# REFRIGERANT PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

|                                                                 |                                    |
|-----------------------------------------------------------------|------------------------------------|
| <b>9</b>                                                        | <b>CHECK INTERMITTENT INCIDENT</b> |
| Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |
| ▶                                                               | <b>INSPECTION END</b>              |

GI

MA

EM

LC

**EC**

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

# ELECTRICAL LOAD SIGNAL

CONSULT-II Reference Value in Data Monitor Mode

## CONSULT-II Reference Value in Data Monitor Mode

NCEC0664

Specification data are reference values.

| MONITOR ITEM | CONDITION                                                               |                                                               | SPECIFICATION |
|--------------|-------------------------------------------------------------------------|---------------------------------------------------------------|---------------|
| LOAD SIGNAL  | <ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul> | Rear window defogger switch "ON" and/or lighting switch "2ND" | ON            |
|              |                                                                         | Rear window defogger switch and lighting switch "OFF"         | OFF           |

## ECM Terminals and Reference Value

NCEC0665

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

| TER-MINAL NO. | WIRE COLOR | ITEM                 | CONDITION                                                                                                                                    | DATA (DC Voltage)          |
|---------------|------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 50            | R          | Electric load signal | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Rear window defogger switch "ON" and/or lighting switch "2ND"</li> </ul> | BATTERY VOLTAGE (11 - 14V) |
|               |            |                      | <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Rear window defogger switch and lighting switch "OFF"</li> </ul>         | Approximately 0V           |

# ELECTRICAL LOAD SIGNAL

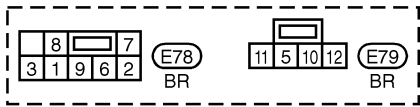
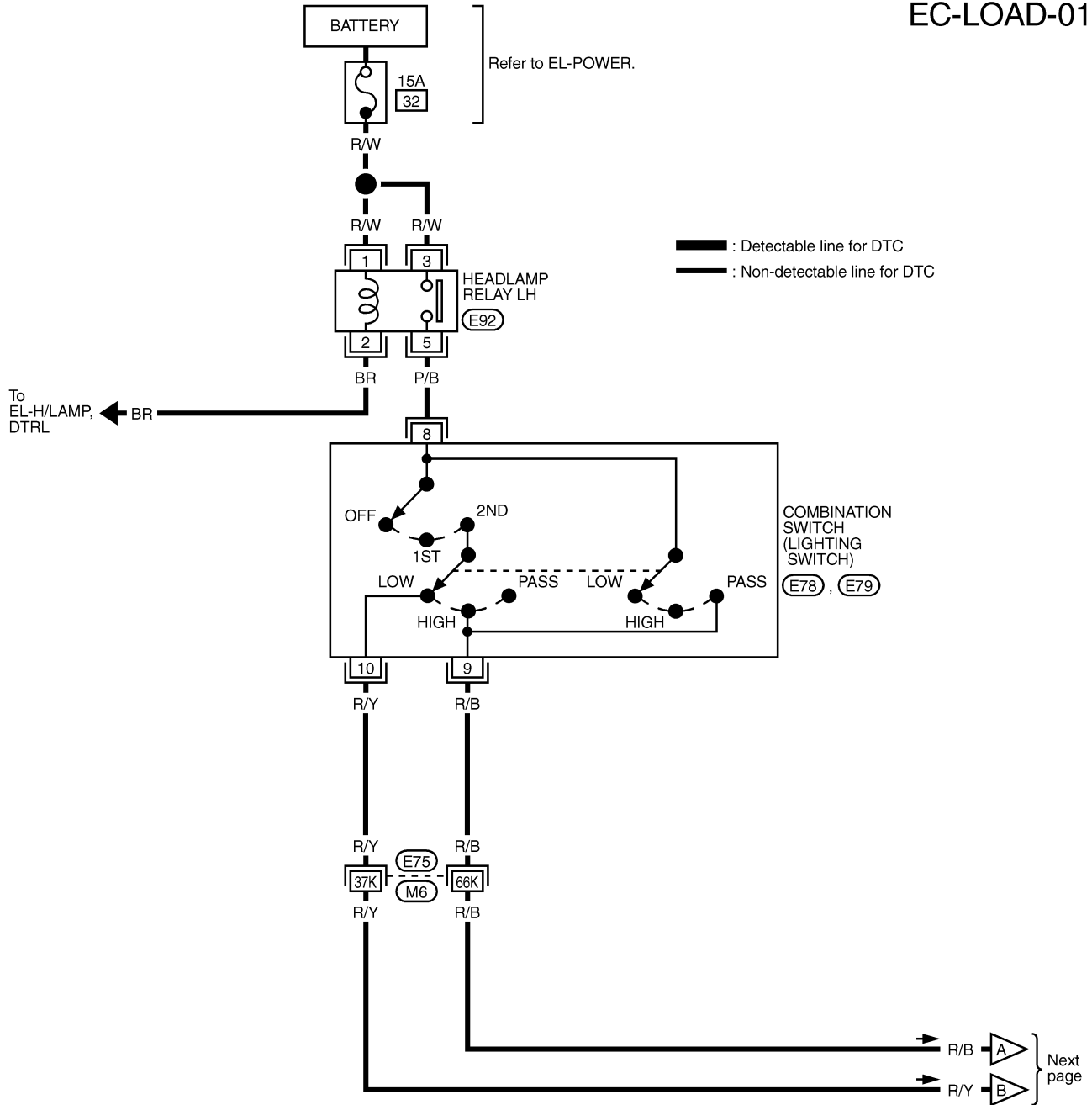
Wiring Diagram

## Wiring Diagram

NCEC0641

EC-LOAD-01

GI  
MA  
EM  
LC  
**EC**  
FE  
CL  
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REFER TO THE FOLLOWING.

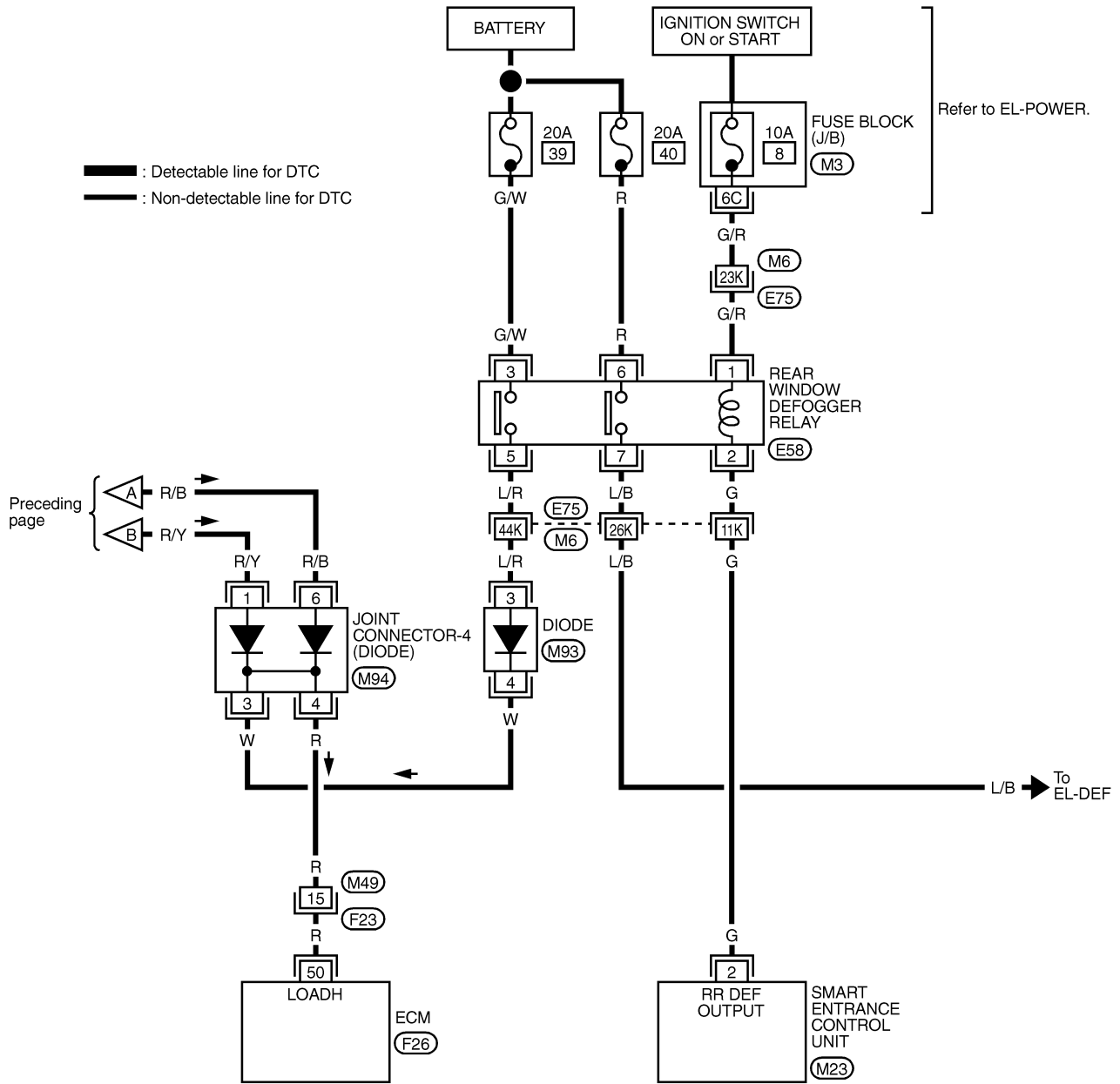
(E75) -SUPER MULTIPLE JUNCTION (SMJ)

TEC728

# ELECTRICAL LOAD SIGNAL

Wiring Diagram (Cont'd)

EC-LOAD-02

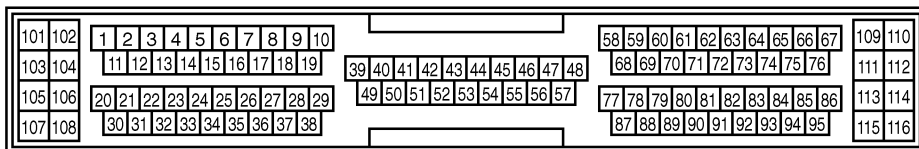
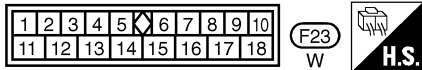
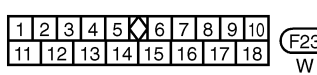
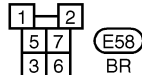
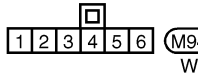
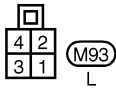


Refer to EL-POWER.

Preceding page

REFER TO THE FOLLOWING.

- (E75) -SUPER MULTIPLE JUNCTION (SMJ)
- (M3) -FUSE BLOCK-JUNCTION BOX (J/B)



TEC729

# ELECTRICAL LOAD SIGNAL


Diagnostic Procedure

## Diagnostic Procedure


NCEC0642

|                         |                         |          |
|-------------------------|-------------------------|----------|
| <b>1</b>                | <b>INSPECTION START</b> |          |
| Do you have CONSULT-II? |                         |          |
| Yes or No               |                         |          |
| Yes                     | ▶                       | GO TO 2. |
| No                      | ▶                       | GO TO 4. |

GI  
MA  
EM

| <b>2</b>                                                                                                                                                                                                                                                       | <b>CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I</b> |          |                                  |    |                                   |        |             |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----------|----------------------------------|----|-----------------------------------|--------|-------------|----|
| <p> <b>With CONSULT-II</b></p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>      |                                                     |          |                                  |    |                                   |        |             |    |
| <table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>LOAD SIGNAL</td> <td>ON</td> </tr> </tbody> </table>                                       |                                                     |          | DATA MONITOR                     |    | MONITOR                           | NO DTC | LOAD SIGNAL | ON |
| DATA MONITOR                                                                                                                                                                                                                                                   |                                                     |          |                                  |    |                                   |        |             |    |
| MONITOR                                                                                                                                                                                                                                                        | NO DTC                                              |          |                                  |    |                                   |        |             |    |
| LOAD SIGNAL                                                                                                                                                                                                                                                    | ON                                                  |          |                                  |    |                                   |        |             |    |
| <table border="1" style="margin: auto;"> <tbody> <tr> <td>Rear window defogger switch "ON"</td> <td style="text-align: center;">ON</td> </tr> <tr> <td>Rear window defogger switch "OFF"</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table> |                                                     |          | Rear window defogger switch "ON" | ON | Rear window defogger switch "OFF" | OFF    |             |    |
| Rear window defogger switch "ON"                                                                                                                                                                                                                               | ON                                                  |          |                                  |    |                                   |        |             |    |
| Rear window defogger switch "OFF"                                                                                                                                                                                                                              | OFF                                                 |          |                                  |    |                                   |        |             |    |
| SEF229Y                                                                                                                                                                                                                                                        |                                                     |          |                                  |    |                                   |        |             |    |
| OK or NG                                                                                                                                                                                                                                                       |                                                     |          |                                  |    |                                   |        |             |    |
| OK                                                                                                                                                                                                                                                             | ▶                                                   | GO TO 3. |                                  |    |                                   |        |             |    |
| NG                                                                                                                                                                                                                                                             | ▶                                                   | GO TO 6. |                                  |    |                                   |        |             |    |

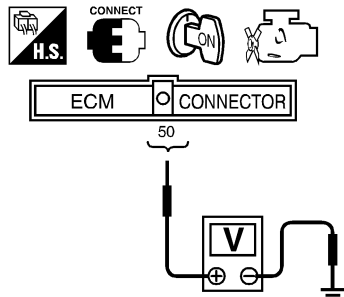
LC  
EC  
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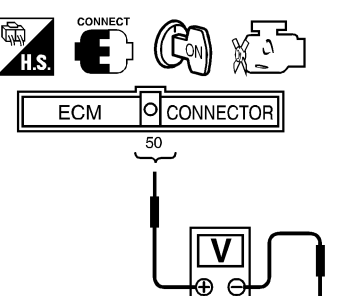
| <b>3</b>                                                                                                                                                                                                                                                    | <b>CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II</b> |                       |                                      |    |                       |        |             |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------|--------------------------------------|----|-----------------------|--------|-------------|----|
| <p> <b>With CONSULT-II</b></p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p> |                                                      |                       |                                      |    |                       |        |             |    |
| <table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>LOAD SIGNAL</td> <td>ON</td> </tr> </tbody> </table>                                    |                                                      |                       | DATA MONITOR                         |    | MONITOR               | NO DTC | LOAD SIGNAL | ON |
| DATA MONITOR                                                                                                                                                                                                                                                |                                                      |                       |                                      |    |                       |        |             |    |
| MONITOR                                                                                                                                                                                                                                                     | NO DTC                                               |                       |                                      |    |                       |        |             |    |
| LOAD SIGNAL                                                                                                                                                                                                                                                 | ON                                                   |                       |                                      |    |                       |        |             |    |
| <table border="1" style="margin: auto;"> <tbody> <tr> <td>Lighting switch "ON" at 2nd position</td> <td style="text-align: center;">ON</td> </tr> <tr> <td>Lighting switch "OFF"</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table>      |                                                      |                       | Lighting switch "ON" at 2nd position | ON | Lighting switch "OFF" | OFF    |             |    |
| Lighting switch "ON" at 2nd position                                                                                                                                                                                                                        | ON                                                   |                       |                                      |    |                       |        |             |    |
| Lighting switch "OFF"                                                                                                                                                                                                                                       | OFF                                                  |                       |                                      |    |                       |        |             |    |
| SEF230Y                                                                                                                                                                                                                                                     |                                                      |                       |                                      |    |                       |        |             |    |
| OK or NG                                                                                                                                                                                                                                                    |                                                      |                       |                                      |    |                       |        |             |    |
| OK                                                                                                                                                                                                                                                          | ▶                                                    | <b>INSPECTION END</b> |                                      |    |                       |        |             |    |
| NG                                                                                                                                                                                                                                                          | ▶                                                    | GO TO 10.             |                                      |    |                       |        |             |    |

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# ELECTRICAL LOAD SIGNAL

Diagnostic Procedure (Cont'd)

| <b>4</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I</b> |          |           |         |                                  |                 |                                   |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----------|-----------|---------|----------------------------------|-----------------|-----------------------------------|----|
| <p> <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "ON".</li> <li>2. Check voltage between ECM terminal 50 and ground under the following conditions.</li> </ol>                                                                                                                                                                                                                                                          |                                                     |          |           |         |                                  |                 |                                   |    |
|                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |          |           |         |                                  |                 |                                   |    |
| <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Rear window defogger switch "ON"</td> <td style="text-align: center;">BATTERY VOLTAGE</td> </tr> <tr> <td style="text-align: center;">Rear window defogger switch "OFF"</td> <td style="text-align: center;">0V</td> </tr> </tbody> </table> |                                                     |          | Condition | Voltage | Rear window defogger switch "ON" | BATTERY VOLTAGE | Rear window defogger switch "OFF" | 0V |
| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Voltage                                             |          |           |         |                                  |                 |                                   |    |
| Rear window defogger switch "ON"                                                                                                                                                                                                                                                                                                                                                                                                                                        | BATTERY VOLTAGE                                     |          |           |         |                                  |                 |                                   |    |
| Rear window defogger switch "OFF"                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0V                                                  |          |           |         |                                  |                 |                                   |    |
| SEF956X                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                     |          |           |         |                                  |                 |                                   |    |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                     |          |           |         |                                  |                 |                                   |    |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                                                   | GO TO 5. |           |         |                                  |                 |                                   |    |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ▶                                                   | GO TO 6. |           |         |                                  |                 |                                   |    |

| <b>5</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II</b> |                       |           |         |                                      |                 |                       |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------|-----------|---------|--------------------------------------|-----------------|-----------------------|----|
| <p> <b>Without CONSULT-II</b></p> <ol style="list-style-type: none"> <li>1. Turn ignition switch "ON".</li> <li>2. Check voltage between ECM terminal 50 and ground under the following conditions.</li> </ol>                                                                                                                                                                                                                                                  |                                                      |                       |           |         |                                      |                 |                       |    |
|                                                                                                                                                                                                                                                                                                                                                                               |                                                      |                       |           |         |                                      |                 |                       |    |
| <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Lighting switch "ON" at 2nd position</td> <td style="text-align: center;">BATTERY VOLTAGE</td> </tr> <tr> <td style="text-align: center;">Lighting switch "OFF"</td> <td style="text-align: center;">0V</td> </tr> </tbody> </table> |                                                      |                       | Condition | Voltage | Lighting switch "ON" at 2nd position | BATTERY VOLTAGE | Lighting switch "OFF" | 0V |
| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Voltage                                              |                       |           |         |                                      |                 |                       |    |
| Lighting switch "ON" at 2nd position                                                                                                                                                                                                                                                                                                                                                                                                                            | BATTERY VOLTAGE                                      |                       |           |         |                                      |                 |                       |    |
| Lighting switch "OFF"                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0V                                                   |                       |           |         |                                      |                 |                       |    |
| SEF957X                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                      |                       |           |         |                                      |                 |                       |    |
| <b>OK or NG</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                      |                       |           |         |                                      |                 |                       |    |
| OK                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶                                                    | <b>INSPECTION END</b> |           |         |                                      |                 |                       |    |
| NG                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ▶                                                    | GO TO 10.             |           |         |                                      |                 |                       |    |

|                                                                                                                                                                                                    |                                            |                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------|
| <b>6</b>                                                                                                                                                                                           | <b>CHECK REAR WINDOW DEFOGGER FUNCTION</b> |                                          |
| <ol style="list-style-type: none"> <li>1. Start engine.</li> <li>2. Turn "ON" the rear window defogger switch.</li> <li>3. Check the rear windshield. Is the rear windshield heated up?</li> </ol> |                                            |                                          |
| <b>Yes or No</b>                                                                                                                                                                                   |                                            |                                          |
| Yes                                                                                                                                                                                                | ▶                                          | GO TO 7.                                 |
| No                                                                                                                                                                                                 | ▶                                          | Refer to EL-121, "Rear Window Defogger". |

# ELECTRICAL LOAD SIGNAL

Diagnostic Procedure (Cont'd)

| <b>7</b>                                                                                                                                                                                                                                                                   | <b>CHECK REAR WINDOW DEFOGGER INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT</b> |                                                                                                                                                                                                                                                                                                                                                                              |           |            |   |               |   |                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|---|---------------|---|-------------------|
| <ol style="list-style-type: none"> <li>1. Stop engine.</li> <li>2. Disconnect ECM harness connector.</li> <li>3. Disconnect rear window defogger relay.</li> <li>4. Check harness continuity between ECM terminal 50 and rear window defogger relay terminal 5.</li> </ol> |                                                                          |                                                                                                                                                                                                                                                                                                                                                                              |           |            |   |               |   |                   |
| <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>CONDITION 1</b></p> </div> <div style="text-align: center;"> <p><b>CONDITION 2</b></p> </div> </div>                                                                   |                                                                          |                                                                                                                                                                                                                                                                                                                                                                              |           |            |   |               |   |                   |
|                                                                                                                                                                                                                                                                            |                                                                          | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>CONDITION</th> <th>CONTINUITY</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">Should exist.</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Should not exist.</td> </tr> </tbody> </table> | CONDITION | CONTINUITY | 1 | Should exist. | 2 | Should not exist. |
| CONDITION                                                                                                                                                                                                                                                                  | CONTINUITY                                                               |                                                                                                                                                                                                                                                                                                                                                                              |           |            |   |               |   |                   |
| 1                                                                                                                                                                                                                                                                          | Should exist.                                                            |                                                                                                                                                                                                                                                                                                                                                                              |           |            |   |               |   |                   |
| 2                                                                                                                                                                                                                                                                          | Should not exist.                                                        |                                                                                                                                                                                                                                                                                                                                                                              |           |            |   |               |   |                   |
| <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: right;">SEF958X</p>                                                                                                                                                             |                                                                          |                                                                                                                                                                                                                                                                                                                                                                              |           |            |   |               |   |                   |
| <b>OK or NG</b>                                                                                                                                                                                                                                                            |                                                                          |                                                                                                                                                                                                                                                                                                                                                                              |           |            |   |               |   |                   |
| OK                                                                                                                                                                                                                                                                         | ▶                                                                        | GO TO 9.                                                                                                                                                                                                                                                                                                                                                                     |           |            |   |               |   |                   |
| NG                                                                                                                                                                                                                                                                         | ▶                                                                        | GO TO 8.                                                                                                                                                                                                                                                                                                                                                                     |           |            |   |               |   |                   |

|                                                                                                                                                                                                                                                                              |                                   |                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------|
| <b>8</b>                                                                                                                                                                                                                                                                     | <b>DETECT MALFUNCTIONING PART</b> |                                                                                      |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M49, F23</li> <li>● Harness connectors E75, M6</li> <li>● Diode M93</li> <li>● Diode M94</li> <li>● Harness for open and short between ECM and rear window defogger relay</li> </ul> |                                   |                                                                                      |
|                                                                                                                                                                                                                                                                              |                                   | ▶ Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                                |                                    |                         |
|----------------------------------------------------------------|------------------------------------|-------------------------|
| <b>9</b>                                                       | <b>CHECK INTERMITTENT INCIDENT</b> |                         |
| Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. |                                    |                         |
|                                                                |                                    | ▶ <b>INSPECTION END</b> |

|                                                                                                                                                                                 |                                |                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------|
| <b>10</b>                                                                                                                                                                       | <b>CHECK HEADLAMP FUNCTION</b> |                                                                                                |
| <ol style="list-style-type: none"> <li>1. Start engine.</li> <li>2. Turn the lighting switch "ON" at 2nd position.</li> <li>3. Check that headlamps are illuminated.</li> </ol> |                                |                                                                                                |
| <b>OK or NG</b>                                                                                                                                                                 |                                |                                                                                                |
| OK                                                                                                                                                                              | ▶                              | GO TO 11.                                                                                      |
| NG                                                                                                                                                                              | ▶                              | Refer to EL-30, "HEADLAMP (FOR USA)" or EL-42, "HEADLAMP (FOR CANADA) — DAYTIME LIGHT SYSTEM". |

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# ELECTRICAL LOAD SIGNAL

Diagnostic Procedure (Cont'd)

| <b>11</b>                                                                                                                                                                                                                                                                                                                                       | <b>CHECK HEADLAMP INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT</b> |           |            |   |               |   |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------|------------|---|---------------|---|-------------------|
| <p>1. Stop engine.<br/>                 2. Disconnect ECM harness connector.<br/>                 3. Disconnect lighting switch harness connectors.<br/>                 4. Check harness continuity between ECM terminal 50 and lighting switch terminals 9, 10 under the following conditions.</p>                                            |                                                              |           |            |   |               |   |                   |
| <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>CONDITION 1</b></p> </div> <div style="text-align: center;"> <p><b>CONDITION 2</b></p> </div> </div>                                                                                                                                        |                                                              |           |            |   |               |   |                   |
| <table border="1" style="margin-left: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">CONDITION</th> <th>CONTINUITY</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Should exist.</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Should not exist.</td> </tr> </tbody> </table> |                                                              | CONDITION | CONTINUITY | 1 | Should exist. | 2 | Should not exist. |
| CONDITION                                                                                                                                                                                                                                                                                                                                       | CONTINUITY                                                   |           |            |   |               |   |                   |
| 1                                                                                                                                                                                                                                                                                                                                               | Should exist.                                                |           |            |   |               |   |                   |
| 2                                                                                                                                                                                                                                                                                                                                               | Should not exist.                                            |           |            |   |               |   |                   |
| <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p>                                                                                                                                                                                                                         |                                                              |           |            |   |               |   |                   |
| OK                                                                                                                                                                                                                                                                                                                                              | ▶                                                            | GO TO 13. |            |   |               |   |                   |
| NG                                                                                                                                                                                                                                                                                                                                              | ▶                                                            | GO TO 12. |            |   |               |   |                   |

SEF959X

|                                                                                                                                                                                                                                              |                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>12</b>                                                                                                                                                                                                                                    | <b>DETECT MALFUNCTIONING PART</b>                                                  |
| <p>Check the following.</p> <ul style="list-style-type: none"> <li>● Harness connectors M49, F23</li> <li>● Harness connectors E75, M6</li> <li>● Diode M94</li> <li>● Harness for open and short between ECM and lighting switch</li> </ul> |                                                                                    |
| ▶                                                                                                                                                                                                                                            | Repair open circuit or short to ground or short to power in harness or connectors. |

|                                                                       |                                    |
|-----------------------------------------------------------------------|------------------------------------|
| <b>13</b>                                                             | <b>CHECK INTERMITTENT INCIDENT</b> |
| <p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p> |                                    |
| ▶                                                                     | <b>INSPECTION END</b>              |



# MIL & DATA LINK CONNECTORS

Wiring Diagram

## Wiring Diagram

NCEC0466

EC-MIL/DL-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

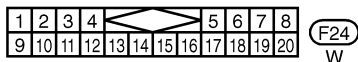
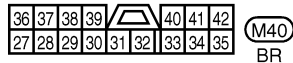
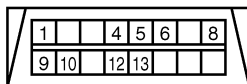
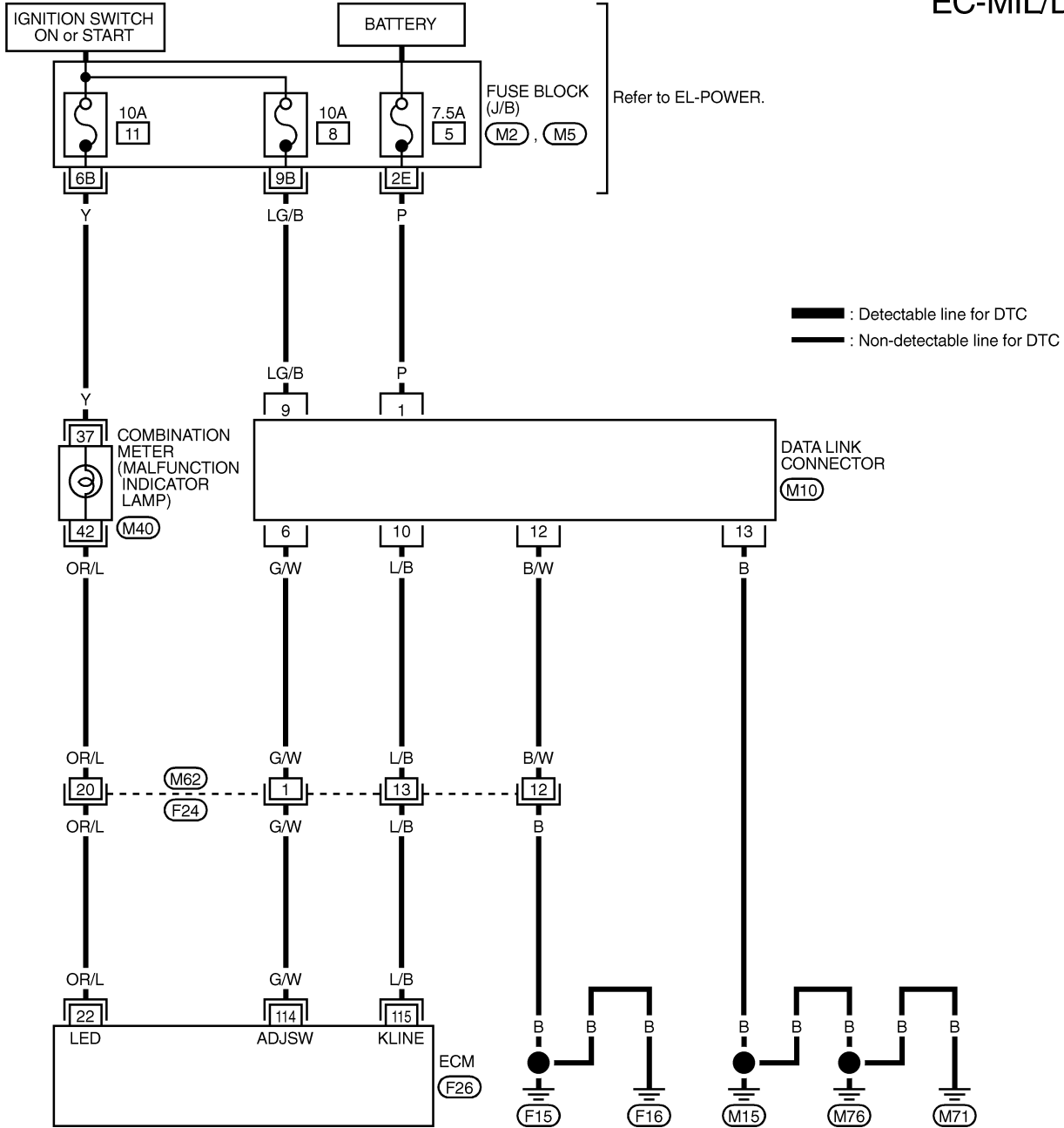
BT

HA

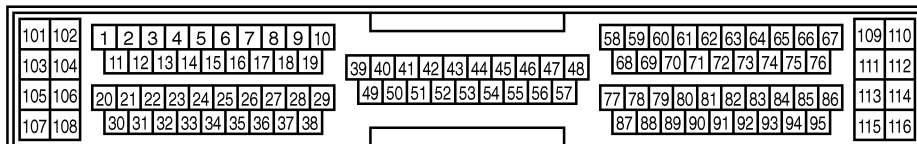
SC

EL

IDX



REFER TO THE FOLLOWING.  
 M2, M5 - FUSE BLOCK-JUNCTION BOX (J/B)



TEC730

# SERVICE DATA AND SPECIFICATIONS (SDS)

## Fuel Pressure Regulator

### Fuel Pressure Regulator

NCEC0467

|                                                           |                             |                             |
|-----------------------------------------------------------|-----------------------------|-----------------------------|
| Fuel pressure at idling<br>kPa (kg/cm <sup>2</sup> , psi) | Vacuum hose is connected    | Approximately 235 (2.4, 34) |
|                                                           | Vacuum hose is disconnected | Approximately 294 (3.0, 43) |

### Idle Speed and Ignition Timing

NCEC0468

|                                          |                                    |             |
|------------------------------------------|------------------------------------|-------------|
| Target idle speed*1 rpm                  | No-load*3 (in "P" or "N" position) | 800±50      |
| Air conditioner: ON rpm                  | In "P" or "N" position             | 850 or more |
| Ignition timing*2                        | In "P" or "N" position             | 15°±2° BTDC |
| Throttle position sensor idle position V |                                    | 0.15 - 0.85 |

\*1: Throttle position sensor harness connector connected

\*2: Throttle position sensor harness connector disconnected

\*3: Under the following conditions:

- Air conditioner switch: OFF
- Electrical load: OFF (Lights & rear window defogger)
- Steering wheel: Kept in straight-ahead position

### Ignition Coil

NCEC0469

|                                          |                           |
|------------------------------------------|---------------------------|
| Primary voltage V                        | Battery voltage (11 - 14) |
| Primary resistance [at 25°C (77°F)] Ω    | Approximately 0.8         |
| Secondary resistance [at 25°C (77°F)] kΩ | Approximately 16          |

### Mass Air Flow Sensor

NCEC0470

|                                                    |                                                |
|----------------------------------------------------|------------------------------------------------|
| Supply voltage V                                   | Battery voltage (11 - 14)                      |
| Output voltage V                                   | 1.3 - 1.7*                                     |
| Mass air flow<br>(Using CONSULT-II or GST) g-m/sec | 2.5 - 5.0 at idle*<br>7.1 - 12.5 at 2,500 rpm* |

\*: Engine is warmed up to normal operating temperature and idling under no-load.

### Engine Coolant Temperature Sensor

NCEC0471

|                     |               |
|---------------------|---------------|
| Temperature °C (°F) | Resistance kΩ |
| 20 (68)             | 2.1 - 2.9     |
| 50 (122)            | 0.68 - 1.00   |
| 90 (194)            | 0.236 - 0.260 |

### EGR Volume Control Valve

NCEC0671

|                                                                          |             |
|--------------------------------------------------------------------------|-------------|
| Resistance [at 20°C (68°F)] Ω<br>Between terminals 1-2, 2-3, 4-5 and 5-6 | 20.9 - 23.1 |
|--------------------------------------------------------------------------|-------------|

### EGR Temperature Sensor

NCEC0472

|                            |              |                  |
|----------------------------|--------------|------------------|
| EGR temperature<br>°C (°F) | Voltage<br>V | Resistance<br>MΩ |
| 0 (32)                     | 4.56         | 0.73 - 0.89      |
| 50 (122)                   | 2.25         | 0.074 - 0.082    |
| 100 (212)                  | 0.59         | 0.012 - 0.014    |

# SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Pump

| <b>Fuel Pump</b>                                      |                                                                                                       | NCEC0473    |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|
| Resistance [at 25°C (77°F)] $\Omega$                  |                                                                                                       | 0.2 - 5.0   |
| <b>IACV-AAC Valve</b>                                 |                                                                                                       | NCEC0474    |
| Resistance [at 20°C (68°F)] $\Omega$                  |                                                                                                       | 20 - 24     |
| <b>Injector</b>                                       |                                                                                                       | NCEC0475    |
| Resistance [at 20°C (68°F)] $\Omega$                  |                                                                                                       | 13.5 - 17.5 |
| <b>Resistor</b>                                       |                                                                                                       | NCEC0476    |
| Resistance [at 25°C (77°F)] $k\Omega$                 |                                                                                                       | 4 - 8       |
| <b>Throttle Position Sensor</b>                       |                                                                                                       | NCEC0477    |
| Throttle valve conditions                             | Voltage (at normal operating temperature, engine off, ignition switch ON, throttle opener disengaged) |             |
| Completely closed (a)                                 | 0.15 - 0.85V                                                                                          |             |
| Partially open                                        | Between (a) and (b)                                                                                   |             |
| Completely open (b)                                   | 3.5 - 4.7V                                                                                            |             |
| <b>Heated Oxygen Sensor 1 Heater (Front)</b>          |                                                                                                       | NCEC0478    |
| Resistance [at 25°C (77°F)] $\Omega$                  |                                                                                                       | 2.3 - 4.3   |
| <b>Calculated Load Value</b>                          |                                                                                                       | NCEC0479    |
|                                                       | Calculated load value %<br>(Using CONSULT-II or GST)                                                  |             |
| At idle                                               | 20.0 - 35.5                                                                                           |             |
| At 2,500 rpm                                          | 17.0 - 30.0                                                                                           |             |
| <b>Intake Air Temperature Sensor</b>                  |                                                                                                       | NCEC0480    |
| Temperature $^{\circ}\text{C}$ ( $^{\circ}\text{F}$ ) | Resistance $k\Omega$                                                                                  |             |
| 20 (68)                                               | 2.1 - 2.9                                                                                             |             |
| 80 (176)                                              | 0.27 - 0.38                                                                                           |             |
| <b>EVAP Canister Purge Volume Control Valve</b>       |                                                                                                       | NCEC0481    |
| Resistance [at 20°C (68°F)] $\Omega$                  |                                                                                                       | 22 - 26     |
| <b>Heated Oxygen Sensor 2 Heater (Rear)</b>           |                                                                                                       | NCEC0483    |
| Resistance [at 25°C (77°F)] $\Omega$                  |                                                                                                       | 2.3 - 4.3   |
| <b>Crankshaft Position Sensor (OBD)</b>               |                                                                                                       | NCEC0484    |
| Resistance [at 20°C (68°F)] $\Omega$                  |                                                                                                       | 166 - 204   |

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

# SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Tank Temperature Sensor

## Fuel Tank Temperature Sensor

=NCEC0485

| Temperature °C (°F) | Resistance kΩ |
|---------------------|---------------|
| 20 (68)             | 2.3 - 2.7     |
| 50 (122)            | 0.79 - 0.90   |