# SECTION ECE ENGINE CONTROL SYSTEM C

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# < PRECAUTION > PRECAUTION PRECAUTIONS

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

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

## WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/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 "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

## PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

## WARNING:

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precautions For Xenon Headlamp Service

INFOID:000000009650914

## WARNING:

Comply with the following warnings to prevent any serious accident.

- Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.
- Never work with wet hands.
- Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)
- Never touch the bulb glass immediately after turning it OFF. It is extremely hot.

## CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)
- Never perform HID circuit inspection with a tester.
- Never touch the xenon bulb glass with hands. Never put oil and grease on it.
- Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.
- Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).

# Precaution for Procedure without Cowl Top Cover

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.

# Precautions for Removing Battery Terminal

When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.

NOTE:

< PRECAUTION >

ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch. NOTE:

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC. NOTE:

The removal of 12V battery may cause a DTC detection error.

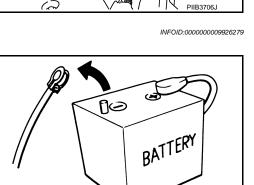
# On Board Diagnostic (OBD) System of Engine and CVT

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

- Always to turn the ignition switch OFF and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to illuminate.
- Always to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to illuminate 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 PG-5, "Harness Connector".
- Always route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to illuminate due to the short circuit.
- · Always to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to illuminate due to the malfunction of the EVAP system or fuel injection system, etc.
- Always to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

EC-9

ПO BATTERY



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[VQ35DE]

EC

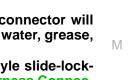
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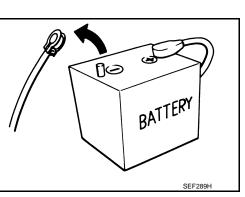
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# PRECAUTIONS

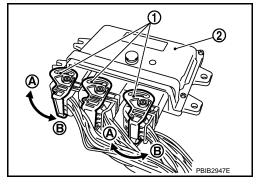
## < PRECAUTION >

# **General Precautions**

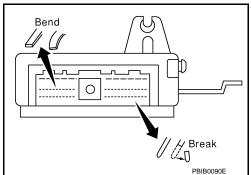
- Always use a 12 volt battery as power source.
- Never attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.
- Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.



- Never disassemble ECM.
- If a battery cable is disconnected, the memory will return to the ECM value. The ECM will now start to self-control at its initial value. Thus, engine operation can vary slightly in this case. However, this is not an indication of a malfunction. Never replace parts because of a slight variation.
- If the battery is disconnected, the following emission-related diagnostic information will be lost within 24 hours.
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values
- When connecting ECM harness connector, fasten (B) it securely with a lever (1) as far as it will go as shown in the figure.
- ECM (2)
- Loosen (A)



- When connecting or disconnecting pin connectors into or from ECM, never damage pin terminals (bends or break). Check that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- 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 engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.



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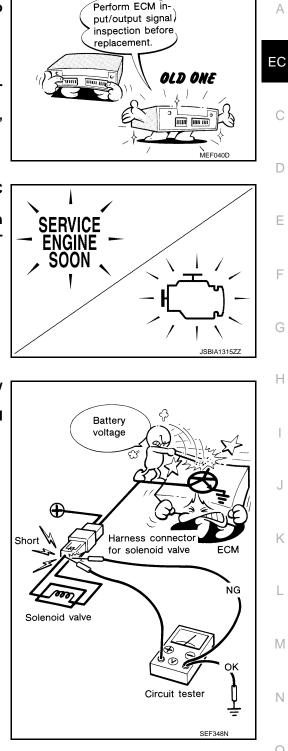
# PRECAUTIONS

## < PRECAUTION >

- Before replacing ECM, perform ECM Terminals and Reference Value inspection and check ECM functions properly. Refer to <u>EC-79, "Reference Value"</u>.
- Handle mass air flow sensor carefully to avoid damage.
- Never clean mass air flow sensor with any type of detergent.
- Never disassemble electric throttle control actuator.
- Even a slight leakage in the air intake system can cause serious incidents.
- Never shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).
- After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Component Function Check. The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Component Function Check should be a good result if the repair is completed.

• 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.



[VQ35DE]

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# PRECAUTIONS

B1 indicates bank 1, B2 indicates bank 2 as shown in the figure.

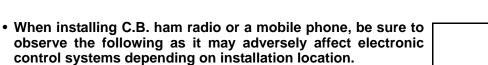
Immediately after starting, never rev up engine unnecessarily.

- Never operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.

Never depress accelerator pedal when starting.

• Never rev up engine just prior to shutdown.

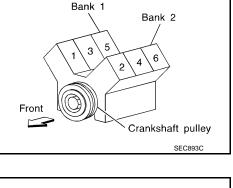
< PRECAUTION >



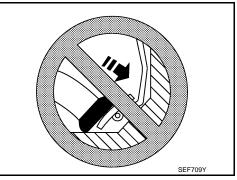
- Keep the antenna as far as possible from the electronic control units.
- Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.

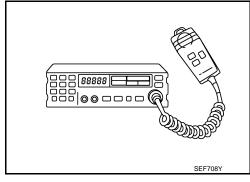
Never let them run parallel for a long distance.

- Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
- Be sure to ground the radio to vehicle body.



Cylinder number and Bank layout





# PREPARATION

# < PREPARATION > PREPARATION

# PREPARATION

# 2

	tools may differ from those of special service to	ools illustrated here.
ool number Kent-Moore No.) ool name		Description
I-44321) uel pressure gauge t		Checks fuel pressure
J-44321-6) uel pressure adapter	LEC642	Connects fuel pressure gauge to quick connector type fuel lines
	LBIA0376E	
ommercial Service	Tools	INFOID-00000000550
	e Tools	INFOID:000000000650
ool name Kent-Moore No.) J-45488) Quick connector re-	PBIC0198E	Description Removes fuel tube quick connectors in engine

S-NT704

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# PREPARATION

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Tool name (Kent-Moore No.)		Description
Fuel filler cap adapter i.e.: (MLR-8382)		Checks fuel tank vacuum relief valve opening pressure
	EP ODD	
Socket wrench	S-NT815 19 mm (0.75 in) Nore than 32 mm (1.26 in)	Removes and installs engine coolant temperature sensor. Refer to <u>CO-26. "Exploded View"</u> .
Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12)	S-NT705	Reconditions the exhaust system threads before installing a new oxygen sensor. Use with anti- seize lubricant shown below. a: 18 mm diameter with pitch 1.5 mm for Zirco- nia Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Tita- nia Oxygen Sensor
Anti-seize lubricant i.e.: (Permatex <sup>TM</sup> 133AR or equivalent meeting MIL specifica- tion MIL-A-907)	S-NT779	Lubricates oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

# < SYSTEM DESCRIPTION >

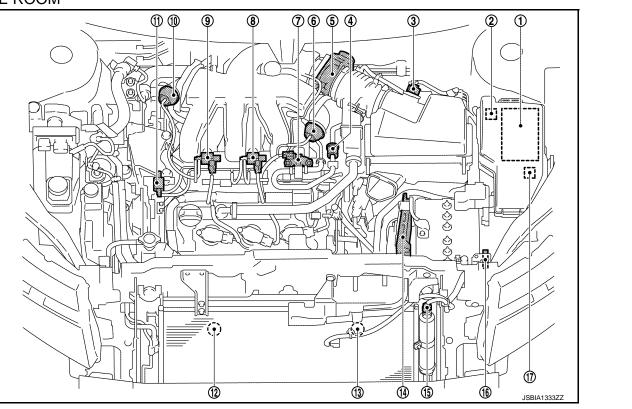
# SYSTEM DESCRIPTION

COMPONENT PARTS

ENGINE CONTROL SYSTEM

# **ENGINE CONTROL SYSTEM : Component Parts Location**

## **ENGINE ROOM**



No.	Component	Function
1.	IPDM E/R	IPDM E/R activates the internal control circuit to perform the relay- ON-OFF control according to the input signals from various sen- sors and the request signals received from control units via CAN communication. Refer to <u>PCS-36</u> , " <u>Exploded View</u> " for detailed installationlocation.
2.	Cooling fan motor relay-3	EC-26. "Cooling Fan"
3.	Mass air flow sensor (with intake air temperature sensor)	EC-21, "Mass Air Flow Sensor (With Intake Air Temperature Sen- sor)"
4.	EVAP service port	_
5.	Electric throttle control actuator	EC-19, "Electric Throttle Control Actuator"
6.	Power valve actuator 2	EC-24, "Power Valve Actuator 1 and 2"
7.	EVAP canister purge volume control solenoid valve	EC-26, "EVAP Canister Purge Volume Control Solenoid Valve"
8.	VIAS control solenoid valve 2	EC-24, "VIAS Control Solenoid Valve 1 and 2"
9.	VIAS control solenoid valve 1	EC-24, "VIAS Control Solenoid Valve 1 and 2"
10.	Power valve actuator 1	EC-24, "Power Valve Actuator 1 and 2"
11.	Electronic controlled engine mount control solenoid valve	EC-24, "Electronic Controlled Engine Mount"
12.	Cooling fan motor-2	EC-26, "Cooling Fan"
13.	Cooling fan motor-1	EC-26, "Cooling Fan"
14.	ECM	EC-18, "ECM"

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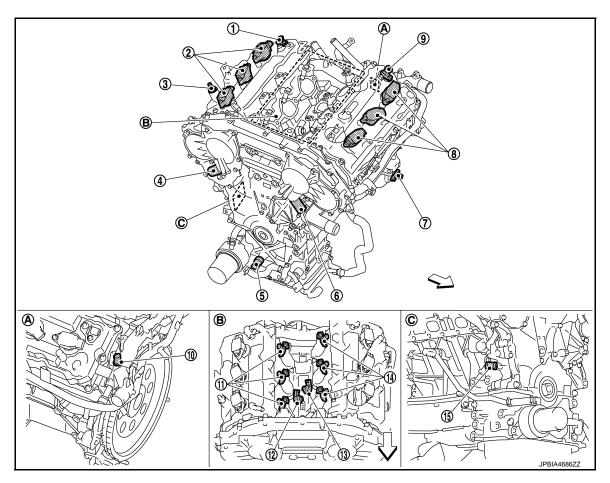
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## < SYSTEM DESCRIPTION >

No.	Component	Function
15.	Refrigerant pressure sensor	EC-25, "Refrigerant Pressure Sensor" Refer to <u>HA-43</u> , "Exploded View" for detailed installationlocation.
16.	Battery current sensor (With Battery Temperrature Sensor)	EC-25, "Battery Current Sensor (With Battery Temperature Sen- sor)"
17.	Cooling fan motor relay-2	EC-26, "Cooling Fan"

## ENGINE



- A. Engine rear upper-left
- B. Engine top center
- C. Engine front lower-right

✓ :Vehicle front

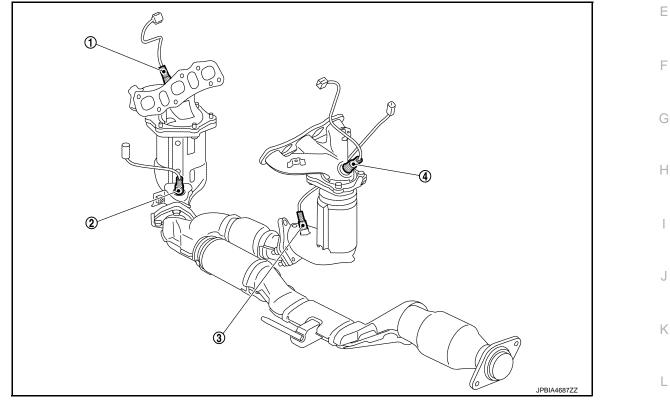
No.	Component	Function
1.	Camshaft position sensor (PHASE) (bank 1)	EC-22, "Camshaft Position Sensor (PHASE)"
2.	Ignition coil (with power transistor) (bank 1)	EC-20, "Ignition Coil (With Power Transistor)"
3.	PCV valve	EC-30, "Positive Crankcase Ventilation (PCV)"
4.	Intake valve timing control solenoid valve (bank 1)	EC-23, "Intake Valve Timing Control Solenoid Valve"
5.	Engine oil pressure sensor*	_
6.	Intake valve timing control solenoid valve (bank 2)	EC-23, "Intake Valve Timing Control Solenoid Valve"
7.	Crankshaft position sensor (POS)	EC-22, "Crankshaft Position Sensor (POS)"
8.	Ignition coil (with power transistor) (bank 2)	EC-20, "Ignition Coil (With Power Transistor)"

## < SYSTEM DESCRIPTION >

y	Camshaft position sensor (PHASE)		A
	(bank 2)	EC-22, "Camshaft Position Sensor (PHASE)"	
10.	Engine coolant temperature sensor	EC-23, "Engine Coolant Temperature Sensor"	FO
11.	Fuel injector (bank 1)	EC-21, "Fuel Injector"	EC
12.	Knock sensor (bank 1)	EC-24, "Knock Sensor"	
13.	Knock sensor (bank 2)	EC-24, "Knock Sensor"	С
14.	Fuel injector (bank 2)	EC-21, "Fuel Injector"	
15.	Engine oil temperature sensor	EC-23, "Engine Oil Temperature Sensor"	

\*: Not applicable

# EXHAUST

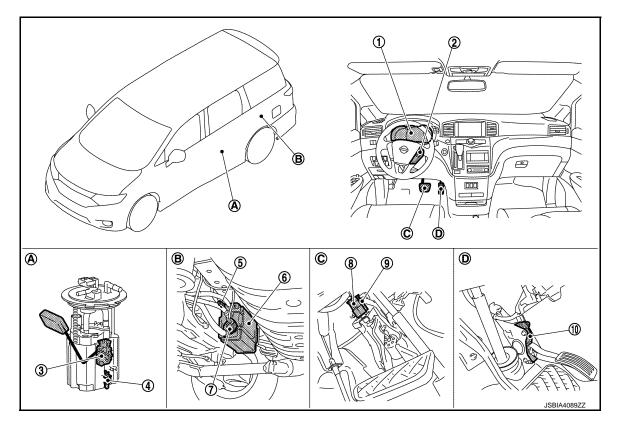


No.	Component	Function	
1.	Air fuel ratio (A/F) sensor 1 (bank 2)	EC-27, "Air Fuel Ratio (A/F) Sensor 1"	M
2.	Heated oxygen sensor 2 (bank 2)	EC-27, "Heated Oxygen Sensor 2"	
3.	Heated oxygen sensor 2 (bank 1)	EC-27, "Heated Oxygen Sensor 2"	N
4.	Air fuel ratio (A/F) sensor 1 (bank 1)	EC-27, "Air Fuel Ratio (A/F) Sensor 1"	14

# BODY

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## < SYSTEM DESCRIPTION >



- A. Fuel tank top center
- B. Rear suspension member periphery C. Pedal periphery
- D. Pedal periphery

No.		Component Function	
		Malfunction indicator lamp (MIL)	EC-19, "Malfunction Indicator lamp (MIL)"
1.	Combination meter	Information display	The operation mode of the ASCD is indicated on the information display in the combination meter. ECM transmits the status signal to the combination meter via CAN communication according to ASCD operation.
2.	ASCD steering switch	I	EC-28. "ASCD Steering Switch"
3.	Fuel level sensor unit and fuel pump		EC-28, "Fuel Level Sensor Unit and Fuel Pump" Refer to FL-5, "Exploded View" for detailed installationlocation.
4.	Fuel tank temperature	esensor	EC-28, "Fuel Tank Temperature Sensor"
5.	EVAP canister vent control valve		EC-26, "EVAP Canister Vent Control Valve"
6.	EVAP canister		EC-26, "EVAP Canister Vent Control Valve"
7.	EVAP control system pressure sensor		EC-26, "EVAP Control System Pressure Sensor"
8.	ASCD brake switch		EC 28 "Stan Long Switch & ASCD Broke Switch"
9.	Stop lamp switch		EC-28, "Stop Lamp Switch & ASCD Brake Switch"
10.	Accelerator pedal position sensor		EC-19, "Accelerator Pedal Position Sensor"

# ECM

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• ECM (Engine Control Module) controls the engine.

## < SYSTEM DESCRIPTION >

- · ECM consists of a microcomputer and connectors for signal input and output and for power supply.
- Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.

#### engine running. This is a bulb check. When the engine is started, MIL should turn OFF. If the MIL remains

illuminated, the on board diagnostic system has detected an engine system malfunction.

For details, refer to EC-58, "Diagnosis Description".

# Accelerator Pedal Position Sensor

Malfunction Indicator lamp (MIL)

meter.

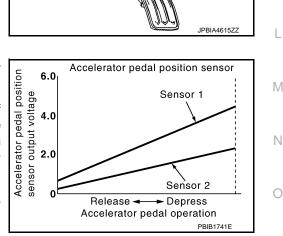
The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

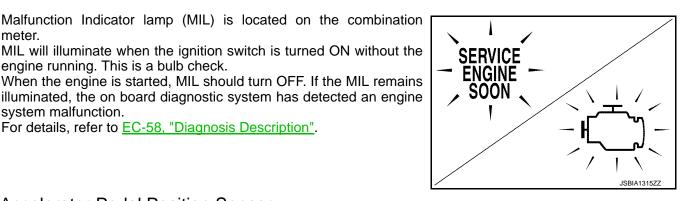
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

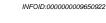
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

Electric Throttle Control Actuator

OUTLINE







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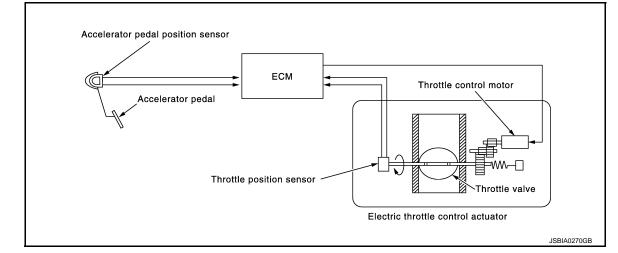
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## < SYSTEM DESCRIPTION >

Electric throttle control actuator consists of throttle body, throttle valve, throttle control motor and throttle position sensor.



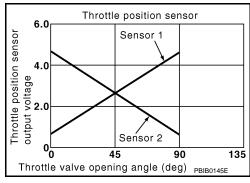
## THROTTLE CONTROL MOTOR

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.

The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

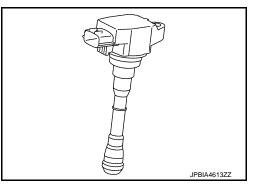
## THROTTLE POSITION SENSOR

The throttle position sensor responds to the throttle valve movement. The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



# Ignition Coil (With Power Transistor)

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns ON and OFF the ignition coil primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.



## < SYSTEM DESCRIPTION >

## **Fuel Injector**

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the fuel injector circuit, the coil in the fuel injector is energized. The energized coil pulls the ball valve back and allows fuel to flow through the fuel injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the fuel injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.

# Mass Air Flow Sensor (With Intake Air Temperature Sensor)

## MASS AIR FLOW SENSOR

The mass air flow sensor (1) is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to 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 electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.

## INTAKE AIR TEMPERATURE SENSOR

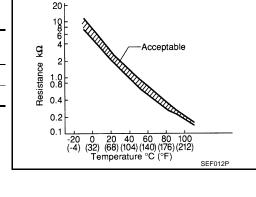
The intake air temperature sensor is built-into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.

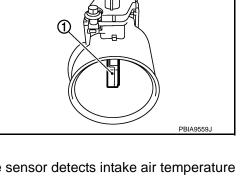
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.

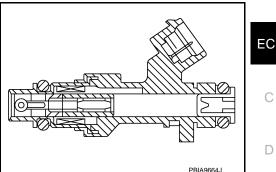
## <Reference data>

Intake air temperature [°C (°F)]	Voltage <sup>*</sup> (V)	Resistance (k $\Omega$ )
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

\*: These data are reference values and are measured between ECM terminals.







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## < SYSTEM DESCRIPTION >

# Camshaft Position Sensor (PHASE)

The camshaft position sensor (PHASE) senses the retraction of intake camshaft to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.

When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

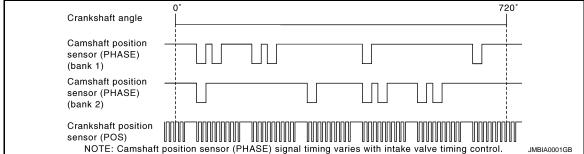
The sensor consists of a permanent magnet and Hall IC.

When 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.

ECM receives the signals as shown in the figure.



## Crankshaft Position Sensor (POS)

The crankshaft position sensor (POS) is located on the oil pan facing the gear teeth (cogs) of the signal plate. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet and Hall IC.

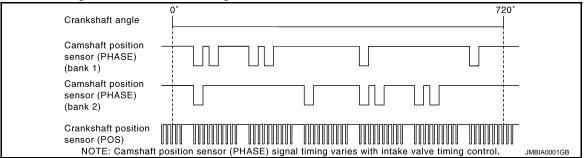
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

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.

ECM receives the signals as shown in the figure.



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## < SYSTEM DESCRIPTION >

## Intake Valve Timing Control Solenoid Valve

Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.

The longer pulse width advances valve angle.

The shorter pulse width retards valve angle.

When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.

# Engine Coolant Temperature Sensor

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

[°C (°F)] -10 (14)

20 (68)

50 (122)

90 (194)

*: These data are reference values and are measured between ECI	M terminals.
---	--------------

Voltage<sup>\*</sup> (V)

4.4

3.5

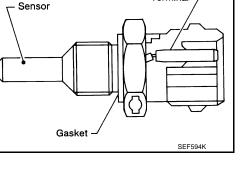
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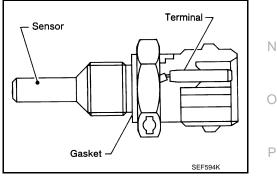
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# Engine Oil Temperature Sensor

The engine oil temperature sensor is used to detect the engine oil temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine oil 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.











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Terminal

Plunger

Coil

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EC

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M

Resistance (k<sub>Ω</sub>)

7.0 - 11.4

2.1 - 2.9

0.68 - 1.00

0.236 - 0.260

# < SYSTEM DESCRIPTION >

## <Reference data>

Engine oil temperature [°C (°F)]	Voltage <sup>*</sup> (V)	Resistance (k $\Omega$ )
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.37 - 2.63
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260
110 (230)	0.6	0.143 - 0.153

\*: These data are reference values and are measured between ECM terminals.

# Knock Sensor

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.

# VIAS Control Solenoid Valve 1 and 2

The VIAS control solenoid valve cuts the intake manifold vacuum signal for power valve control. It responds to ON/OFF signals from the ECM. When the solenoid is OFF, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and sends the vacuum signal to the power valve actuator.

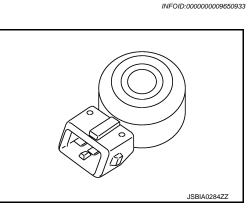
# Power Valve Actuator 1 and 2

The power valves are used to control the suction passage of the variable induction air control system. They are set in the fully closed or fully opened position by the power valve actuators operated by the vacuum stored in the vacuum tank. The vacuum to power valve actuators is controlled by the VIAS control solenoid valves.

# **Electronic Controlled Engine Mount**

In the idle range, ECM turns OFF the electronically-controlled engine mount control solenoid valve and applies manifold pressure to the electronically-controlled engine mount. This decreases damping force of the electronically-controlled engine mount and absorbs vibrations traveling from the engine to the body for improving the quietness.

In the driving range, ECM turns ON the electronically-controlled engine mount control solenoid valve and cuts manifold pressure applied on the electronically-controlled engine mount. This increases damping force of the electronically-controlled engine mount and reduces vibrations generated during driving.



0 20 40 60 80 100 (32) (68) (104) (140) (176) (212) Temperature °C (°F)

20 10 6

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2 1.0 8.0 8.0 8.0 4.0 2.0 1.0

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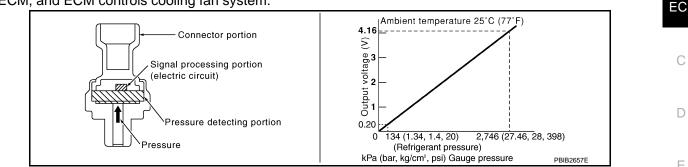
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Acceptable

## < SYSTEM DESCRIPTION >

## **Refrigerant Pressure Sensor**

The refrigerant pressure sensor is installed at the condenser 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.

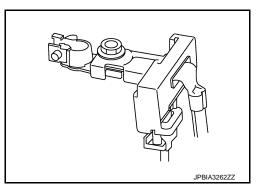




## OUTLINE

The power generation voltage variable control enables fuel consumption to be decreased by reducing the engine load which is caused by the power generation of the generator.

Based on sensor signals, ECM judges whether or not the power generation voltage variable control is performed. When performing the power generation voltage variable control, ECM calculates the target power generation voltage based on the sensor signal. And ECM sends the calculated value as the power generation command value to IPDM E/R.



## **CAUTION:**

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power generation voltage variable control, and then the battery discharge may occur.

## BATTERY CURRENT SENSOR

The battery current sensor is installed to the battery cable at the negative terminal. The sensor measures the charging/discharging current of the battery.

## BATTERY TEMPERATURE SENSOR

Battery temperature sensor is integrated in battery current sensor. The sensor measures temperature around the battery. The electrical resistance of the thermistor decreases as temperature

increases date

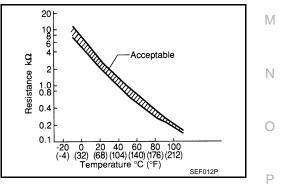
## <Reference data>

Temperature [°C (°F)]	Voltage* (V)	Resistance (k $\Omega$ )
25 (77)	3.333	1.9 - 2.1
90 (194)	0.969	0.222 - 0.258

\*: These data are reference values and are measured between battery temperature sensor signal terminal and sensor ground.

## Power Steering Pressure Sensor

Power steering pressure sensor is installed to the power steering high-pressure tube and detects a power steering load.



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## < SYSTEM DESCRIPTION >

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This sensor is a potentiometer which transforms the power steering load into output voltage, and emits the voltage signal to the ECM. The ECM controls the electric throttle control actuator and adjusts the throttle valve opening angle to increase the engine speed and adjusts the idle speed for the increased load.

# Cooling Fan

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## DESCRIPTION

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 4-step control [HIGH/MIDDLE/LOW/OFF]. Refer to <u>EC-45</u>, "COOLING FAN CONTROL : System Description" for cooling fan operation.

## COOLING FAN MOTOR RELAY

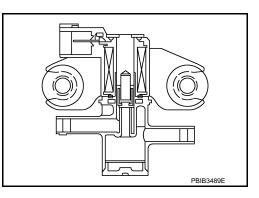
Power supply for the cooling fan motor is provided via cooling fan motor relay.

## **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. For details, refer to EC-49, "EVAPORATIVE EMISSION SYSTEM : System Description".

# EVAP Canister Purge Volume Control Solenoid Valve

The EVAP canister purge volume control solenoid valve is used 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.



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# EVAP Canister Vent Control Valve

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

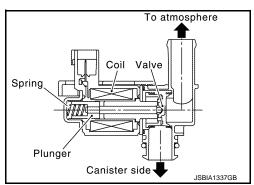
This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

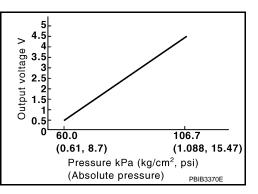
This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnosis.

# EVAP Control System Pressure Sensor

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.





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## < SYSTEM DESCRIPTION >

# Air Fuel Ratio (A/F) Sensor 1

## DESCRIPTION

The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element. The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range. The exhaust gas components diffuse through the diffusion layer at the sensor cell. An electrode layer is applied voltage, and this current relative oxygen density in lean. Also this current relative hydrocarbon density in rich.

Therefore, the A/F sensor 1 is able to indicate air fuel ratio by this electrode layer of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of approximately 800°C (1,472°F).

# A/F SENSOR 1 HEATER

A/F sensor 1 heater is integrated in the sensor.

The ECM performs ON/OFF duty control of the A/F sensor 1 heater corresponding to the engine operating condition to keep the temperature of A/F sensor 1 element within the specified range.

# Heated Oxygen Sensor 2

# DESCRIPTION

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1 V in richer conditions to 0 V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.

# HEATED OXYGEN SENSOR 2 HEATER

Heated oxygen sensor 2 heater is integrated in the sensor.

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

Engine speed	Heated oxygen sensor 2 heater
Above 3,600 rpm	OFF
<ul> <li>Below 3,600 rpm after the following conditions are met.</li> <li>Engine: After warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	ON

Protector

1500 1000 500

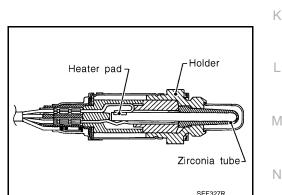
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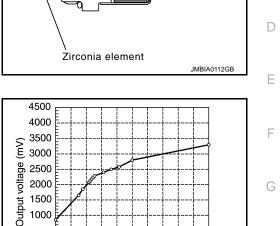




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10 12 14 16 18 20 22 24 26 28 30 Air fuel ratio

Holder

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## < SYSTEM DESCRIPTION >

## Fuel Level Sensor Unit and Fuel Pump

## FUEL PUMP

The ECM activates the fuel pump for 1 second after the ignition switch is turned ON to improve engine start ability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed 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 1 second.
Engine running and cranking	Operates.
When engine is stopped	Stops in 1.5 seconds.
Except as shown above	Stops.

## FUEL LEVEL SENSOR

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 combination meter. The combination meter sends the fuel level sensor signal to the ECM via the CAN communication line.

It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

# Fuel Tank Temperature Sensor

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 terminals 95 (Fuel tank temperature sensor) and ground.

# ASCD Steering Switch

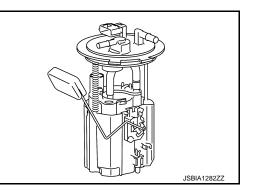
ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.

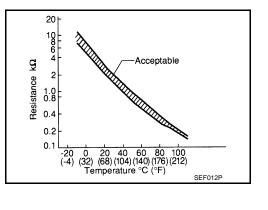
Refer to <u>EC-44, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description"</u> for the ASCD function.

## Stop Lamp Switch & ASCD Brake Switch

Stop lamp switch and ASCD brake switch are installed to brake pedal bracket. ECM detects the state of the brake pedal by those two types of input (ON/OFF signal).

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INFOID:000000009650950

## < SYSTEM DESCRIPTION >

# [VQ35DE]

Brake pedal	ASCD brake switch	Stop lamp switch	^
Released	ON	OFF	A
Depressed	OFF	ON	

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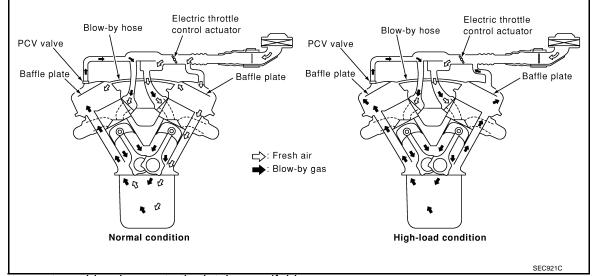
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## < SYSTEM DESCRIPTION >

# STRUCTURE AND OPERATION

Positive Crankcase Ventilation (PCV)



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

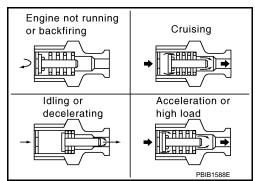
The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

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 drawn from the air inlet tubes 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.

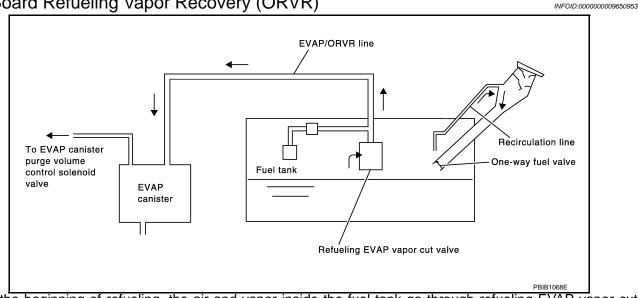
On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.



# STRUCTURE AND OPERATION

## < SYSTEM DESCRIPTION >

# On Board Refueling Vapor Recovery (ORVR)



From the beginning of refueling, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve and EVAP/ORVR 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. Н

#### WARNING:

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

- Put a "CAUTION: FLAMMABLE" sign in workshop.
- Never smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Always to furnish the workshop with a CO<sub>2</sub> fire extinguisher.

## **CAUTION:**

- Before removing fuel line parts, carry out the following procedures:
- Put drained fuel in an explosion-proof container and put lid on securely.
- Release fuel pressure from fuel line. Refer to EC-141, "Work Procedure".
- Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Never kink or twist hose and tube when they are installed.
- Never tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leakage at connections.
- Never 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.

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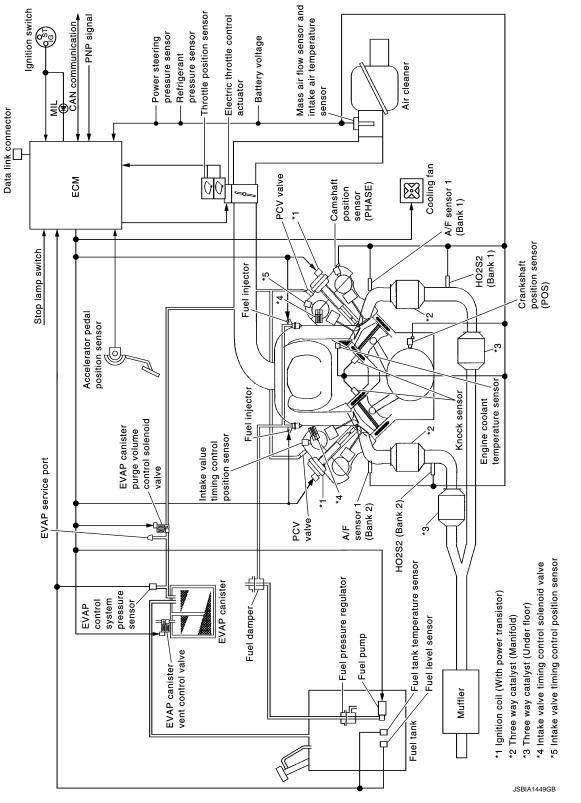
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# SYSTEM ENGINE CONTROL SYSTEM

**ENGINE CONTROL SYSTEM : System Description** 

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

# SYSTEM

## < SYSTEM DESCRIPTION >

ECM controls the engine by various functions.

Function	Reference	
MULTIPORT FUEL INJECTION SYSTEM	EC-39, "MULTIPORT FUEL INJECTION SYSTEM : System De- scription"	E
ELECTRIC IGNITION SYSTEM	EC-42, "ELECTRIC IGNITION SYSTEM : System Description"	
AIR CONDITIONING CUT CONTROL	EC-43, "AIR CONDITIONING CUT CONTROL : System Descrip- tion"	(
AUTOMATIC SPEED CONTROL DEVICE (ASCD)	EC-44, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : Sys- tem Description"	-
COOLING FAN CONTROL	EC-45, "COOLING FAN CONTROL : System Description"	
ELECTRONIC CONTROLLED ENGINE MOUNT	EC-46, "ELECTRONIC CONTROLLED ENGINE MOUNT : Sys- tem Description"	-
EVAPORATIVE EMISSION SYSTEM	EC-49, "EVAPORATIVE EMISSION SYSTEM : System Descrip- tion"	-
INTAKE VALVE TIMING CONTROL	EC-50, "INTAKE VALVE TIMING CONTROL : System Description"	
FUEL FILLER CAP WARNING SYSTEM	EC-51, "FUEL FILLER CAP WARNING SYSTEM : System De- scription"	-
CAN COMMUNICATION	EC-54, "CAN COMMUNICATION : System Description"	-

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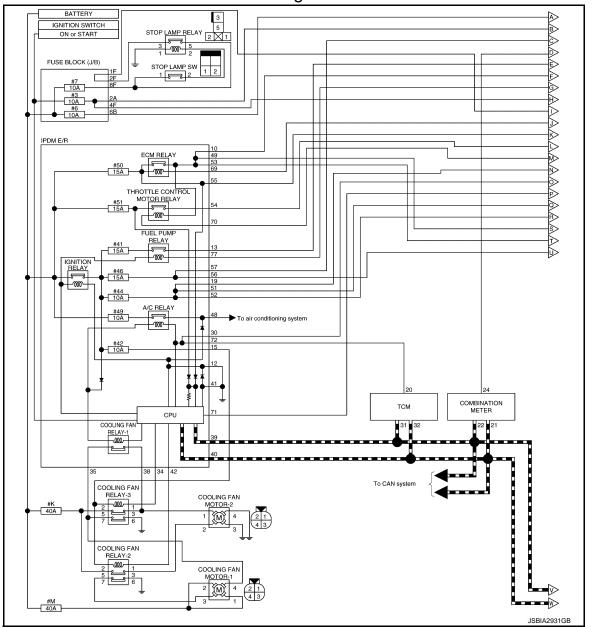
# SYSTEM

# < SYSTEM DESCRIPTION >

# ENGINE CONTROL SYSTEM : Circuit Diagram

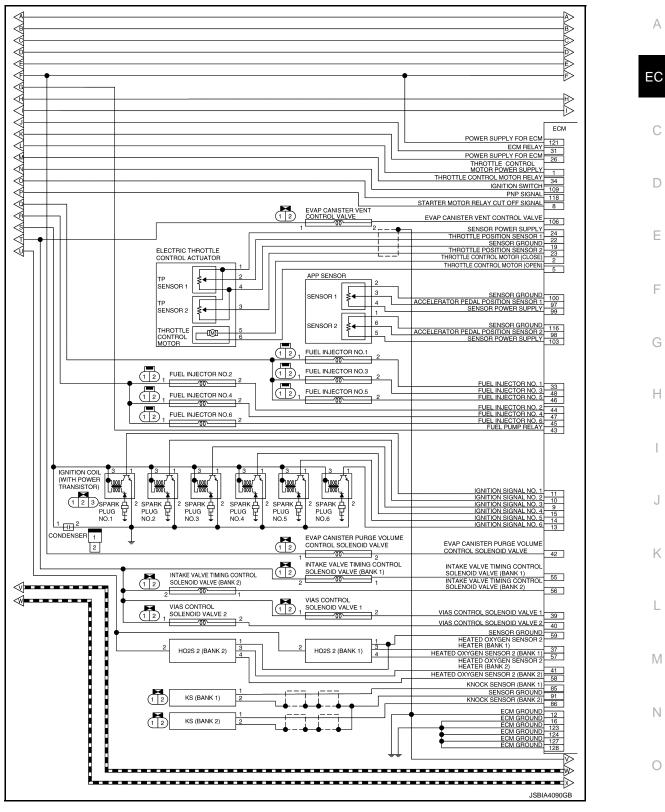


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## < SYSTEM DESCRIPTION >



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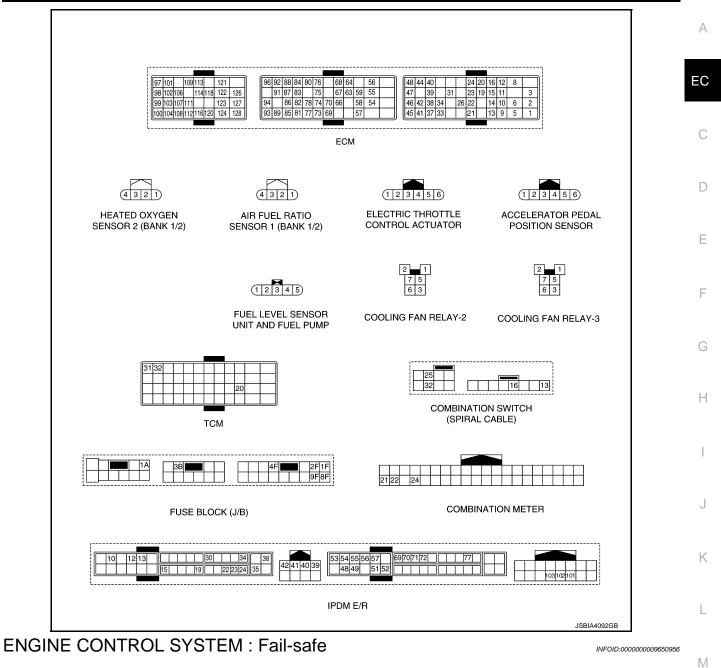
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## < SYSTEM DESCRIPTION >

		ASCD STEERING SWITCH MAIN (ON/OFF)
N		
22	STOP LAMP SWITCH	
01	ASCD STEERING SWITCH	25 COMBINATION 13
08	SENSOR GROUND	
26	ASCD BRAKE SWITCH	
		MAF SENSOR
'4		
30 32	SENSOR GROUND MASS AIR FLOW SENSOR	
3 18	SENSOR POWER SUPPLY SENSOR GROUND	1 CMP SENSOR
14 17	SENSOR POWER SUPPLY	3 (BANK 1) (1 2 3) (1 2 3) (1 2 3)
12	SENSOR GROUND CAMSHAFT POSITION SENSOR (PHASE) (BANK 2)	
	SENSOR POWER SUPPLY SENSOR GROUND CRANKSHAFT POSITION SENSOR (POS)	
9		
		CKP SENSOR 1 2 3
5	SENSOR POWER SUPPLY BATTERY TEMPERATURE SENSOR	BATTERY CURRENT SENSOR
68 66	BATTERY CURRENT SENSOR	2 TEMPERATURE SENSOR
12	SENSOR GROUND EVAP CONTROL SYSTEM PRESSURE SENSOR SENSOR POWER SUPPLY	EVAP CONTROL 3 SYSTEM PRESSURE 1 2 3
07		
'0 '8	ENGINE COOLANT TEMPERATURE SENSOR ENGINE OIL TEMPERATURE SENSOR	ECT SENSOR 1 2 (12) ECT SENSOR 1 2 (12)
'6	SENSOR GROUND	
	SENSOR POWER SUPPLY REFRIGERANT PRESSURE SENSOR SENSOR GROUND	24 103 1 102 2 102 2 101 3 PRESSURE SENSOR (3 2 1)
54		
		FUEL LEVEL SENSOR
11	FUEL TANK TEMPERATURE SENSOR	FTT SENSOR
20	SENSOR GROUND	
8	ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE	MOUNT CONTROL
:0	A/F SENSOR 1 (BANK 1)	
22	A/F SENSOR 1 (BANK 1) A/F SENSOR 1 HEATER (BANK 1)	A/F SENSOR 1 4 (BANK 1) A/F SENSOR 1 4 (BANK 2)
	A/F SENSOR 1 (BANK 2) A/F SENSOR 1 (BANK 2) A/F SENSOR 1 HEATER (BANK 2)	
3	CAN COMMUNICATION LINE	
14 13	CAN COMMUNICATION LINE	
13		
	DATA LINK CONNECTOR	7 DATA LINK 5
04		

## < SYSTEM DESCRIPTION >

# [VQ35DE]



# NON DTC RELATED ITEM

Engine operating condi- tion in fail-safe mode	Detected items	Remarks	Reference page	Ν
Engine speed will not rise more than 2,500 rpm due to the fuel cut	Malfunction indicator lamp circuit	When there is an open circuit on MIL circuit, the ECM cannot warn the driver by illuminating MIL when there is malfunction on engine control system. Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating the fail-safe function. The fail-safe function also operates when above diagnoses except MIL circuit are detected and demands the driver to repair the malfunction.	<u>EC-437</u>	O

## DTC RELATED ITEM

# < SYSTEM DESCRIPTION >

DTC No.	Detected items	Engine opera	ating condition in fail-safe mode			
P0011 P0021	Intake valve timing control	The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function.				
P0101 P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.				
P0117 P0118	Engine coolant tempera- ture sensor circuit	Engine coolant temperature will be determined by ECM based on the following condition CONSULT displays the engine coolant temperature decided by ECM.				
		Condition	Engine coolant temperature decided (CONSULT display)			
		Just as ignition switch is turned ON or START	40°C (104°F)			
		Approx 4 minutes or more after en- gine starting	80°C (176°F)			
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)			
		When the fail-safe system for engin fan operates while engine is runnin	e coolant temperature sensor is activated, the cooling g.			
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	order for the idle position to be with	eed of the throttle valve to be slower than the norma			
P0196 P0197 P0198	Engine oil temperature sensor	Intake valve timing control does no	t function.			
P0500	Vehicle speed sensor	The cooling fan operates (Highest)	while engine is running.			
P0605	ECM	(When ECM calculation function is ECM stops the electric throttle cont fixed opening (approx. 5 degrees) b ECM deactivates ASCD operation.	rol actuator control, throttle valve is maintained at a			
P0643	Sensor power supply	ECM stops the electric throttle cont fixed opening (approx. 5 degrees) I	rol actuator control, throttle valve is maintained at a by the return spring.			
P1805	Brake switch	ECM controls the electric throttle co small range. Therefore, acceleration will be poor	ontrol actuator by regulating the throttle opening to a r.			
		Vehicle condition	Driving condition			
		When engine is idling	Normal			
		When accelerating	Poor acceleration			
P2100 P2103	Throttle control motor relay	ECM stops the electric throttle cont fixed opening (approx. 5 degrees) I	rrol actuator control, throttle valve is maintained at a by the return spring.			
P2101	Electric throttle control function	ECM stops the electric throttle cont fixed opening (approx. 5 degrees) b	rol actuator control, throttle valve is maintained at a by the return spring.			
P2118	Throttle control motor	ECM stops the electric throttle cont fixed opening (approx. 5 degrees) I	rol actuator control, throttle valve is maintained at a			

# < SYSTEM DESCRIPTION >

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P2119	Electric throttle control ac- tuator	(When electric throttle control actuator does not function properly due to the return spring malfunction:) ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.	EC
		(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.	C
		(When ECM detects the throttle valve is stuck open:) While the vehicle is being driven, it slows down gradually because of fuel cut. After the vehicle stops, the engine stalls. The engine can restart in the N or P position, and engine speed will not exceed 1,000 rpm or more.	D
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. Therefore, the acceleration will be poor.	E
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# MULTIPORT FUEL INJECTION SYSTEM

# MULTIPORT FUEL INJECTION SYSTEM : System Description

# SYSTEM DIAGRAM

Crankshaft position sensor (POS)	Engine speed*2 & Piston position	•		
Camshaft position sensor (PHASE)				
Mass air flow sensor	Amount of intake air	•		
Intake air temperature sensor	Intake air temperature	•		
Engine coolant temperature sensor	Engine coolant temperature	•		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas	•		
Throttle position sensor	Throttle position	•		
Accelerator pedal position sensor	Accelerator pedal position	→	Fuel injection & mixture ratio	_
ТСМ	Gear position	► ECM	Control Fuel injector	
Battery	Battery voltage <sup>*2</sup>	•		_
Knock sensor	Engine knocking condition	•		
Power steering pressure sensor	Power steering operation	•		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas	•		
ABS actuator and electric unit (control unit)	VDC/TCS operation command	▶		
Combination meter	Vehicle speed	•		
BCM	Air conditioner operation	•		
*1 : This sensor is not used to control the e *2 : ECM determines the start signal status	ngine system under normal conditions. by the signals of engine speed and battery vo	oltage.	-	
This signal is sent via the CAN cor		-	JMBIA1833GB	

INPUT/OUTPUT SIGNAL CHART

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# < SYSTEM DESCRIPTION >

Sensor	Input signal to ECM	ECM function	Actuator	
Crankshaft position sensor (POS)	Engine speed* <sup>3</sup>			
Camshaft position sensor (PHASE)	Piston position			
Mass air flow sensor	Amount of intake air			
Intake air temperature sensor	Intake air temperature			
Engine coolant temperature sensor	Engine coolant temperature			
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas			
Throttle position sensor	Throttle position			
Accelerator pedal position sensor	Accelerator pedal position	Fuel injection		
ТСМ	Gear position	& mixture ratio	Fuel injector	
Battery	Battery voltage*3	- control		
Knock sensor	Engine knocking condition			
Power steering pressure sensor	Power steering operation			
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas			
ABS actuator and electric unit (control unit)	VDC/TCS operation command*2			
Combination meter	Vehicle speed*2			
BCM	Air conditioner operation* <sup>2</sup>			

\*1: This sensor is not used to control the engine system under normal conditions.

\*2: This signal is sent to the ECM via the CAN communication line.

\*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

#### SYSTEM DESCRIPTION

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 the crankshaft position sensor (POS), camshaft position sensor (PHASE) and the mass air flow sensor.

#### VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

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

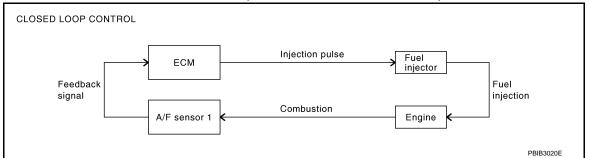
<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever position is changed from N to D
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation

## MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



#### < SYSTEM DESCRIPTION >

The mixture ratio feedback system provides the best air-fuel mixture ratio for drive ability and emission control. The three way catalyst (manifold) can better reduce CO, HC and NOx emissions. This system uses A/F sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about A/F sensor 1, refer to <u>EC-27</u>, "Air Fuel Ratio (A/F) Sensor 1". 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 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of A/F sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

Open Loop Control

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

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of A/F sensor 1 or its circuit
- Insufficient activation of A/F sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from N to D
- When starting the engine

#### MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from A/F sensor 1. 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 wire) and characteristic changes during operation (i.e., fuel injector clogging) directly affect mixture ratio.

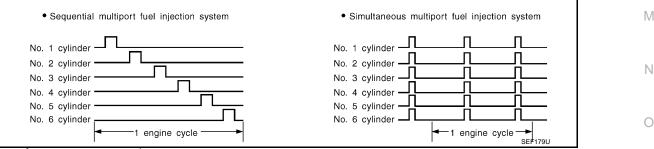
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"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 A/F sensor 1 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 over time to compensate for continual deviation of the "short-term fuel trim" from the central value. Continual deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

## FUEL INJECTION TIMING



Two types of systems are used.

Sequential Multiport Fuel Injection System
 Fuel is injected into each cylinder during each engine cycle according to the ignition order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System

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

The six injectors will then receive the signals 2 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.

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# < SYSTEM DESCRIPTION >

## FUEL SHUT-OFF

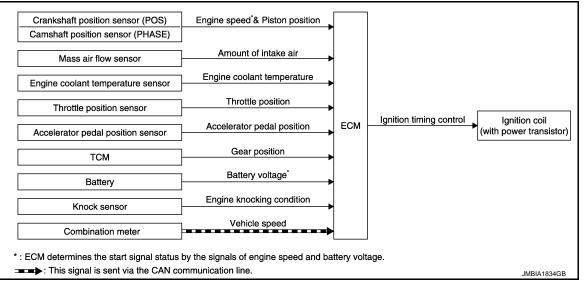
Fuel to each cylinder is cut off during deceleration, operation of the engine at excessively high speeds or operation of the vehicle at excessively high speeds.

# ELECTRIC IGNITION SYSTEM

# ELECTRIC IGNITION SYSTEM : System Description

INFOID:000000009650958

## SYSTEM DIAGRAM



# INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2		
Camshaft position sensor (PHASE)	Piston position		Ignition coil (with power transistor)
Mass air flow sensor	Amount of intake air	Engine coolant temperature     Ignition timing       Throttle position     Ignition timing	
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
ТСМ	Gear position		
Battery	Battery voltage*2		
Knock sensor	Engine knocking		
Combination meter	Vehicle speed*1		

\*1: This signal is sent to the ECM via the CAN communication line.

\*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

## SYSTEM DESCRIPTION

Ignition order: 1 - 2 - 3 - 4 - 5 - 6

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.

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

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

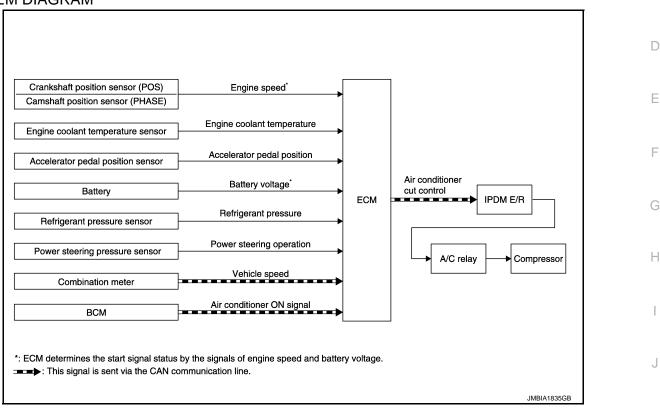
- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

#### < SYSTEM DESCRIPTION >

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

# AIR CONDITIONING CUT CONTROL : System Description

## SYSTEM DIAGRAM



# INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator	
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed* <sup>2</sup>			-
Engine coolant temperature sensor	Engine coolant temperature		IPDM E/R	
Accelerator pedal position sensor	Accelerator pedal position			
Battery	Battery voltage*2	Air conditioner	↓ Air conditioner relay	
Refrigerant pressure sensor	Refrigerant pressure			
Power steering pressure sensor	Power steering operation		Compressor	
Combination meter	Vehicle speed*1			
BCM	Air conditioner ON signal* <sup>1</sup>			

\*1: This signal is sent to the ECM via the CAN communication line.

\*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

## SYSTEM DESCRIPTION

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.

# EC-43

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## < SYSTEM DESCRIPTION >

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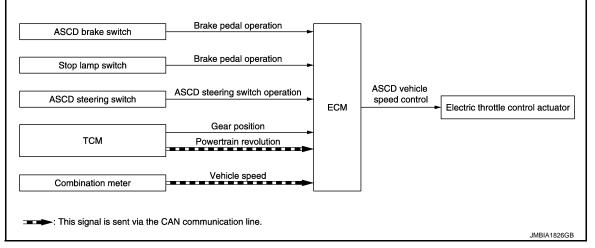
• When operating power steering during low engine speed or low vehicle speed.

- · When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

# AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description

## SYSTEM DIAGRAM



# INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation		
Stop lamp switch	Brake pedal operation		ol Electric throttle control actuator
ASCD steering switch	ASCD steering switch operation		
ТСМ	Gear position	ASCD vehicle speed control	
	Powertrain revolution*		
Combination meter	Vehicle speed*		

\*: This signal is sent to the ECM via the CAN communication line

## BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/ h (25 MPH) and 144 km/h (89 MPH).

ECM controls throttle angle of electric throttle control actuator to regulate engine speed.

Operation status of ASCD is indicated by CRUISE on combination meter. If any malfunction occurs in the ASCD system, it automatically deactivates control.

#### NOTE:

#### Always drive vehicle in a safe manner according to traffic conditions and obey all traffic laws.

#### SET OPERATION

Press MAIN switch. (The CRUISE on combination meter illuminates.)

When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH), press SET/COAST switch.

#### ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is pressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system. And then ASCD will maintain the new set speed.

## CANCEL OPERATION

When any of following conditions exist, cruise operation will be canceled.

CANCEL switch is pressed

#### Revision: 2014 May



More than 2 switches on ASCD steering switch are pressed at the same time (Set speed will be cleared)

BCM

## Revision: 2014 May

				F
	n 144 k	m/h (89 MPH)		G
System Description			INF0ID:000000009650961	Η
				I
Engine speed				J
Refrigerant pressure	=	Cooling fan control	► IPDM E/R	K
Battery voltage	ECM	Cooling fan	Cooling fan	L
Air conditioner ON signal		relay	motor	M
	ttery voltage	э.	JMBIA1857GB	N
Input signal to ECM	1	ECM function	Actuator	0
Engine speed* <sup>1</sup> Piston position				Р
Engine coolant temperature		Cooling fan control	IPDM E/R	
Refrigerant pressure			↓ Cooling fan relay	
Battery voltage*1			↓ Cooling for motor	
Vehicle speed*2				
	Il return to last set speed. P and N h/h (25 MPH) and less tha System Description Engine speed Engine coolant temperature Battery voltage Vehicle speed Air conditioner ON signal soby the signals of engine speed and ba ommunication line. Input signal to ECM Engine speed*1 Piston position Engine coolant temperature Refrigerant pressure Battery voltage*1	P and N n/h (25 MPH) and less than 144 k System Description Engine speed' Engine coolant temperature Refrigerant pressure Battery voltage' Vehicle speed Air conditioner ON signal s by the signals of engine speed and battery voltage ommunication line. Input signal to ECM Engine speed*1 Piston position Engine coolant temperature Refrigerant pressure Battery voltage*1	Il return to last set speed. To resume vehicle set s P and N h/h (25 MPH) and less than 144 km/h (89 MPH) System Description Engine speed Engine coolant temperature Battery voltage Vehicle speed Air conditioner ON signal Air conditioner ON signal So by the signals of engine speed and battery voltage. ommunication line. Input signal to ECM ECM function Engine speed*1 Piston position Engine coolant temperature Refrigerant pressure Cooling fan Cooling fan Coo	h/h (25 MPH) and less than 144 km/h (89 MPH) System Description

< SYSTEM DESCRIPTION >

Selector lever position changed to N, P or R

Brake pedal is depressed

TCS system is operated

 Engine coolant temperature is slightly higher than the normal operating temperature When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.

Malfunction for some self-diagnoses regarding ASCD control: CRUISE will blink quickly.

Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed

CVT control system has a malfunction. Refer to <u>EC-381, "Description"</u>.

If MAIN switch is turned to OFF while ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

#### COAST OPERATION

When the SET/COAST switch is pressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will maintain the new set speed.

## RESUME OPERATION

When the RESUME/ACCELERATE switch is pressed after canceling operation other than pressing the MAIN

Air conditioner ON signal\*2

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## < SYSTEM DESCRIPTION >

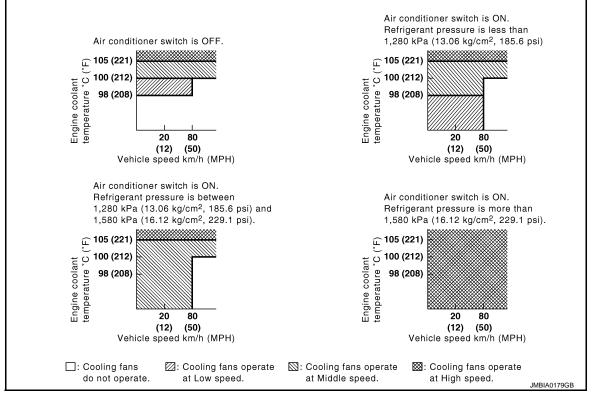
\*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

\*2: This signal is sent to ECM via the CAN communication line.

#### SYSTEM DESCRIPTION

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 4-step control [HIGH/MIDDLE/LOW/OFF].

#### **Cooling Fan Operation**



#### Cooling Fan Relay Operation

The ECM controls cooling fan relays in the IPDM E/R through CAN communication line.

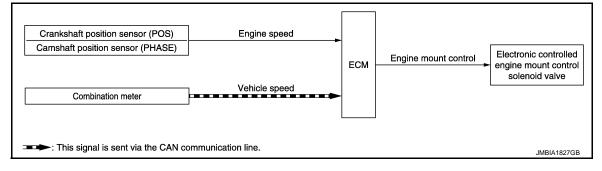
Cooling fan speed	Cooling fan relay			
	1	2	3	
Stop (OFF)	OFF	OFF	OFF	
Low (LOW)	ON	OFF	OFF	
Middle (MID)	OFF	ON	OFF	
High (HI)	OFF	ON	ON	

ELECTRONIC CONTROLLED ENGINE MOUNT

# ELECTRONIC CONTROLLED ENGINE MOUNT : System Description

INFOID:000000009650962

## SYSTEM DIAGRAM



# < SYSTEM DESCRIPTION >

# INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator	
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Engine mount	Electronic controlled en- gine mount control solenoid	EC
Combination meter	Vehicle speed*	control	valve	

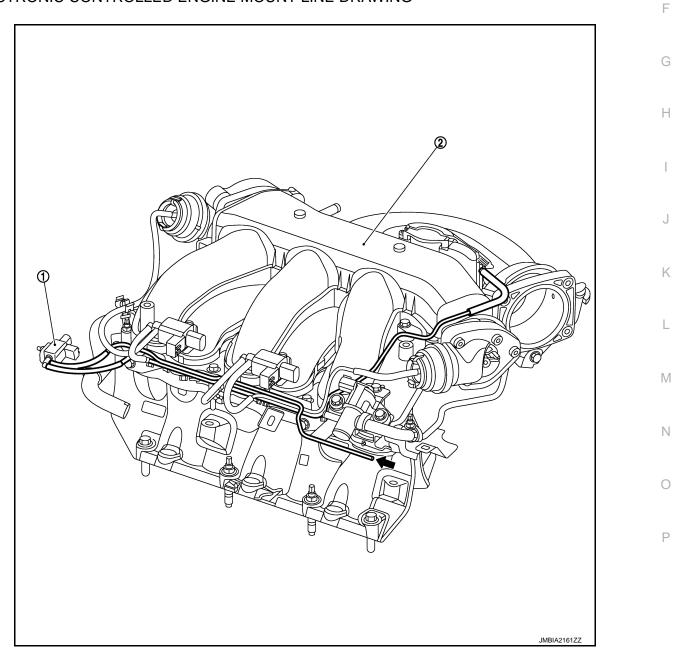
\*: This signal is sent to the ECM via the CAN communication line.

## SYSTEM DESCRIPTION

The ECM controls the engine mount operation corresponding to the engine speed. The control system has a 2-step control [Soft/Hard]

Vehicle condition	Engine mount control	
Idle (With vehicle stopped)	Soft	Е
Except above conditions	Hard	

# ELECTRONIC CONTROLLED ENGINE MOUNT LINE DRAWING



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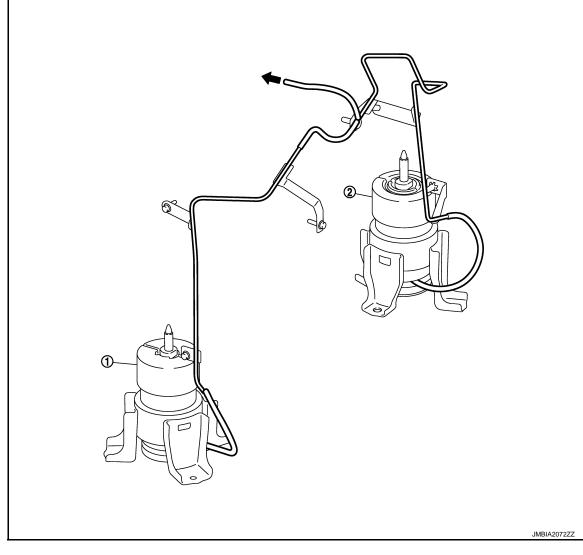
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Intake manifold collector

# < SYSTEM DESCRIPTION >

- 1. Electronic controlled engine mount 2. control solenoid valve
- + : From next figure



- 1. Front electronic controlled engine mount 2. Rear electronic controlled engine mount
- : To previous figure

# NOTE:

Do not use soapy water or any type of solvent while installing vacuum hose. EVAPORATIVE EMISSION SYSTEM

## < SYSTEM DESCRIPTION >

# **EVAPORATIVE EMISSION SYSTEM : System Description**

# SYSTEM DIAGRAM

Amount of intake air			
Amount of intake air			
	•		
Engine coolant temperature	•		
Density of oxygen in exhaust gas	•	purge flow	EVAP canister
Throttle position	ECI	M	purge volume control solenoid valve
Accelerator pedal position	•		
Battery voltage*	•		
Vehicle speed			
	Throttle position Accelerator pedal position Battery voltage* Vehicle speed	EC Throttle position Accelerator pedal position Battery voltage* Vehicle speed	ECM Control

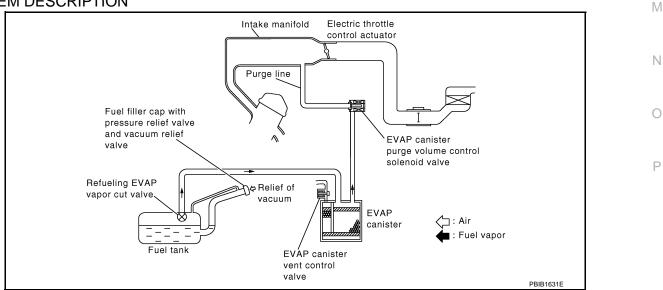
## INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*1		
Camshaft position sensor (PHASE)	Piston position		
Mass air flow sensor	Amount of intake air	_	
Engine coolant temperature sensor	Engine coolant temperature	_	
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	EVAP canister purge flow control	EVAP canister purge vol- ume control solenoid valve
Throttle position sensor	Throttle position	_	
Accelerator pedal position sensor	Accelerator pedal position	_	
Battery	Battery voltage*1		
Combination meter	Vehicle speed* <sup>2</sup>		

\*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

\*2: This signal is sent to the ECM via the CAN communication line.

## SYSTEM DESCRIPTION



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#### < SYSTEM DESCRIPTION >

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.

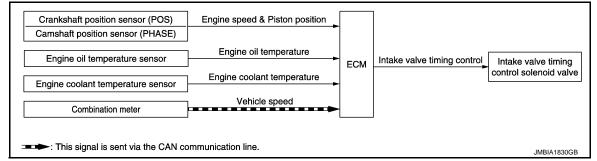
EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating and idling.

# INTAKE VALVE TIMING CONTROL

# **INTAKE VALVE TIMING CONTROL : System Description**

INFOID:000000009650964

# SYSTEM DIAGRAM

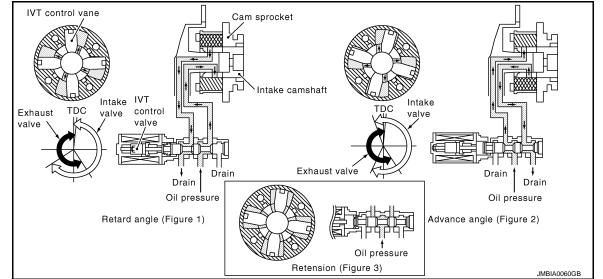


## INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator	
Crankshaft position sensor (POS)	Engine speed and piston position			
Camshaft position sensor (PHASE)	Engine speed and piston position			
Engine oil temperature sensor	Engine oil temperature	Intake valve timing control	Intake valve timing control solenoid valve	
Engine coolant temperature sensor	Engine coolant temperature	uning control		
Combination meter	Vehicle speed*			

\*: This signal is sent to the ECM via the CAN communication line

# SYSTEM DESCRIPTION



This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

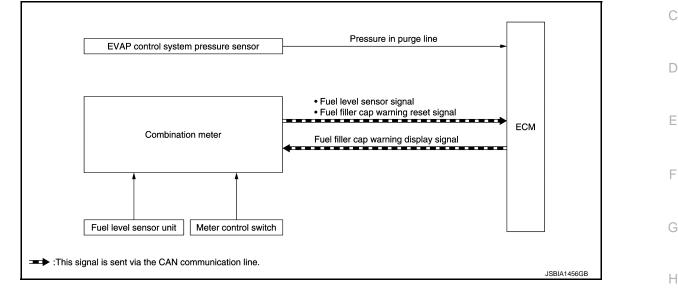
The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing (IVT) control sole-

#### < SYSTEM DESCRIPTION >

# noid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range. FUEL FILLER CAP WARNING SYSTEM

# FUEL FILLER CAP WARNING SYSTEM : System Description

#### SYSTEM DIAGRAM



# INPUT/OUTPUT SIGNAL CHART

#### Input

Unit/Sensor	Input signal to ECM	ECM function		
EVAP control system pressure sensor	Pressure in purge line			
Combination meter	Fuel level sensor signal <sup>*</sup>	Fuel filler cap warning control	J	
	Fuel filler cap warning reset signal*			

\*: This signal is sent to the ECM via the CAN communication line.

Output	
--------	--

Unit	Output signal	Actuator	_
ECM	Fuel filler cap warning display signal <sup>*</sup>	Combination meter	

\*: This signal is sent to the combination meter via the CAN communication line.

#### SYSTEM DESCRIPTION

The fuel filler cap warning system alerts the driver to the prevention of the fuel filler being left uncapped and malfunction occurrences after refueling, by turning ON the fuel filler cap warning display on the combination meter.

ECM judges a refueled state, based on a fuel level signal transmitted from the combination meter. N When a very small leak is detected through the EVAP leak diagnosis performed after judging the refueled state, ECM transmits a fuel filler cap warning display signal (request for display ON) to the combination meter via CAN communication.

When receiving the signal, the combination meter turns ON the fuel filler cap warning display. **CAUTION:** 

## Check fuel filler cap installation condition when the fuel filler cap warning display turns ON.

#### Reset Operation

- The fuel filler cap warning lamp tunes OFF, according to any condition listed below:
- Reset operation is performed by operating the meter control switch on the combination meter.
- When the reset operation is performed, the combination meter transmits a fuel filler cap warning reset signal to ECM via CAN communication. ECM transmits a fuel filler cap warning display signal (request for display OFF) to the combination meter via CAN communication. When receiving the signal, the combination meter turns OFF the fuel filler cap warning display.
- EVAP leak diagnosis result is normal.

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# < SYSTEM DESCRIPTION >

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• Fuel refilled.

• DTC erased by using CONSULT.

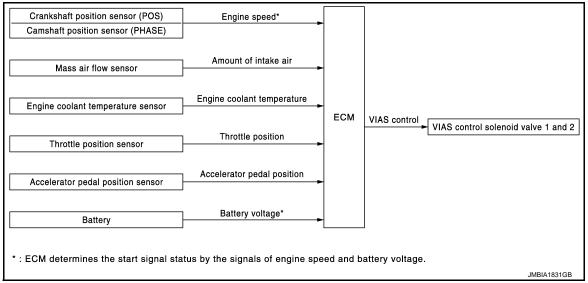
#### NOTE:

MIL turns ON if a malfunction is detected in leak diagnosis results again at the trip after the fuel filler cap warning display turns ON/OFF.

VARIABLE INDUCTION AIR SYSTEM

# VARIABLE INDUCTION AIR SYSTEM : System Description

## SYSTEM DIAGRAM



# INPUT/OUTPUT SIGNAL CHART

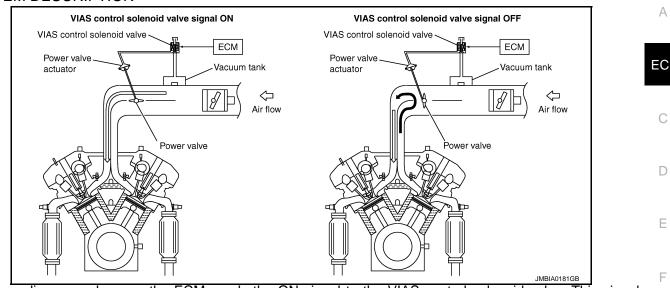
Sensor	Sensor Input signal to ECM		Actuator		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*				
Mass air flow sensor	Amount of intake air				
Engine coolant temperature sensor	Engine coolant temperature	VIAS control	VIAS control solenoid valve 1 VIAS control solenoid valve 2		
Throttle position sensor	Throttle position		VIAS control solenoid valve 2		
Accelerator pedal position sensor	Accelerator pedal position				
Battery	Battery voltage*				

\*: ECM determines the start signal status by the signals of engine speed and battery voltage.



## [VQ35DE]

#### < SYSTEM DESCRIPTION > SYSTEM DESCRIPTION



In the medium speed range, the ECM sends the ON signal to the VIAS control solenoid valve. This signal introduces the intake manifold vacuum into the power valve actuator and therefore closes the power valve. Under this condition, the pressure waves of the exhaust stroke do not disturb the pressure waves of the intake stroke of each opposite bank. Therefore, charging efficiency is increased together with the effect of the long intake passage.

However, in the high speed range, the ECM sends the OFF signal to the VIAS control solenoid valve and the power valve is opened. Under this condition, the pressure waves of intake stroke are resonant with those of H each opposite bank exhaust stroke. Therefore, charging efficiency is also increased.

In addition, both valves 1 and 2 are opened or closed in other ranges mentioned above. Thus maximum charging efficiency is obtained for the various driving conditions.

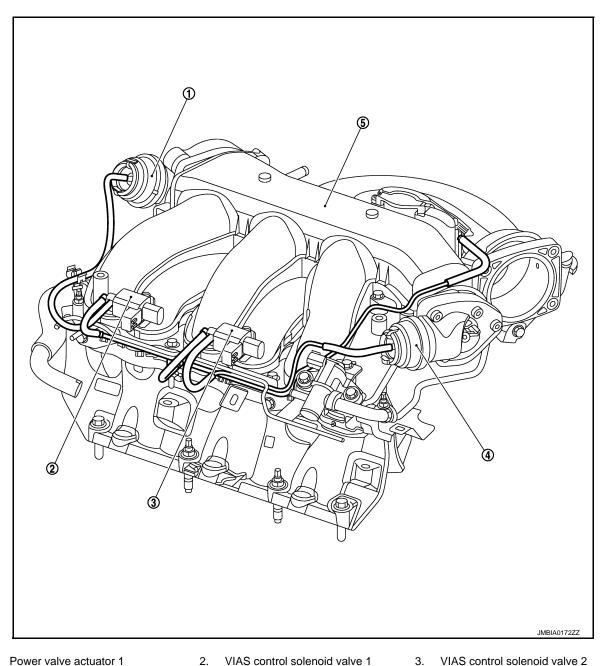
#### VACUUM HOSE DRAWING

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- Power valve actuator 1 1.
- 2. VIAS control solenoid valve 1
- 4. Power valve actuator 2
- 5. Intake manifold collector

# CAN COMMUNICATION

# CAN COMMUNICATION : System Description

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

Refer to LAN-32, "CAN COMMUNICATION SYSTEM : CAN Communication Signal Chart", about CAN communication for detail.

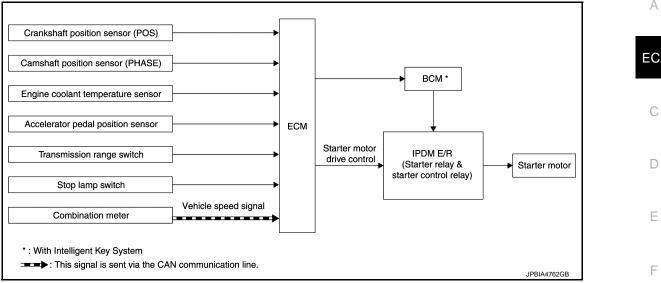
STARTER MOTOR DRIVE CONTROL

INFOID:000000009650967

Revision: 2014 May

## < SYSTEM DESCRIPTION >

# STARTER MOTOR DRIVE CONTROL : System Diagram



# STARTER MOTOR DRIVE CONTROL : System Description

# **INPUT/OUTPUT SIGNAL CHART**

Sensor	Input signal to ECM	ECM function	Actuator	Н		
Crankshaft position sensor (POS)	Engine speed <sup>*1</sup>					
Camshaft position sensor (PHASE)	Piston position			1		
Engine coolant temperature sensor	Engine coolant temperature	ant temperature   BCM		)	• BCM	
Accelerator pedal position sensor	Accelerator pedal position	Starter motor drive control	• IPDM E/R			
Transmission range switch	Gear position		(Starter relay & starter control relay)	J		
Stop lamp switch	Brake pedal position					
Combination meter	Vehicle speed signal <sup>*2</sup>			K		

\*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

\*2: This signal is sent to the ECM through CAN communication line.

## SYSTEM DESCRIPTION

When rapid deceleration occurs during engine runs or idle speed decreases due to heavy load conditions, ECM detects a decrease in idle speed and restarts the engine to secure reliability in handleability by transmitting a cranking request signal to IPDM E/R for activating the starter motor under the following conditions: Μ

- Selector lever: P or any position other than N
- Idle switch: ON (Accelerator pedal not depressed)
- Stop lamp switch: ON (Brake pedal depressed)
- Ν Models with no Intelligent Key System transmit a control signal directly to IPDM E/R. On the other hand, models with the Intelligent Key System transmit a control signal to IPDM E/R by way of BCM via CAN communication.

IPDM E/R detects an operating state of the starter motor relay and the starter motor control relay and transmits a feed back signal to ECM via CAN Communication.

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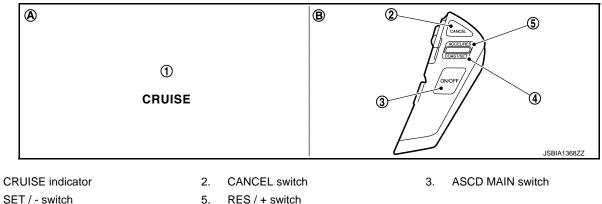
# OPERATION

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

# AUTOMATIC SPEED CONTROL DEVICE (ASCD) : Switch Name and Function

INFOID:000000009650972

# SWITCHES AND INDICATORS



(RESUME/ACCELERATE)

4. SET / - switch (SET/COAST)

1.

- A. On the combination meter
- B. On the steering wheel

# SET SPEED RANGE

ASCD system can be set the following vehicle speed.

Minimum speed (Approx.)	Maximum speed (Approx.)		
40 km/h (25 MPH)	144 km/h (89 MPH)		

## SWITCH OPERATION

Item	Function
CANCEL switch	Cancels the cruise control driving.
RES / + switch (RESUME/ACCELERATE)	<ul><li>Resumes the set speed.</li><li>Increases speed incrementally during cruise control driving.</li></ul>
SET / – switch (SET/COAST)	<ul><li>Sets desired cruise speed.</li><li>Decreases speed incrementally during cruise control driving.</li></ul>
ASCD MAIN switch	Master switch to activate the ASCD system.

# CANCEL CONDITION

- When any of following conditions exist, the cruise operation is canceled.
- CANCEL switch is pressed
- ASCD MAIN switch pressed (Set speed is cleared)
- More than two switches at ASCD steering switch are pressed at the same time (Set speed is cleared)
- Brake pedal is depressed
- Selector lever position is changed to N, P or R
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed
- TCS system is operated
- When the ECM detects any of the following conditions, the ECM cancels the cruise operation and informs the driver by blinking CRUISE indicator lamp.
- Engine coolant temperature is slightly higher than the normal operating temperature. Then CRUISE indicator lamp is blinked slowly.

#### NOTE:

Engine coolant temperature decreases to the normal operating temperature, CRUISE indicator lamp stop blinking and the cruise operation is able to work.

Malfunction for some self-diagnoses regarding ASCD system. SET indicator lamp is blinked quickly.

# EC-56

# **OPERATION**

## < SYSTEM DESCRIPTION >

 When ASCD MAIN switch is turned to OFF during the cruise control driving, all of ASCD operations is canceled and vehicle speed memory is erased.

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# **ON BOARD DIAGNOSTIC (OBD) SYSTEM**

## < SYSTEM DESCRIPTION >

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

# Diagnosis Description

This system is an on board diagnostic system that records exhaust emission-related diagnostic information and detects a sensors/actuator-related malfunction. A malfunction is indicated by the malfunction indicator lamp (MIL) and stored in ECU memory as a DTC. The diagnostic information can be obtained with the diagnostic tool (GST: Generic Scan Tool).

# GST (Generic Scan Tool)

INFOID:000000009650974

When GST is connected with a data link connector equipped on the vehicle side, it will communicate with the control unit equipped in the vehicle and then enable various kinds of diagnostic tests. Refer to <u>EC-58</u>, "<u>Diagnosis Description</u>".

#### NOTE:

Service \$0A is not applied for regions where it is not mandated.

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< SYSTEM DESCRIPTION >

# **DIAGNOSIS SYSTEM (ECM)** DIAGNOSIS DESCRIPTION

DIAGNOSIS DESCRIPTION : 1st Trip Detection Logic and Two Trip Detection Logic

EC INFOID:000000009650975

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 illuminate 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 illuminates. The MIL illuminates 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 illuminate or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

×: Applicable —: Not applicable

	MIL			DTC		1st trip DTC		Е	
Items	1s	t trip	2nc	l trip	1st trip	2nd trip	1st trip	2nd trip	
	Blinking	Illuminat- ed	Blinking	Illuminat- ed	displaying	displaying	displaying	display- ing	F
Misfire (Possible three way catalyst damage) — DTC: P0300 – P0306 is being detected	×	_	_	_	_	_	×	_	G
Misfire (Possible three way catalyst damage) — DTC: P0300 – P0306 is being detected	_	_	×	_	_	×	_	_	Н
One trip detection diagnoses (Re- fer to <u>EC-96, "DTC Index"</u> .)	_	×	_	—	×	_	—	_	
Except above	—	—	—	×	—	×	×	_	

# **DIAGNOSIS DESCRIPTION : DTC and Freeze Frame Data**

# DTC AND 1ST TRIP DTC

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 recur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is saved 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 saved 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 M 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

For malfunctions in which 1st trip DTCs are displayed, refer to EC-96, "DTC Index". 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.

1st trip DTC is specified in Service \$07 of SAE J1979/ISO 15031-5. 1st trip DTC detection occurs without illuminating the MIL and therefore does not warn the driver of a malfunction.

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 2, refer to EC-124, "Work Flow". Then perform DTC Confirmation Procedure or Component Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair. Ρ

# FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

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, absolute throttle position, base fuel schedule and intake air temperature 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. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT or GST. The 1st trip freeze frame data can only be displayed on the CONSULT screen.

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#### < SYSTEM DESCRIPTION >

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 – P0306 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175			
2		Except the above items			
3	1st trip freeze frame data				

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was saved 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 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.

# **DIAGNOSIS DESCRIPTION : Counter System**

INFOID:000000009650977

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

- 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.
- 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.
- The MIL will turn OFF after the vehicle is driven 3 times (driving pattern B) 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.
- 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 CON-SULT will count the number of times the vehicle is driven.
- The 1st trip DTC is not displayed when the self-diagnosis results in OK for the 2nd trip.

## COUNTER SYSTEM CHART

Items	Fuel Injection System	Misfire	Other
MIL (turns 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 "EXPLANATION FOR DRIVING PATTERNS FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM".

For details about patterns A and B under Other, see "EXPLANATION FOR DRIVING PATTERNS FOR "MIS-FIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM".

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

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

Relationship Between MIL, DTC, 1st Trip DTC and Driving Patterns for "Misfire < Exhaust Quality Deterioration>", "Fuel Injection System"

## < SYSTEM DESCRIPTION >

#### А This driving pattern satisfies with B and C patterns. This driving pattern EC satisfies with C but not B. NG This driving pattern NG OK NG Detection satisfies with B but not C. Detection Detection Detection <Driving Pattern> Vehicle 1st speed Trip Trip Trip Trip D NG OK NG NG IGN ON MIL MIL illuminates illuminates MIL turns off F MIL turns off ۲Ż в Нc 0 Ω 0 Counter DTC & DISPLAY NO DISPLAY Freeze NO DISPL Data> Н Frame Data \*4 °3 DISPLAY DISPLAY Frame 1st trip CLEAR CLEAR Freeze Frame Freeze 6 Data DISPLAY DISPLAY 1st trip CLEAR CLEAF trip) DTC (1st 1 6 \*8 ∞ DTC 80 С 79 5 Counter Κ trip) <(1st L JMBIA1417GB Μ \*1: When the same malfunction is de-\*2: MIL will turn OFF after vehicle is driv- \*3: When the same malfunction is deen 3 times (pattern B) without any tected in two consecutive trips, MIL tected in two consecutive trips, the will light up. malfunctions. DTC and the freeze frame data will be stored in ECM. Ν \*4: The DTC and the freeze frame data \*6: The 1st trip DTC and the 1st trip \*5: When a malfunction is detected for freeze frame data will be cleared at will not be displayed any longer after the first time, the 1st trip DTC and the 1st trip freeze frame data will be the moment OK is detected. vehicle is driven 80 times (pattern C) without the same malfunction. (The stored in ECM. DTC and the freeze frame data still remain in ECM.) \*7: When the same malfunction is de-\*8: 1st trip DTC will be cleared when ve-Ρ tected in the 2nd trip, the 1st trip hicle is driven once (pattern C) withfreeze frame data will be cleared. out the same malfunction after DTC is stored in ECM.

Explanation for Driving Patterns for "Misfire < Exhaust Quality Deterioration>", "Fuel Injection System"

#### Driving Pattern B Refer to EC-63, "DIAGNOSIS DESCRIPTION : Driving Pattern".

## EC-61

< SYSTEM DESCRIPTION >

Driving Pattern C Refer to <u>EC-63. "DIAGNOSIS DESCRIPTION : Driving Pattern"</u>. Example: If the stored freeze frame data is as per the following:

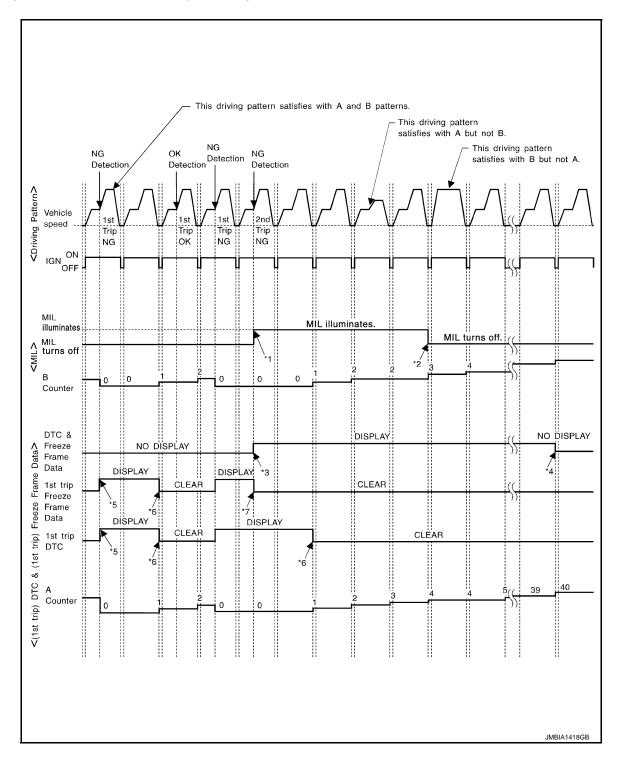
If the stored freeze frame data is as per the following:

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  $70^{\circ}C$  ( $158^{\circ}F$ )

Relationship Between MIL, DTC, 1st Trip DTC and Driving Patterns Except For "Misfire <Exhaust Quality Deterioration>", "Fuel Injection System"



## OVOTEM DECODIDITION

## [VQ35DF]

< SYSTEM DESCRIPTION > [VQ3DE]	1
*1: When the same malfunction is de- tected in two consecutive trips, MIL will light up. *2: MIL will turn OFF after vehicle is driv- en 3 times (pattern B) without any malfunctions. *3: When the same malfunction is de- tected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.	A
<ul> <li>*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.)</li> <li>*5: When a malfunction is detected for the first time, the 1st trip DTC and the first time, the 1st trip DTC and the same malfunction.</li> <li>*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.</li> <li>*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.</li> </ul>	EC C
*7: When the same malfunction is de- tected in the 2nd trip, the 1st trip freeze frame data will be cleared.	D
Explanation for Driving Patterns Except for "Misfire < Exhaust Quality Deterioration>", "Fuel Injection System"	۱ E
Driving Pattern A Refer to <u>EC-63, "DIAGNOSIS DESCRIPTION : Driving Pattern"</u> .	F
Driving Pattern B Refer to EC-63, "DIAGNOSIS DESCRIPTION : Driving Pattern".	
DIAGNOSIS DESCRIPTION : Driving Pattern	G G
CAUTION: Always drive at a safe speed.	Н
<ul> <li>DRIVING PATTERN A</li> <li>Driving pattern A means a trip satisfying the following conditions.</li> <li>Engine speed reaches 400 rpm or more.</li> <li>Engine coolant temperature rises by 20°C (36°F) or more after starting the engine.</li> </ul>	I
<ul> <li>Engine coolant temperature reaches 70°C (158°F) or more.</li> <li>The ignition switch is turned from ON to OFF.</li> <li>NOTE:</li> </ul>	J
<ul> <li>When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern A.</li> <li>When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern A.</li> </ul>	
DRIVING PATTERN B Driving pattern B means a trip satisfying the following conditions.	L
<ul> <li>Engine speed reaches 400 rpm or more.</li> <li>Engine coolant temperature reaches 70°C (158°F) or more.</li> <li>Vehicle speed of 70 – 120 km/h (44 – 75 MPH) is maintained for 60 seconds or more under the control or placed lace.</li> </ul>	f M
<ul> <li>closed loop.</li> <li>Vehicle speed of 30 – 60 km/h (19 – 37 MPH) is maintained for 10 seconds or more under the control or closed loop.</li> </ul>	f
<ul> <li>closed loop.</li> <li>Under the closed loop control condition, the following state reaches 12 seconds or more in total: Vehicle speed of 4 km/h (2 MPH) or less with idling condition.</li> </ul>	e N
<ul> <li>The state of driving at 10 km/h (7 MPH) or more reaches 10 minutes or more in total.</li> <li>A lapse of 22 minutes or more after engine start.</li> <li>NOTE:</li> </ul>	0
<ul> <li>Drive the vehicle at a constant velocity.</li> <li>When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern B.</li> </ul>	ר P
<ul> <li>When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern B.</li> </ul>	]
DRIVING PATTERN C	

Driving pattern C means operating vehicle as per the following: The following conditions should be satisfied at the same time: Engine speed: (Engine speed in the freeze frame data)  $\pm 375$  rpm

**EC-63** 

## < SYSTEM DESCRIPTION >

Calculated load value: (Calculated load value in the freeze frame data) x  $(1\pm0.1)$  [%] Engine coolant temperature condition:

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

#### NOTE:

- When the same malfunction is detected regardless of the above vehicle conditions, reset the counter of driving pattern C.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern C.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

#### DRIVING PATTERN D

Driving pattern D means a trip satisfying the following conditions.

- The state of driving at 40 km/h (25 MPH) reaches 300 seconds or more in total.
- Idle speed lasts 30 seconds or more.
- A lapse of 600 seconds or more after engine start.

#### NOTE:

- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern D.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern D.

# DIAGNOSIS DESCRIPTION : System Readiness Test (SRT) Code

INFOID:000000009650979

System Readiness Test (SRT) code is specified in Service \$01 of SAE J1979/ISO 15031-5.

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 permanent DTC is stored or MIL illuminates 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"), DTC (No DTCs) and permanent DTC (NO permanent DTCs) before the inspection.

#### 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.

## < SYSTEM DESCRIPTION >

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				Example			
Self-diagnosis result		Diagnosis	$\leftarrow ON \rightarrow$	$\begin{array}{rcl} & \text{Ignitio} \\ \text{OFF} & \leftarrow \text{ON} \rightarrow & \text{O} \end{array}$	on cycle $PFF \leftarrow ON \rightarrow OFF$	$FF \leftarrow ON \rightarrow$	-
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)	E(
		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	ОК	—		- 6
		P0402	_	—	—		-
		P1402	NG	_	NG	NG (Consecutive NG)	F
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= 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 show OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate "CMPLT".  $\rightarrow$  Case 1 above

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

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

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is the number one (1) for each self-diagnosis (Case 1 & 2) or the number two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for 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.
- During SRT driving pattern, the 1st trip DTC (NG) is detected prior to "CMPLT" of SRT and the self-diagnosis memory must be erased from the 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".

DIAGNOSIS DESCRIPTION : Permanent Diagnostic Trouble Code (Permanent DTC)

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Permanent DTC is defined in SAE J1979/ISO 15031-5 Service \$0A.

ECM stores a DTC issuing a command of turning on MIL as a permanent DTC and keeps storing the DTC as a permanent DTC until ECM judges that there is no presence of malfunction.

Permanent DTCs cannot be erased by using the Erase function of CONSULT-III or Generic Scan Tool (GST) and by disconnecting the battery to shut off power to ECM. This prevents a vehicle from passing the state emission inspection without repairing a malfunctioning part.

When not passing the state emission inspection due to more than one permanent DTC, permanent DTCs should be erased, referring to this manual.

#### NOTE:

- The important items in state emission inspection are that MIL is not ON, SRT test items are set, and permanent DTCs are not included.
- Permanent DTCs do not apply for regions that permanent DTCs are not regulated by law.

## < SYSTEM DESCRIPTION >

#### PERMANENT DTC SET TIMING

The setting timing of permanent DTC is stored in ECM with the lighting of MIL when a DTC is confirmed.

# DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp (MIL)

When emission-related ECU detects a malfunction in the emission control systems components and/or the powertrain control components (which affect vehicle emissions), it turns on/blinks MIL to inform the driver that a malfunction has been detected.

 The MIL illuminates when ignition switch is turned ON (engine is not running).
 NOTE:

Check the MIL circuit if MIL does not illuminate. Refer to <u>EC-437, "Component Function Check"</u>.

2. When the engine is started, the MIL should go off. **NOTE:** 

If MIL continues to illuminate/blink, perform self-diagnoses and inspect/repair accordingly because an emission-related ECU has detected a malfunction in the emission control systems components and/or the powertrain control components (which affect vehicle emissions).

# **On Board Diagnosis Function**

#### ON BOARD DIAGNOSIS ITEM

The on board diagnostic system has the following functions.

Diagnostic test mode	Function
Bulb check	MIL can be checked.
SRT status	ECM can read if SRT codes are set.
Malfunction warning	If ECM detects a malfunction, it illuminates or blinks MIL to inform the driver that a malfunction has been detected.
Self-diagnostic results	DTCs or 1st trip DTCs stored in ECM can be read.
Accelerator pedal released po- sition learning	ECM can learn the accelerator pedal released position. Refer to EC-135. "Description".
Throttle valve closed position learning	ECM can learn the throttle valve closed position. Refer to EC-136, "Description".
Idle air volume learning	ECM can learn the idle air volume. Refer to EC-137, "Description".
Mixture ratio self-learning value clear	Mixture ratio self-learning value can be erased. Refer to <u>EC-139, "Description"</u> .

## BULB CHECK MODE

Description

This function allows damage inspection in the MIL bulb (blown, open circuit, etc.).

**Operation Procedure** 

- 1. Turn ignition switch ON.
- The MIL on the instrument panel should stay ON. If it remains OFF, check MIL circuit. Refer to <u>EC-437, "Diagnosis Procedure"</u>.

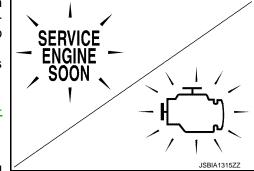
#### SRT STATUS MODE

#### Description

This function allows to read if ECM has completed the self-diagnoses of major emission control systems and components. For SRT, refer to <u>EC-64, "DIAGNOSIS DESCRIPTION : System Readiness Test (SRT) Code"</u>.

**Operation Procedure** 

- 1. Turn ignition switch ON and wait 20 seconds.
- 2. SRT status is indicated as shown blow.
  - ECM continues to illuminate MIL if all SRT codes are set.



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#### < SYSTEM DESCRIPTION >

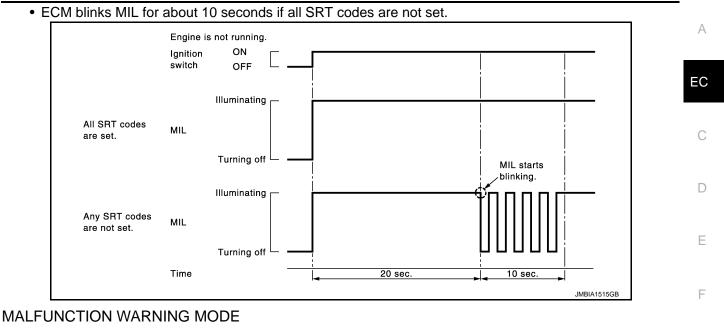
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#### Description

In this function ECM turns on or blinks MIL when it detects a malfunction in the emission control system components and/or the powertrain control components (which affect vehicle emissions) to inform the driver that a malfunction has been detected.

#### **Operation Procedure**

1.	Turn ignition switch ON.
2.	Check that MIL illuminates. If it remains OFF, check MIL circuit. Refer to <u>EC-437, "Diagnosis Procedure"</u> .
2	Start angine and let it idle

- 3. Start engine and let it idle.
  - For two trip detection logic diagnoses, ECM turns on MIL when it detects the same malfunction twice in the two consecutive driving cycles.
  - For 1st trip detection logic diagnoses, ECM turns on MIL when it detects a malfunction in one driving cycle.
  - ECM blinks MIL when it detects a malfunction that may damage the three way catalyst (misfire).

## SELF-DIAGNOSTIC RESULTS MODE

#### Description

This function allows to indicate DTCs or 1st trip DTCs stored in ECM according to the number of times MIL is blinking.

How to Set Self-diagnostic Results Mode

#### NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a mal-  $_{\rm N}$  function.
- After ignition switch is turned off, ECM is always released from the "self-diagnostic results" mode.
- 1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
- 2. Repeat the following procedure quickly five times within 5 seconds.
  - Fully depress the accelerator pedal.
  - Fully release the accelerator pedal.
- 3. Wait 7 seconds, fully depress the accelerator pedal and keep it depressed for approx. 10 seconds until the MIL starts blinking.

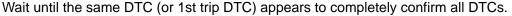
#### NOTE:

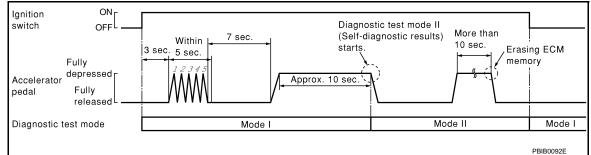
Do not release the accelerator pedal for 10 seconds if MIL starts blinking during this period. This blinking is displaying SRT status and is continued for another 10 seconds.

4. Fully release the accelerator pedal. ECM has entered to "Self-diagnostic results" mode.

## < SYSTEM DESCRIPTION >

#### NOTE:

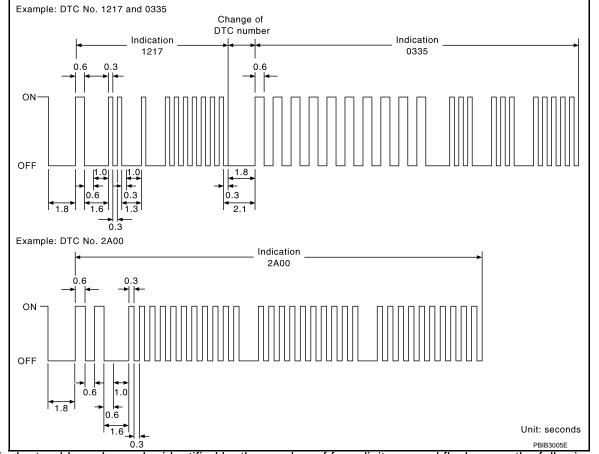




#### How to Read Self-diagnostic Results

The DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below.

The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in "malfunction warning" mode, it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These unidentified codes can be identified by using the CONSULT or GST. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes per the following.

Number	0	1	2	3	4	5	6	7	8	9	А	В	С	D	Е	F
Flashes	10	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16

The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-seconds) - OFF (0.6-seconds) cycle.

The 100th-digit numeral and lower digit numerals consist of a 0.3-seconds ON and 0.3-seconds OFF cycle. A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared. A change from one trouble code to another occurs at an interval of 1.8-seconds OFF.

#### < SYSTEM DESCRIPTION >

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. Refer to <u>EC-96, "DTC Index"</u>.

How to Erase Self-diagnostic Results

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By performing this procedure, ECM memory is erased and the following diagnostic information is erased as		
well.	E	ſ
· Diamastic travella codes		

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes

#### Test values

#### NOTE:

Also, if a battery terminal is disconnected, ECM memory is erased and the diagnostic information as listed above is erased. (The amount of time required for erasing may vary from a few seconds to several hours.)

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Set ECM in "self-diagnostic results" mode.
- 6. The diagnostic information has been erased from the backup memory in the ECM. Fully depress the accelerator pedal and keep it depressed for more than 10 seconds.
- 7. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

# **CONSULT** Function

# FUNCTION

Diagnostic test mode	Function
Self Diagnostic Result	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.*
Data Monitor	Input/Output data in the ECM can be read.
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the in- dications on the CONSULT unit.
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
ECU Identification	ECM part number can be read.
DTC Work Support	The status of system monitoring tests and the self-diagnosis status/results can be confirmed.

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

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

# SELF DIAGNOSTIC RESULT MODE

# Self Diagnostic Item Regarding items of DTC and 1st trip DTC, refer to <u>EC-96, "DTC\_Index"</u>.

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

DTCs and 1st trip DTCs related to the malfunction are displayed in "self-diag results".

- When ECM detects a 1st trip DTC, 1t" is displayed for "TIME".
- When ECM has detected a current DTC, "0" is displayed for "TIME".
- If "TIME" is neither "0" nor "1t", the DTC occurred in the past and ECM shows the number of times the vehicle has been driven since the last detection of the DTC.

# EC-69

[VQ35DE]

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INFOID:000000009650983

< SYSTEM DESCRIPTION >

## NOTE:

- 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.
- If the DTC is not for A/T related items (see <u>EC-96, "DTC Index"</u>), skip step 1.
- 1. Erase DTC in TCM. Refer to TM-48, "DTC Index".
- 2. Select "ENGINE" with CONSULT.
- 3. Select "SELF-DIAG RESULTS".
- 4. Touch "ERASE". (DTC in ECM will be erased.)

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	<ul> <li>The engine control component part/control system has a trouble code that is displayed as PXXXX. (Refer to <u>EC-96, "DTC Index"</u>.)</li> </ul>
FUEL SYS-B1	• "Fuel injection system status" at the moment a malfunction is detected is displayed.
FUEL SYS-B2	<ul> <li>One of the following mode is displayed.</li> <li>Mode2: Open loop due to detected system malfunction</li> <li>Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment)</li> <li>Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control</li> <li>Mode5: Open loop - has not yet satisfied condition to go to closed loop</li> </ul>
CAL/LD VALUE [%]	The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	"Long-term fuel trim" at the moment a malfunction is detected is displayed.
L-FUEL TRM-B2 [%]	• The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRM-B1 [%]	"Short-term fuel trim" at the moment a malfunction is detected is displayed.
S-FUEL TRM-B2 [%]	<ul> <li>The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.</li> </ul>
ENGINE SPEED [rpm]	The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH·P/S [%]	The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	The intake air temperature at the moment a malfunction is detected is displayed.
INT MANI PRES [kPa]	These items are displayed but are not applicable to this model.
COMBUST CONDITION	

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

# DATA MONITOR MODE

#### NOTE:

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

#### Monitored Item

For reference values of the following items, refer to EC-79, "Reference Value".

## < SYSTEM DESCRIPTION >

# [VQ35DE]

Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	<ul> <li>Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).</li> </ul>	<ul> <li>Accuracy becomes poor if engine speed drops below the idle rpm.</li> <li>If the signal is interrupted while the engine is running, an abnormal value may be indicated.</li> </ul>
MAS A/F SE-B1	V	<ul> <li>The signal voltage of the mass air flow sensor is displayed.</li> </ul>	<ul> <li>When the engine is stopped, a certain value is indicated.</li> <li>When engine is running, specification range is indicated in "SPEC".</li> </ul>
B/FUEL SCHDL	msec	"Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	• When engine is running, specification range is indicated in "SPEC".
A/F ALPHA-B1			• When the engine is stopped, a certain
A/F ALPHA-B2	%	The mean value of the air-fuel ratio feedback cor- rection factor per cycle is indicated.	<ul> <li>value is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> <li>When engine is running, specification range is indicated in "SPEC".</li> </ul>
COOLAN TEMP/S	°C or °F	• The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	• 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.
A/F SEN1 (B1)		• The A/F signal computed from the input signal of	
A/F SEN1 (B2)	- V	the air fuel ratio (A/F) sensor 1 is displayed.	
HO2S2 (B1)	V	• The signal voltage of the heated oxygen sensor 2	
HO2S2 (B2)	v	is displayed.	
HO2S2 MNTR(B1)		Display of heated oxygen sensor 2 signal:	
HO2S2 MNTR(B2)	RICH/LEAN	RICH: means the amount of oxygen after three way catalyst is relatively small. LEAN: means the amount of oxygen after three way catalyst is relatively large.	• When the engine is stopped, a certain value is indicated.
VHCL SPEED SE	km/h or mph	• The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	
BATTERY VOLT	V	• The power supply voltage of ECM is displayed.	
ACCEL SEN 1		The accelerator pedal position sensor signal volt-	ACCEL SEN 2 signal is converted by
ACCEL SEN 2	V	age is displayed.	ECM internally. Thus, it differs from ECM terminal voltage signal.
TP SEN 1-B1		The throttle position consor signal voltage is dis	• TP SEN 2-B1 signal is converted by
TP SEN 2-B1	V	The throttle position sensor signal voltage is dis- played.	ECM internally. Thus, it differs from ECM terminal voltage signal.
FUEL T/TMP SE	°C or °F	• The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed.	
INT/A TEMP SE	°C or °F	• The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.	
EVAP SYS PRES	V	The signal voltage of EVAP control system pres- sure sensor is displayed.	
FUEL LEVEL SE	V	• The signal voltage of the fuel level sensor is displayed.	
START SIGNAL	ON/OFF	<ul> <li>Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.</li> </ul>	<ul> <li>After starting the engine, [OFF] is dis- played regardless of the starter sig- nal.</li> </ul>

# < SYSTEM DESCRIPTION >

# [VQ35DE]

Monitored item	Unit	Description	Remarks
CLSD THL POS	ON/OFF	<ul> <li>Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.</li> </ul>	
AIR COND SIG	ON/OFF	• Indicates [ON/OFF] condition of the air condition- er switch as determined by the air conditioner sig- nal.	
P/N POSI SW	ON/OFF	Indicates [ON/OFF] condition from the park/neu- tral position (PNP) signal.	
PW/ST SIGNAL	ON/OFF	• [ON/OFF] condition of the power steering system (determined by the signal voltage of the power steering pressure sensor) is indicated.	
LOAD SIGNAL	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from the electrical load signal.</li> <li>ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position.</li> <li>OFF: Both rear window defogger switch and light- ing switch are OFF.</li> </ul>	
IGNITION SW	ON/OFF	Indicates [ON/OFF] condition from ignition switch signal.	
HEATER FAN SW	ON/OFF	Indicates [ON/OFF] condition from the heater fan switch signal.	
BRAKE SW	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from the stop lamp switch signal.</li> </ul>	
INJ PULSE-B1 INJ PULSE-B2	msec	<ul> <li>Indicates the actual fuel injection pulse width compensated by ECM according to the input sig- nals.</li> </ul>	When the engine is stopped, a certain computed value is indicated.
IGN TIMING	BTDC	<ul> <li>Indicates the ignition timing computed by ECM according to the input signals.</li> </ul>	• When the engine is stopped, a certain value is indicated.
CAL/LD VALUE	%	"Calculated load value" indicates the value of the current air flow divided by peak air flow.	
MASS AIRFLOW	g/s	Indicates the mass air flow computed by ECM ac- cording to the signal voltage of the mass air flow sensor.	
PURG VOL C/V	%	<ul> <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>	
INT/V TIM (B1) INT/V TIM (B2)	°CA	<ul> <li>Indicates [°CA] of intake camshaft advance an- gle.</li> </ul>	
INT/V SOL-B1		• The control value of the intake valve timing con- trol solenoid valve (determined by ECM accord- ing to the input signals) is indicated.	
INT/V SOL-B2	%	<ul> <li>The advance angle becomes larger as the value increases.</li> </ul>	
VIAS S/V-1	ON/OFF	<ul> <li>The control condition of the VIAS control solenoid valve 1 (determined by ECM according to the in- put signals) is indicated.</li> <li>ON: VIAS control solenoid valve 1 is operating.</li> <li>OFF: VIAS control solenoid valve 1 is not operat- ing.</li> </ul>	
VIAS S/V-2	ON/OFF	<ul> <li>The control condition of the VIAS control solenoid valve 2 (determined by ECM according to the in- put signals) is indicated.</li> <li>ON: VIAS control solenoid valve 2 is operating.</li> <li>OFF: VIAS control solenoid valve 2 is not operat- ing.</li> </ul>	

#### < SYSTEM DESCRIPTION >

## [VQ35DE]

Monitored item	Unit	Description	Remarks	Λ
AIR COND RLY	ON/OFF	• The air conditioner relay control condition (deter- mined by ECM according to the input signals) is indicated.		A
ENGINE MOUNT	IDLE/TRVL	<ul> <li>The control condition of the electronic controlled engine mount (determined by ECM according to the input signals) is indicated.</li> <li>IDLE: Engine speed is below 950 rpm</li> <li>TRVL: Engine speed is above 950 rpm</li> </ul>		EC C
VENT CONT/V	ON/OFF	<ul> <li>The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated.</li> <li>ON: Closed</li> <li>OFF: Open</li> </ul>		D
THRTL RELAY	ON/OFF	<ul> <li>Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.</li> </ul>		E
COOLING FAN	HI/MID/LOW/ OFF	<ul> <li>The control condition of the cooling fan (determined by ECM according to the input signals) is indicated.</li> <li>HI: High speed operation</li> <li>MID: Middle speed operation</li> <li>LOW: Low speed operation</li> <li>OFF: Stop</li> </ul>		F
HO2S2 HTR (B1)		Indicates [ON/OFF] condition of heated oxygen		Н
HO2S2 HTR (B2)	ON/OFF	sensor 2 heater determined by ECM according to the input signals.		
I/P PULLY SPD	rpm	• Indicates the engine speed computed from the in- put speed sensor signal.		I
VEHICLE SPEED	km/h or mph	The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.		
IDL A/V LEARN	YET/CMPLT	<ul> <li>Displays the condition of idle air volume learning YET: Idle Air Volume Learning has not been per- formed yet.</li> <li>CMPLT: Idle Air Volume Learning has already been performed successfully.</li> </ul>		J
ENG OIL TEMP	°C or °F	• The engine oil temperature (determined by the signal voltage of the engine oil temperature sensor) is displayed.		L
TRVL AFTER MIL	km or mile	Distance traveled while MIL is activated.		
A/F S1 HTR(B1) A/F S1 HTR(B2)	%	<ul> <li>Air fuel ratio (A/F) sensor 1 heater control value computed by ECM according to the input signals.</li> <li>The current flow to the heater becomes larger as the value increases.</li> </ul>		Μ
AC PRESS SEN	V	The signal voltage from the refrigerant pressure sensor is displayed.		Ν
VHCL SPEED SE	km/h or mph	<ul> <li>The vehicle speed computed from the vehicle speed signal sent from combination meter is dis- played.</li> </ul>		0
SET VHCL SPD	km/h or mph	The preset vehicle speed is displayed.		
MAIN SW	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from MAIN switch signal.</li> </ul>		Ρ
CANCEL SW	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from CANCEL switch signal.</li> </ul>		
RESUME/ACC SW	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from RESUME/AC- CELERATE switch signal.</li> </ul>		
SET SW	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from SET/COAST switch signal.</li> </ul>		

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#### < SYSTEM DESCRIPTION >

Monitored item	Unit	Description	Remarks
BRAKE SW1	ON/OFF	<ul> <li>Indicates [ON/OFF] condition from ASCD brake switch signal or ASCD clutch switch.</li> </ul>	
BRAKE SW2	ON/OFF	Indicates [ON/OFF] condition of stop lamp switch signal.	
VHCL SPD CUT	NON/CUT	<ul> <li>Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.</li> </ul>	
LO SPEED CUT	NON/CUT	<ul> <li>Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off.</li> </ul>	
AT OD MONITOR	ON/OFF	<ul> <li>Indicates [ON/OFF] condition of CVT O/D ac- cording to the input signal from the TCM.</li> </ul>	
AT OD CANCEL	ON/OFF	<ul> <li>Indicates [ON/OFF] condition of CVT O/D cancel request signal.</li> </ul>	
CRUISE LAMP	ON/OFF	<ul> <li>Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.</li> </ul>	
SET LAMP	ON/OFF	<ul> <li>Indicates [ON/OFF] condition of SET lamp deter- mined by the ECM according to the input signals.</li> </ul>	
BAT CUR SEN	mV	<ul> <li>The signal voltage of battery current sensor is displayed.</li> </ul>	
ALT DUTY SIG	ON/OFF	<ul> <li>The control condition of the power generation voltage variable control (determined by ECM ac- cording to the input signals) is indicated.</li> <li>ON: Power generation voltage variable control is active.</li> <li>OFF: Power generation voltage variable control is inactive.</li> </ul>	
A/F ADJ-B1		<ul> <li>Indicates the correction of a factor stored in ECM. The factor is calculated from the difference be-</li> </ul>	
A/F ADJ-B2	_	tween the target air-fuel ratio stored in ECM and the air-fuel ratio calculated from A/F sensor 1 sig- nal.	
ALT DUTY	%	• Indicates the duty ratio of the power generation command value. The ratio is calculated by ECM based on the battery current sensor signal.	
EVAP LEAK DIAG	YET/CMPLT	<ul> <li>Indicates the condition of EVAP leak diagnosis.</li> <li>YET: EVAP leak diagnosis has not been performed yet.</li> <li>CMPLT: EVAP leak diagnosis has been performed successfully.</li> </ul>	
EVAP DIAG READY	ON/OFF	<ul> <li>Indicates the ready condition of EVAP leak diagnosis.</li> <li>ON: Diagnosis has been ready condition.</li> <li>OFF: Diagnosis has not been ready condition.</li> </ul>	
HO2 S2 DIAG1 (B1)	INCMP/CM- PLT	<ul> <li>Indicates DTC P0139 self-diagnosis (delayed re- sponce) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	
HO2 S2 DIAG1 (B2)	INCMP/CM- PLT	<ul> <li>Indicates DTC P0139 self-diagnosis (delayed re- sponce) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>	

#### < SYSTEM DESCRIPTION >

Monitored item	Unit	Description	Remarks	
HO2 S2 DIAG2 (B1)	INCMP/CM- PLT	<ul> <li>Indicates DTC P0139 self-diagnosis (slow re- sponce) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>		EC
HO2 S2 DIAG2 (B2)	INCMP/CM- PLT	<ul> <li>Indicates DTC P0139 self-diagnosis (slow re- sponce) condition.</li> <li>INCMP: Self-diagnosis is incomplete.</li> <li>CMPLT: Self-diagnosis is complete.</li> </ul>		С
THRTL STK CNT B1*	—	_		
FUEL PUMP DUTY	%	• The control condition of the fuel pump control module (FPCM) (determined by ECM according-to the input signals) is indicated.		D
BAT TEMP SEN	V	• The signal voltage from the battery temperature sensor is displayed.		Е

\*: The item is indicated, but not used.

#### NOTE:

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically. F WORK SUPPORT MODE

#### WORK SOFF ORT MOD

Work Item

WORK ITEM	CONDITION	USAGE
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
IDLE AIR VOL LEARN	• The idle air volume that keeps the engine within the spec- ified range is memorized in ecm.	When learning the idle air volume
SELF-LEARNING CONT	• The coefficient of self-learning control mixture ratio returns to the original coefficient.	When clearing mixture ratio self- learning value
EVAP SYSTEM CLOSE       Close the EVAP canister vent control valve in order to make EVAP system close under the following conditions.         • Ignition switch ON       • Ignition switch ON         • Engine not running       • Ambient temperature is above 0°C (32°F).         • No vacuum and no high pressure in EVAP system         • Fuel tank temperature is more than 0°C (32°F).         • Within 10 minutes after starting "EVAP SYSTEM CLOSE"         • When trying to execute "EVAP SYSTEM CLOSE" under the condition except above, CONSULT will discontinue it and display appropriate instruction.         NOTE:         When starting engine, CONSULT may display "BAT-TERY VOLTAGE IS LOW. CHARGE BATTERY", even in using charged battery.		When detecting EVAP vapor leak- age in the EVAP system
VIN REGISTRATION	In this mode, VIN is registered in ECM	When registering VIN in ECM
TARGET IDLE RPM ADJ*	Idle condition	When setting target idle speed
TARGET IGN TIM ADJ*	Idle condition	When adjusting target ignition tim- ing
CLSD THL POS LEARN	Ignition on and engine stopped.	When learning the throttle valve closed position
SAVING DATA FOR REPLC CPU	In this mode, save data that is in ECM.	When ECM is replaced.
WRITING DATA FOR REPLC CPU	In this mode, write data stored by "SAVE DATA FOR CPU REPLC" in work support mode to ECM.	When ECM is replaced.

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

#### ACTIVE TEST MODE

Test Item

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#### < SYSTEM DESCRIPTION >

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
FUEL INJEC- TION	<ul> <li>Engine: Return to the original non-standard condition</li> <li>Change the amount of fuel injec- tion using CONSULT.</li> </ul>	If malfunctioning symptom disappears, see CHECK ITEM.	<ul> <li>Harness and connectors</li> <li>Fuel injector</li> <li>Air fuel ratio (A/F) sensor 1</li> </ul>
IGNITION TIM- ING	<ul> <li>Engine: Return to the original non-standard condition</li> <li>Timing light: Set</li> <li>Retard the ignition timing using CONSULT.</li> </ul>	If malfunctioning symptom disappears, see CHECK ITEM.	Perform Idle Air Volume Learning.
POWER BAL- ANCE	<ul> <li>Engine: After warming up, idle the engine.</li> <li>A/C switch OFF</li> <li>Selector lever: P or N position</li> <li>Cut off each injector signal one at a time using CONSULT.</li> </ul>	Engine runs rough or stops.	<ul> <li>Harness and connectors</li> <li>Compression</li> <li>Fuel injector</li> <li>Power transistor</li> <li>Spark plug</li> <li>Ignition coil</li> </ul>
COOLING FAN*	<ul> <li>Ignition switch: ON</li> <li>Turn the cooling fan "HI", "MID", "LOW" and "OFF" using CON- SULT.</li> </ul>	Cooling fan moves and stops.	<ul> <li>Harness and connectors</li> <li>Cooling fan motor</li> <li>IPDM E/R</li> </ul>
ENG COOLANT TEMP	<ul> <li>Engine: Return to the original non-standard condition</li> <li>Change the engine coolant tem- perature using CONSULT.</li> </ul>	If malfunctioning symptom disap- pears, see CHECK ITEM.	<ul> <li>Harness and connectors</li> <li>Engine coolant temperature sensor</li> <li>Fuel injector</li> </ul>
FUEL PUMP RE- LAY	<ul> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn the fuel pump relay "ON" and "OFF" using CONSULT and listen to operating sound.</li> </ul>	Fuel pump relay makes the operat- ing sound.	<ul><li>Harness and connectors</li><li>Fuel pump relay</li></ul>
VIAS S/V-1	<ul> <li>Ignition switch: ON</li> <li>Turn solenoid valve "ON" and "OFF" using CONSULT and listen to operating sound.</li> </ul>	Solenoid valve makes the operating sound.	<ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>
VIAS S/V-2	<ul> <li>Ignition switch: ON</li> <li>Turn solenoid valve "ON" and "OFF" using CONSULT and listen to operating sound.</li> </ul>	Solenoid valve makes the operating sound.	<ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>
ENGINE MOUNTING	<ul> <li>Ignition switch: ON</li> <li>Turn electronic controlled engine mount "IDLE" and "TRVL" with CONSULT.</li> </ul>	Electronic controlled engine mount makes the operating sound.	<ul><li>Harness and connectors</li><li>Electronic controlled engine mount</li></ul>
PURG VOL CONT/V	<ul> <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 CON-SULT.</li> </ul>	Engine speed changes according to the opening percent.	<ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>
FUEL/T TEMP SEN	Change the fuel tank temperature	using CONSULT.	
VENT CON- TROL/V	<ul> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn solenoid valve "ON" and "OFF" with the CONSULT and listen to operating sound.</li> </ul>	Solenoid valve makes an operating sound.	<ul><li>Harness and connectors</li><li>Solenoid valve</li></ul>

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TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)	
INT V/T ASSIGN	Engine: Return to the original non-standard condition	If malfunctioning symptom disap-	<ul> <li>Harness and connectors</li> <li>Intake valve timing control sole-</li> </ul>	A
ANGLE	Change intake valve timing using CONSULT.	pears, see CHECK ITEM.	noid valve	EC
ALTERNATOR DUTY	<ul> <li>Engine: Idle</li> <li>Change duty ratio using CON- SULT.</li> </ul>	Battery voltage changes.	<ul> <li>Harness and connectors</li> <li>IPDM E/R</li> <li>Alternator</li> </ul>	С

\*: Leaving cooling fan OFF with CONSULT while engine is running may cause the engine to overheat.

#### DTC WORK SUPPORT MODE

Test Item

Test mode	Test item	Corresponding DTC No.	Reference page
	EVP V/S LEAK P0456/P1456*	P0456	<u>EC-315</u>
EVAPORATIVE SYSTEM	PURG VOL CN/V P1444	P0443	<u>EC-287</u>
	PURG FLOW P0441	P0441	<u>EC-282</u>
	A/F SEN1(B1) P1278/P1279	—	_
	A/F SEN1(B1) P1276	P0130	<u>EC-206</u>
A/F SEN1	A/F SEN1(B2) P1288/P1289	—	_
	A/F SEN1(B2) P1286	P0150	<u>EC-206</u>
	HO2S2(B1) P1146	P0138	<u>EC-222</u>
	HO2S2(B1) P1147	P0137	<u>EC-216</u>
110000	HO2S2(B1) P0139	P0139	<u>EC-229</u>
HO2S2	HO2S2(B2) P1166	P0158	<u>EC-222</u>
	HO2S2(B2) P1167	P0157	<u>EC-216</u>
	HO2S2(B2) P0159	P0159	<u>EC-229</u>

\*: DTC P1442 and P1456 does not apply to this model but appears in DTC Work Support Mode screens.

#### SRT & P-DTC MODE

SRT STATUS Mode

- For items whose SRT codes are set, "CMPLT" is displayed on the CONSULT screen; for items whose SRT codes are not set, "INCMP" is displayed.
- "SRT STATUS" provides the presence or absence of permanent DTCs stored in ECM memory.

#### PERMANENT DTC STATUS Mode

Hov 1.	v to display permanent DTC status Turn ignition switch OFF and wait at least 10 seconds.	Μ
2.	Turn ignition switch ON. Turn ignition switch OFF and wait at least 10 seconds.	Ν
4. 5.	Turn ignition switch ON. Select "PERMANENT DTC STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT.	
	<b>NOTE:</b> Permanent DTCs stored in ECM memory are displayed on the CONSULT screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).	0
		Р

#### < SYSTEM DESCRIPTION >

JSBIA0062GB

Since the "PERMANENT DTC STATUS" screen displays the previous trip information, repeat the following twice to update the information: "Ignition switch OFF", "Wait for more than 10 seconds" and "Ignition switch ON".

ANENT DTC & SRT CONFIRM	ATION : PERMANENT DTC STATUS		
CAUTION: Turn ignition switch from O status screen.	N to OFF twice to update the information	ation on the	
	<u> </u>		,
PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D	
хххх	INCMP	INCMP	
xxxx	CMPLT	INCMP	
XXXX	INCMP	CMPLT	
XXXX	CMPLT	INCMP	
XXXX	INCMP	INCMP	
XXXX	INCMP	INCMP	٦¦
-	The previous trip information is displayed		· ·

#### NOTE:

This mode is not used in regions that permanent DTCs are not regulated by law.

#### SRT WORK SUPPORT Mode

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

#### PERMANENT DTC WORK SUPPORT Mode

This mode enables a technician to drive a vehicle to complete the driving pattern that is required for erasing permanent DTC.

#### NOTE:

This mode is not used in regions that permanent DTCs are not regulated by law.

# ECU DIAGNOSIS INFORMATION ECM

Reference Value

#### VALUES ON THE DIAGNOSIS TOOL

#### NOTE:

- The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.
- Numerical values in the following table are reference values.
- These values are input/output values that ECM receives/transmits and may differ from actual operations. Example: The ignition timing shown by the timing light may differ from the ignition timing displayed on the data monitor. This occurs because the timing light shows a value calculated by ECM according to signals received from the cam shaft position sensor and other sensors related to ignition timing. Evangle for outlines of following items, refer to EC-69, "CONSULT Function".

Monitor Item		Condition	Values/Status
ENG SPEED	Run engine and compare CONSULT value with the tachometer indication.		Almost the same speed as the tachometer indication.
MAS A/F SE-B1	See EC-155, "Description".		
B/FUEL SCHDL	See EC-155, "Description".		
A/F ALPHA-B1	See EC-155, "Description".		
A/F ALPHA-B2	See EC-155, "Description".		
COOLANT TEMP/S	Engine: After warming up		More than 70°C (158°F)
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
A/F SEN1 (B2)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
HO2S2 (B1)	<ul> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>		0 - 0.3 V ←→ Approx. 0.6 - 1.0 V
HO2S2 (B2)	<ul> <li>Revving engine from idle to 3,00 are met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed betw idle for 1 minute under no load</li> </ul>	0 - 0.3 V ←→ Approx. 0.6 - 1.0 V	
HO2S2 MNTR (B1)	<ul> <li>Revving engine from idle to 3,00 are met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed betw idle for 1 minute under no load</li> </ul>	$LEAN \leftarrow \rightarrow RICH$	
HO2S2 MNTR (B2)	<ul> <li>Revving engine from idle to 3,00 are met.</li> <li>Engine: After warming up</li> <li>After keeping engine speed betw idle for 1 minute under no load</li> </ul>	$LEAN \leftarrow \rightarrow RICH$	
VHCL SPEED SE	Turn drive wheels and compare cation.	Almost the same speed as speedometer indication	
BATTERY VOLT	Ignition switch: ON (Engine stopped)		11 - 14 V
ACCEL SEN 1	Ignition switch: ON	Accelerator pedal: Fully released	0.5 - 1.0 V
ACCEL SEN 1	(Engine stopped)	Accelerator pedal: Fully depressed	4.2 - 4.8 V
	Ignition switch: ON	Accelerator pedal: Fully released	0.5 - 1.0 V
ACCEL SEN 2 <sup>*1</sup>	(Engine stopped) Accelerator pedal: Fully depressed		4.2 - 4.8 V

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#### < ECU DIAGNOSIS INFORMATION >

C	ondition	Values/Status
Ignition switch: ON	Accelerator pedal: Fully released	More than 0.36 V
<ul><li>(Engine stopped)</li><li>Selector lever: D position</li></ul>	Accelerator pedal: Fully depressed	Less than 4.75 V
Ignition switch: ON	Accelerator pedal: Fully released	More than 0.36 V
<ul><li>(Engine stopped)</li><li>Selector lever: D position</li></ul>	Accelerator pedal: Fully depressed	Less than 4.75 V
Ignition switch: ON		Indicates fuel tank tempera- ture
Ignition switch: ON		Indicates intake air tempera- ture
Ignition switch: ON		Approx. 1.8 - 4.8 V
Ignition switch: ON		Depending on fuel level of fuel tank
• Ignition switch: $ON \rightarrow START \rightarrow C$	DN	$OFF \rightarrow ON \rightarrow OFF$
Ignition switch: ON	Accelerator pedal: Fully released	ON
(Engine stopped)	Accelerator pedal: Slightly depressed	OFF
	Air conditioner switch: OFF	OFF
Engine: After warming up, idle the engine	Air conditioner switch: ON (Compressor operates.)	ON
	Selector lever: P or N position	ON
Ignition switch: ON	Selector lever: Except above position	OFF
• Engine: After warming up, idle the	Steering wheel: Not being turned	OFF
engine	Steering wheel: Being turned	ON
Ignition switch: ON	Rear window defogger switch: ON and/or Lighting switch: 2nd position	ON
	Rear window defogger switch and lighting switch: OFF	OFF
• Ignition switch: $ON \rightarrow OFF \rightarrow ON$		$ON \rightarrow OFF \rightarrow ON$
• Engine: After warming up, idle the	Heater fan switch: ON	ON
engine	Heater fan switch: OFF	OFF
- Ignition quitch: ON	Brake pedal: Fully released	OFF
• Ignition switch. ON	Brake pedal: Slightly depressed	ON
Engine: After warming up	Idle	2.0 - 3.0 msec
<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	1.9 - 2.9 msec
Engine: After warming up     Selector lover: P or N position	Idle	2.0 - 3.0 msec
<ul> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	1.9 - 2.9 msec
Engine: After warming up	Idle	7 - 17°BTDC
<ul> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,000 rpm	25 - 45°BTDC
Engine: After warming up	Idle	5 - 35%
<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,500 rpm	5 - 35%
Engine: After warming up	Idle	2.0 - 6.0 g/s
<ul> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	2,500 rpm	7.0 - 20.0 g/s
	<ul> <li>Ignition switch: ON (Engine stopped)</li> <li>Selector lever: D position</li> <li>Ignition switch: ON (Engine stopped)</li> <li>Selector lever: D position</li> <li>Ignition switch: ON</li> <li>Ignition switch: ON</li> <li>Ignition switch: ON</li> <li>Ignition switch: ON</li> <li>Ignition switch: ON → START → C</li> <li>Ignition switch: ON → START → C</li> <li>Ignition switch: ON</li> <li>Engine: After warming up, idle the engine</li> <li>Ignition switch: ON</li> <li>Engine: After warming up, idle the engine</li> <li>Ignition switch: ON</li> <li>Engine: After warming up, idle the engine</li> <li>Ignition switch: ON → OFF → ON</li> <li>Engine: After warming up, idle the engine</li> <li>Ignition switch: ON → OFF → ON</li> <li>Engine: After warming up, idle the engine</li> <li>Ignition switch: ON</li> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> </ul>	Ignition switch: ON (Engine stopped)       Accelerator pedal: Fully released         Selector lever: D position       Accelerator pedal: Fully depressed         Ignition switch: ON       Accelerator pedal: Fully depressed         Ignition switch: ON       Accelerator pedal: Fully depressed         Ignition switch: ON       Ignition switch: ON         Ignition switch: ON       Ignition switch: ON         Ignition switch: ON       Accelerator pedal: Fully depressed         Ignition switch: ON       Ignition switch: ON         Ignition switch: ON       Accelerator pedal: Fully released         Ignition switch: ON       Accelerator pedal: Fully released         Ignition switch: ON       Accelerator pedal: Sightly depressed         Ignition switch: ON       Accelerator pedal: Sightly depressed         Ignition switch: ON       Accelerator pedal: Sightly depressed         Ignition switch: ON       Selector lever: P or N position         Ignition switch: ON       Selector lever: P or N position         Ignition switch: ON       Selector lever: Except above position         Ignition switch: ON       Steering wheel: Not being turned         Ignition switch: ON       Rear window delogger switch and lighting switch: OF         Ignition switch: ON       Heater fan switch: ON         Ignition switch: ON       PF → OF

#### < ECU DIAGNOSIS INFORMATION >

Monitor Item	С	condition	Values/Status
PURG VOL C/V	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> </ul>	Idle (Accelerator pedal: Not depressed even slightly, after engine starting.)	0%
	No load	2,000 rpm	-
	Engine: After warming up	Idle	–5 - 5°CA
NT/V TIM (B1)	<ul><li>Selector lever: P or N position</li><li>Air conditioner switch: OFF</li><li>No load</li></ul>	2,000 rpm	Approx. 0 - 30°CA
	Engine: After warming up	Idle	–5 - 5°CA
NT/V TIM (B2)	<ul><li>Selector lever: P or N position</li><li>Air conditioner switch: OFF</li><li>No load</li></ul>	2,000 rpm	Approx. 0 - 30°CA
	Engine: After warming up	Idle	0 - 2%
NT/V SOL (B1)	<ul><li>Selector lever: P or N position</li><li>Air conditioner switch: OFF</li><li>No load</li></ul>	2,000 rpm	Approx. 0 - 50%
	Engine: After warming up	Idle	0 - 2%
NT/V SOL (B2)	<ul><li>Selector lever: P or N position</li><li>Air conditioner switch: OFF</li><li>No load</li></ul>	2,000 rpm	Approx. 0 - 50%
VIAS S/V-1	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	When revving engine up to 5,000 rpm quickly	$OFF \rightarrow ON \rightarrow OFF$
/IAS S/V-2	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	When revving engine up to 5,000 rpm quickly	$OFF \to ON \to OFF$
		Air conditioner switch: OFF	OFF
AIR COND RLY	Engine: After warming up, idle the engine	Air conditioner switch: ON (Compressor operates)	ON
ENGINE MOUNT		Below 950 rpm	IDLE
	Engine: After warming up	Above 950 rpm	TRVL
FUEL PUMP RLY	<ul><li>For 1 second after turning ignition</li><li>Engine running or cranking</li></ul>	switch: ON	ON
	Except above		OFF
/ENT CONT/V	Ignition switch: ON		OFF
THRTL RELAY	Ignition switch: ON		ON
		Engine coolant temperature: 97°C (206°F) or less	OFF
COOLING FAN	Engine: After warming up, idle the engine	Engine coolant temperature: Between 98°C (208°F) and 99°C (210°F)	LOW
occenter rain	Air conditioner switch: OFF	Engine coolant temperature: Between 100°C (212°F) and 104°C (219°F)	MID
		Engine coolant temperature: 105°C (221°F) or more	н
HO2S2 HTR (B1)	<ul> <li>Engine speed: Below 3,600 rpm after the following conditions are met.</li> <li>Engine: After warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>		ON
	• Engine speed: Above 3,600 rpm		OFF

## < ECU DIAGNOSIS INFORMATION >

Monitor Item	C	condition	Values/Status
HO2S2 HTR (B2)	idle for 1 minute under no load	fter the following conditions are met. en 3,500 and 4,000 rpm for 1 minute and at	ON
	Engine speed: Above 3,600 rpm		OFF
I/P PULLY SPD	Vehicle speed: More than 20 km/h	n (12 MPH)	Almost the same speed as the tachometer indication
VEHICLE SPEED	<ul> <li>Turn drive wheels and compare C cation.</li> </ul>	ONSULT value with the speedometer indi-	Almost the same speed as the speedometer indication
IDL A/V LEARN	Engine: Running	Idle air volume learning has not been per- formed yet.	YET
IDE A/V LEARIN	• Engine. Running	Idle air volume learning has already been performed successfully.	CMPLT
ENG OIL TEMP	Engine: After warming up		More than 70°C (158°F)
TRVL AFTER MIL	Ignition switch: ON	Vehicle has traveled after MIL has illumi- nated.	0 - 65,535 km (0 - 40,723 miles)
A/F S1 HTR (B1)	Engine: After warming up, idle the (More than 140 seconds after star		4 - 100%
A/F S1 HTR (B2)	Engine: After warming up, idle the (More than 140 seconds after star		4 - 100%
AC PRESS SEN	<ul><li>Engine: Idle</li><li>Both A/C switch and blower fan switch</li></ul>	witch: ON (Compressor operates)	1.0 - 4.0 V
VHCL SPEED SE	Turn drive wheels and compare C cation.	ONSULT value with the speedometer indi-	Almost the same speed as the speedometer indication
SET VHCL SPD	Engine: Running	ASCD: Operating	The preset vehicle speed is displayed
MAIN SW	Ignition switch: ON	MAIN switch: Pressed	ON
MAIN SW		MAIN switch: Released	OFF
CANCEL SW	Ignition switch: ON	CANCEL switch: Pressed	ON
CANCEL SW		CANCEL switch: Released	OFF
RESUME/ACC SW	• Ignition quitch: ON	RESUME/ACCELERATE switch: Pressed	ON
RESUME/ACC SW	Ignition switch: ON	RESUME/ACCELERATE switch: Re- leased	OFF
SET SW	Ignition switch: ON	SET/COAST switch: Pressed	ON
3L1 3W	· Ignition switch. ON	SET/COAST switch: Released	OFF
BRAKE SW1	Ignition switch: ON	Brake pedal: Fully released	ON
(ASCD brake switch)	• Ignition switch. ON	Brake pedal: Slightly depressed	OFF
BRAKE SW2	Ignition switch: ON	Brake pedal: Fully released	OFF
(Stop lamp switch)	• Ignition switch: ON	Brake pedal: Slightly depressed	ON
VHCL SPD CUT	Ignition switch: ON	·	NON
LO SPEED CUT	Ignition switch: ON		NON
AT OD MONITOR	Ignition switch: ON		OFF
AT OD CANCEL	Ignition switch: ON		OFF
CRUISE LAMP	Ignition switch: ON	MAIN switch: Pressed at the 1st time $\rightarrow$ at the 2nd time	$ON \rightarrow OFF$
	MAIN switch: ON	ASCD: Operating	ON
SET LAMP	<ul> <li>When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)</li> </ul>	ASCD: Not operating	OFF

#### < ECU DIAGNOSIS INFORMATION >

#### [VQ35DE]

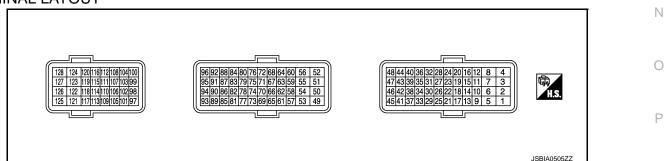
Monitor Item	C	Values/Status	
ALT DUTY	Engine: Idle		0 - 80%
A/F ADJ-B1	Engine: Running		-0.330 - 0.330
A/F ADJ-B2	Engine: Running		-0.330 - 0.330
BAT CUR SEN	<ul> <li>Engine speed: Idle</li> <li>Battery: Fully charged*<sup>2</sup></li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>		Approx. 2,600 - 3,500 mV
ALT DUTY SIG	Power generation voltage variable	e control: Operating	ON
ALI DUTI SIG	Power generation voltage variable	e control: Not operating	OFF
EVAP LEAK DIAG	Ignition switch: ON		Indicates the condition of EVAP leak diagnosis.
EVAP DIAG READY	Ignition switch: ON		Indicates the ready condition of EVAP leak diagnosis.
	DTC P0139 self-diagnosis (delayed	response) is incomplete.	INCMP
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed	response) is complete.	CMPLT
	DTC P0159 self-diagnosis (delayed	response) is incomplete.	INCMP
HO2 S2 DIAG1 (B2)	DTC P0159 self-diagnosis (delayed	response) is complete.	CMPLT
	DTC P0139 self-diagnosis (slow res	ponse) is incomplete.	INCMP
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow res	ponse) is complete.	CMPLT
	DTC P0159 self-diagnosis (slow res	ponse) is incomplete.	INCMP
HO2 S2 DIAG2 (B2)	DTC P0159 self-diagnosis (slow res	ponse) is complete.	CMPLT
THRTL STK CNT 31 <sup>*3</sup>	_		_
BAT TEMP SEN	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	Indicates the temperature around the battery.
FUEL PUMP DUTY	<ul> <li>Engine: After warming up</li> <li>Selector lever: P or N position</li> <li>Air conditioner switch: OFF</li> <li>No load</li> </ul>	Idle	30 – 40%

nally. Thus, they differ from ECM terminals voltage signal.

\*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to <u>PG-97, "How to</u> <u>Handle Battery"</u>.

\*3: The item is indicated, but not used.

#### TERMINAL LAYOUT



#### PHYSICAL VALUES

#### NOTE:

• ECM is located in the engine room left side near battery.

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# < ECU DIAGNOSIS INFORMATION >

# Specification data are reference values.Pulse signal is measured by CONSULT.

Termin	al No.	Description			Value	
+		Signal name	Input/ Output	Condition	(Approx.)	
1 (G/W)	128 (B)	Throttle control motor power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)	
2 (P)	128 (B)	Throttle control motor (Close)	Output	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>	0 - 14 V★ 500µSec/div 500µSec/div 500µSec/div 500µSec/div 500µSec/div JMBIA1125GB	
3 (SB)	128 (B)	A/F sensor 1 heater (bank 2)	Output	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed (More than 140 seconds after starting engine)</li> </ul>	2.9 - 8.8 V★ 50mSec/div 50mSec/div 50mSec/div 50mSec/div 50mSec/div JMBIA0030GB	
5	128	128 (B) Throttle control motor (Open)	Output	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul>	0 - 14 V★ 500µSec/div 500µSec/div 500µSec/div 500µSec/div JMBIA0031GB	
(L)	(B)			<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>	0 - 14 V★ 500µSec/div 500µSec/div 500µSec/div JMBIA0032GB	
6 (BR/Y)	128 (B)	A/F sensor 1 heater (bank 1)	Output	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed (More than 140 seconds after starting engine)</li> </ul>	2.9 - 8.8 V★ 50mSec/div 	
8 (P)	128 (B)	Starter motor relay cut off sig- nal	Output	[Ignition switch: ON] [Engine is running]	0 V BATTERY VOLTAGE	
\· /	(-)			Idle speed	(11 - 14 V)	

#### < ECU DIAGNOSIS INFORMATION >

Terminal No.		Description			Value	
+		Signal name	Input/ Output	Condition	(Approx.)	A
9 (L/B) 10 (G/R) 11 (Y/R)	128	Ignition signal No. 3 Ignition signal No. 2 Ignition signal No. 1		<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> </ul>	0 - 0.2 V★ 50mSec/div 2V/div JMBIA0035GB	C
13 (GR/R) 14 (P) 15	(B)	Ignition signal No. 6 Ignition signal No. 5	Output	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	0.1 - 0.4 V★ 50mSec/div	E
(W)		Ignition signal No. 4			2V/div JMBIA0036GB	F
12 (B)		ECM ground	—	_	_	G
16 (B/Y)	_	ECM ground	_	_	_	
19 (B)	_	Sensor ground (Throttle position sensor)	_	_	_	ŀ
22 (W)	128 (B)	Throttle position sensor 1	Input	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> <li>[Ignition switch: ON]</li> </ul>	More than 0.36 V	l J
				<ul> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul>	Less than 4.75 V	K
23	128	Throttle position sensor 2	Input	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully released</li> </ul>	Less than 4.75 V	L
(R)	(B)		Input -	<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>Selector lever: D position</li> <li>Accelerator pedal: Fully depressed</li> </ul>	More than 0.36 V	M
24 (G)	19 (B)	Sensor power supply (Throttle position sensor)	_	[Ignition switch: ON]	5 V	
26 (W/L)	128 (B)	Power supply for ECM (Back- up)	Input	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)	С
31 (W/B)	128 (B)	ECM relay (Self shut-off)	Output	<ul><li>[Engine is running]</li><li>[Ignition switch: OFF]</li><li>A few seconds after turning ignition switch OFF</li></ul>	0 - 1.5 V	P
、 /	. ,			<ul><li>[Ignition switch: OFF]</li><li>More than a few seconds after turning ignition switch OFF</li></ul>	BATTERY VOLTAGE (11 - 14 V)	

# < ECU DIAGNOSIS INFORMATION >

Termina	al No.	Description			Value											
+		Signal name	Input/ Output	Condition	(Approx.)											
33 (R/B)		Fuel injector No. 1		[Engine is running]	BATTERY VOLTAGE (11 - 14 V)★											
44 (R/W)		Fuel injector No. 2		<ul> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE:</li> <li>The pulse cycle changes de-</li> </ul>	50mSec/div											
45 (P/B)	128	Fuel injector No. 6	Output	pending on rpm at idle	10V/div JMBIA0047GB											
46 (L/W)	(B)	Fuel injector No. 5	Output		BATTERY VOLTAGE (11 - 14 V)★											
47 (LG/R)		Fuel injector No. 4		[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	50mSec/div											
48 (R/Y)		Fuel injector No. 3			10V/div JMBIA0048GB											
34 (O)	128 (B)	Throttle control motor relay	Output	[Ignition switch: $ON \rightarrow OFF$ ]	0 - 1.0 V $\rightarrow$ BATTERY VOLTAGE (11 - 14 V) $\rightarrow$ 0 V											
(0)				[Ignition switch: ON]	0 - 1.0 V											
37 (P/B)	128 (B)	Heated oxygen sensor 2 heat- er (bank 1)	Output	<ul> <li>[Engine is running]</li> <li>Engine speed: Below 3,600 rpm after the following condi- tions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed be- tween 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	10 V★ 50mSec/div 50mSec/div 50mSec/div 50mSec/div JMBIA0902GB											
				<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>[Engine is running]</li> <li>Engine speed: Above 3,600 rpm</li> </ul>	BATTERY VOLTAGE (11 - 14 V)											
38	128	Electronic controlled engine		[Engine is running] <ul> <li>Idle speed</li> </ul>	0 - 1.0 V											
(BR/W)	(B)	mount control solenoid valve	Output	<ul><li>[Engine is running]</li><li>Engine speed: More than 950 rpm</li></ul>	BATTERY VOLTAGE (11 - 14 V)											
				<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	BATTERY VOLTAGE (11 - 14 V)											
39 (V)	128 (B)	VIAS control solenoid valve 1	Output	Output	Output	Output	Output	Output	Output	Output	Output	Output	Output	Output	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>When revving engine up to 5,000 rpm quickly</li></ul>	BATTERY VOLTAGE (11 - 14 V) ↓ 0 - 1.0 V ↓ BATTERY VOLTAGE (11 - 14 V)
				[Engine is running] • Warm-up condition • Idle speed	BATTERY VOLTAGE (11 - 14 V)											
40 (GR/B)	128 (B)	VIAS control solenoid valve 2	Output	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>When revving engine up to 5,000 rpm quickly</li></ul>	BATTERY VOLTAGE (11 - 14 V) ↓ 0 - 1.0 V ↓ BATTERY VOLTAGE (11 - 14 V)											

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value	٨
+		Signal name	Input/ Output	Condition	Value (Approx.)	A
41 (R)	128 (B)	Heated oxygen sensor 2 heat- er (bank 2)	Output	<ul> <li>[Engine is running]</li> <li>Engine speed: Below 3,600 rpm after the following condi- tions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed be- tween 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	10 V★ 50mSec/div 50mSec/div 5V/div JMBIA0902GB	C D
				<ul> <li>[Ignition switch: ON]</li> <li>Engine stopped</li> <li>[Engine is running]</li> <li>Engine speed: Above 3,600 rpm</li> </ul>	BATTERY VOLTAGE (11 - 14 V)	E
	400			<ul> <li>[Engine is running]</li> <li>Idle speed</li> <li>Accelerator pedal: Not depressed even slightly, after engine starting</li> </ul>	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div € 10V/div JMBIA0039GB	F G H
42 (P/L)	42 128 EVAP canister purge volume (P/L) (B) control solenoid valve	Output	<ul> <li>[Engine is running]</li> <li>Engine speed: approximately 2,000 rpm (More than 100 seconds after starting engine)</li> </ul>	BATTERY VOLTAGE (11 - 14 V)★ 50mSec/div € 10V/div JMBIA0040GB	J	
43 (GR)	128 (B)	Fuel pump relay	Output	<ul> <li>[Ignition switch: ON]</li> <li>For 1 second after turning ignition switch: ON</li> <li>[Engine is running]</li> </ul>	0 - 1.0 V	K
54 (R/G)	84 (Y/B)	Sensor power supply [Crankshaft position sensor (POS)]	_	[Ignition switch: ON]	5 V	Μ
				<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	BATTERY VOLTAGE (11 - 14 V)	N
55 (R)	128 (B)		Output	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	7 - 12 V★	O

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Value
+		Signal name	Input/ Output	Condition	(Approx.)
				<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Idle speed</li></ul>	BATTERY VOLTAGE (11 - 14 V)
56 (Y)	128 (B)	Intake valve timing control so- lenoid valve (bank 2)	Output	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	7 - 12 V★
57 (W)	128 (B)	Heated oxygen sensor 2 (bank 1)	Input	<ul> <li>[Engine is running]</li> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	0 - 1.0 V
58 (W/L)	128 (B)	Heated oxygen sensor 2 (bank 2)	Input	<ul> <li>[Engine is running]</li> <li>Revving engine from idle to 3,000 rpm quickly after the following conditions are met</li> <li>Engine: after warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load</li> </ul>	0 - 1.0 V
59 (B)	—	Sensor ground (Heated oxygen sensor 2)	—	_	_
63 (R)	64 (G)	Refrigerant pressure sensor	Input	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Both A/C switch and blower fan motor switch: ON (Com- pressor operates)</li> </ul>	1.0 - 4.0 V
64 (G)	—	Sensor ground (Refrigerant pressure sensor)	—	_	_
66 (BR)	68 (G/B)	Battery current sensor	Input	<ul> <li>[Engine is running]</li> <li>Battery: Fully charged*<sup>2</sup></li> <li>Idle speed</li> </ul>	2.6 - 3.5 V
67 (W)	68 (G/B)	Battery temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with battery temperature.
68 (G/B)		Sensor ground (Battery current sensor)		_	
69 (P)	73 (L)	A/F sensor 1 (bank 1)	Input	[Ignition switch: ON]	2.2 V
70 (Y)	76 (B/R)	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine coolant temperature.
73 (L)	128 (B)	A/F sensor 1 (bank 1)	Input	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,000 rpm</li></ul>	1.8 V Output voltage varies with air fuel ratio.

#### < ECU DIAGNOSIS INFORMATION >

# [VQ35DE]

Termin	al No.	Description			Velue	
+		Signal name	Input/ Output	Condition	Value (Approx.)	A
74 (L/Y)	80 (G/B)	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with intake air temperature.	EC
75 (R/Y)	68 (G/B)	Sensor power supply (Battery current sensor)	_	[Ignition switch: ON]	5 V	С
76 (B/R)		Sensor ground (Engine coolant temperature sensor/Engine oil tempera- ture sensor)	_	_	_	D
77 (V)	81 (LG)	A/F sensor 1 (bank 2)	Input	[Ignition switch: ON]	2.2 V	E
78 (G)	76 (B/R)	Engine oil temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with engine oil temperature.	
80 (G/B)	_	Sensor ground (Mass air flow sensor/Intake air temperature sensor)	_	_	_	F
81 (LG)	128 (B)	A/F sensor 1 (bank 2)	Input	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	1.8 V Output voltage varies with air fuel ratio.	G
82	80	Mass air flow sensor	Input	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.2 V	Н
(O)	(G/B)	Mass an now sensor	Input	<ul><li>[Engine is running]</li><li>Warm-up condition</li><li>Engine speed: 2,500 rpm</li></ul>	1.6 - 1.9 V	I
83 (G/W)	88 (B/R)	Sensor power supply [Camshaft position sensor (PHASE) (bank 1)]	_	[Ignition switch: ON]	5 V	J
84 (Y/B)	_	Sensor ground [Crankshaft position sensor (POS)]	_	_	_	K
85 (B)	91 (—)	Knock sensor (bank 1)	Input	[Engine is running] • Idle speed	2.5 V* <sup>1</sup>	L
86 (W)	91 (—)	Knock sensor (bank 2)	Input	[Engine is running] • Idle speed	2.5 V* <sup>1</sup>	
87 (R/W)	92 (Y/G)	Sensor power supply [Camshaft position sensor (PHASE) (bank 2)]	_	[Ignition switch: ON]	5 V	Μ
88 (B/R)	_	Sensor ground [Camshaft position sensor (PHASE) (bank 1)]	_		_	Ν

0

Ρ

#### < ECU DIAGNOSIS INFORMATION >

Termin	al No.	Description			Volue
+		Signal name	Input/ Output	Condition	Value (Approx.)
89	84		Crankshaft position sensor		4.0 - 5.0 V★ 1mSec/div ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
(W/B)	(Y/B)	(POS)	Input -	[Engine is running] • Engine speed: 2,000 rpm	4.0 - 5.0 V★ 1mSec/div = 
91 (—)		Sensor ground (Knock sensor)	_	_	_
92 (Y/G)	_	Sensor ground [Camshaft position sensor (PHASE) (bank 2)]	_	_	_
93 (BR/W)	92 (Y/G)	Camshaft position sensor (PHASE) (bank 2)	Input	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed NOTE: The pulse cycle changes depending on rpm at idle</li> <li>[Engine is running]</li> <li>Engine speed is 2,000 rpm</li> </ul>	3.0 - 5.0 V★ 20mSec/div 2V/div JMBIA0045GB 3.0 - 5.0 V★ 20mSec/div
94 (W/R)	88 (B/R)	Camshaft position sensor (PHASE) (bank 1)	Input	<ul> <li>[Engine is running]</li> <li>Warm-up condition</li> <li>Idle speed</li> <li>NOTE: The pulse cycle changes depending on rpm at idle</li> <li>[Engine is running]</li> <li>Engine speed is 2,000 rpm</li> </ul>	2V/div JMBIA0046GB 3.0 - 5.0 V★ 20mSec/div 2V/div JMBIA0045GB 3.0 - 5.0 V★ 20mSec/div 20mSec/div
					2V/div JMBIA0046GB

#### < ECU DIAGNOSIS INFORMATION >

Terminal No.		Description			Value		
+		Signal name	Input/ Output	Condition	(Approx.)	ŀ	
96 (BR/W)	64 (G)	Sensor power supply (Refrigerant pressure sensor)	_	[Ignition switch: ON]	5 V	E	
97	100	Accelerator pedal position	Input	<ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully released</li></ul>	0.5 - 1.0 V	(	
(W)	(B)	sensor 1	mput	<ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully depressed</li></ul>	4.2 - 4.8 V		
98	116	Accelerator pedal position	Input	<ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully released</li></ul>	0.25 - 0.50 V		
(O)	(G)	sensor 2	mput	<ul><li>[Ignition switch: ON]</li><li>Engine stopped</li><li>Accelerator pedal: Fully depressed</li></ul>	2.0 - 2.5 V		
99 (P)	100 (B)	Sensor power supply (Accelerator pedal position sensor 1)		[Ignition switch: ON]	5 V	(	
100 (B)	-	Sensor ground (Accelerator pedal position sensor 1)		_	_		
		ASCD steering switch		[Ignition switch: ON] • ASCD steering switch: OFF	4 V		
					[Ignition switch: ON] • MAIN switch: Pressed	0 V	
101 (Y)	108 (BR)		ASCD steering switch Input	[Ignition switch: ON] • CANCEL switch: Pressed	1 V		
(1)				[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	3 V		
				[Ignition switch: ON] • SET/COAST switch: Pressed	2 V		
102 (LG)	112 (V)	EVAP control system pres- sure sensor	Input	[Ignition switch: ON]	1.8 - 4.8 V		
103 (GR)	116 (G)	Sensor power supply (Accelerator pedal position sensor 2)	_	[Ignition switch: ON]	5 V		
104 (LG)		Data link connector	Input/ Output	_	_		
106 (V)	128 (B)	EVAP canister vent control valve	Output	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)		
107 (W)	112 (V)	Sensor power supply (EVAP control system pres- sure sensor)	—	[Ignition switch: ON]	5 V		
108 (BR)	_	Sensor ground (ASCD steering switch)	_	_	_		
109 (G)	128 (B)	Ignition switch	Input	[Ignition switch: OFF] [Ignition switch: ON]	0 V BATTERY VOLTAGE (11 - 14 V)		

#### < ECU DIAGNOSIS INFORMATION >

	[VQ35DE]
Value	

Termin	al No.	Description			Value	
+		Signal name	Input/ Output	Condition	(Approx.)	
111 (Y)	120 (SB)	Fuel tank temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with fuel tank temperature.	
112 (V)	_	Sensor ground (EVAP control system pres- sure sensor)	_	_	_	
113 (P)		CAN communication line	Input/ Output	_	_	
114 (L)		CAN communication line	Input/ Output	_	_	
116 (G)	_	Sensor ground (Accelerator pedal position sensor 2)	_	_	_	
118	100			[Ignition switch: ON] • Selector lever: P or N position	BATTERY VOLTAGE (11 - 14 V)	
(R)		Input	<ul><li>[Ignition switch: ON]</li><li>Selector lever: Except above position</li></ul>	0 V		
120 (SB)	_	Sensor ground (Fuel tank temperature sen- sor)	_	_	_	
121 (L)	128 (B)	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)	
122	128			[Ignition switch: OFF] • Brake pedal: Fully released	0 V	
(SB)	(B)	Stop lamp switch	Input	<ul><li>[Ignition switch: OFF]</li><li>Brake pedal: Slightly depressed</li></ul>	BATTERY VOLTAGE (11 - 14 V)	
123 (B) 124 (B)	_	ECM ground	_	_	_	
126 (BR)	128 (B)	ASCD brake switch	Input	<ul><li>[Ignition switch: ON]</li><li>Brake pedal: Slightly depressed</li></ul>	0 V	
				[Ignition switch: ON] • Brake pedal: Fully released	BATTERY VOLTAGE (11 - 14 V)	
127 (B) 128 (B)		ECM ground	_	_	_	

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

\*1: This may vary depending on internal resistance of the tester.

\*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-97. "How to Handle Battery".

### Fail-safe

INFOID:000000009650985

#### NON DTC RELATED ITEM

# [VQ35DE]

Engine operating condi- tion in fail-safe mode	Detected items	Remarks	Reference page	А
Engine speed will not rise more than 2,500 rpm due to the fuel cut	Malfunction indicator lamp circuit	When there is an open circuit on MIL circuit, the ECM cannot warn the driver by illuminating MIL when there is malfunction on engine control system.		EC
		Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating the fail-safe function. The fail-safe function also operates when above diagnoses except MIL circuit are detected and demands the driver to repair the malfunction.	<u>EC-437</u>	С

# DTC RELATED ITEM

DTC No.	Detected items	Engine operating condition in fail-safe mode					
P0011 P0021	Intake valve timing control	The signal is not energized to the intake valve timing control solenoid valve and the valve control does not function.					
P0101 P0102 P0103	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.					
P0117 P0118	Engine coolant tempera- ture sensor circuit	Engine coolant temperature will be determined by ECM based on the following CONSULT displays the engine coolant temperature decided by ECM.					
		Condition	Engine coolant temperature decided (CONSULT display)				
		Just as ignition switch is turned ON or START	40°C (104°F)				
		Approx 4 minutes or more after en- gine starting	80°C (176°F)				
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)				
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.					
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. Therefore, the acceleration will be poor.					
P0196 P0197 P0198	Engine oil temperature sensor	Intake valve timing control does no	function.				
P0500	Vehicle speed sensor	The cooling fan operates (Highest)	while engine is running.				
P0605	ECM	(When ECM calculation function is ECM stops the electric throttle cont fixed opening (approx. 5 degrees) b ECM deactivates ASCD operation.	rol actuator control, throttle valve is maintained at a				
P0643	Sensor power supply	ECM stops the electric throttle cont fixed opening (approx. 5 degrees) b	rol actuator control, throttle valve is maintained at a by the return spring.				
P1805	Brake switch	ECM controls the electric throttle co small range. Therefore, acceleration will be poor	ontrol actuator by regulating the throttle opening to a				
		Vehicle condition	Driving condition				
		When engine is idling	Normal				
		When accelerating	Poor acceleration				
P2100 P2103	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.					

DTC No.	Detected items	Engine operating condition in fail-safe mode
P2101	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P2118	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P2119	Electric throttle control ac- tuator	(When electric throttle control actuator does not function properly due to the return spring malfunction:) ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
		(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
		(When ECM detects the throttle valve is stuck open:) While the vehicle is being driven, it slows down gradually because of fuel cut. After the vehicle stops, the engine stalls. The engine can restart in the N or P position, and engine speed will not exceed 1,000 rpm or more.
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. Therefore, the acceleration will be poor.

# DTC Inspection Priority Chart

INFOID:000000009650986

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

#### < ECU DIAGNOSIS INFORMATION >

Priority	Detected items (DTC)	
1	<ul> <li>U0100 U0101 U1001 CAN communication line</li> <li>P0101 P0102 P0103 Mass air flow sensor</li> </ul>	-
	<ul> <li>P0111 P0112 P0113 P0127 Intake air temperature sensor</li> <li>P0116 P0117 P0118 P0125 Engine coolant temperature sensor</li> </ul>	E
	<ul> <li>P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor</li> <li>P0128 Thermostat function</li> </ul>	
	<ul> <li>P0181 P0182 P0183 Fuel tank temperature sensor</li> <li>P0196 P0197 P0198 Engine oil temperature sensor</li> <li>P0007 P0000 P0000 P00000 Knock sensor</li> </ul>	(
	<ul> <li>P0327 P0328 P0332 P0333 Knock sensor</li> <li>P0335 Crankshaft position sensor (POS)</li> <li>P0340 P0345 Camshaft position sensor (PHASE)</li> </ul>	
	<ul> <li>P0460 P0461 P0462 P0463 Fuel level sensor</li> <li>P0500 Vehicle speed sensor</li> </ul>	
	<ul><li>P0605 P0607 ECM</li><li>P0643 Sensor power supply</li></ul>	
	<ul> <li>P0705 Transmission range switch</li> <li>P0850 Park/Neutral position (PNP) switch</li> </ul>	
	<ul> <li>P1550 P1551 P1552 P1553 P1554 Battery current sensor</li> <li>P1556 P1557 Battery temperature sensor</li> <li>P1610 P1615 NATE</li> </ul>	
	<ul> <li>P1610 - P1615 NATS</li> <li>P1650 Starter motor relay 2</li> <li>P1651 Starter motor relay</li> </ul>	
	<ul> <li>P1652 Starter motor communication line</li> <li>P1700 CVT control system</li> </ul>	
2	<ul> <li>P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor</li> <li>P0031 P0032 P0051 P0052 Air fuel ratio (A/F) sensor 1 heater</li> </ul>	-
-	<ul> <li>P0037 P0038 P0057 P0058 Heated oxygen sensor 2 heater</li> <li>P0075 P0081 Intake valve timing control solenoid valve</li> </ul>	
	<ul> <li>P0130 P0131 P0132 P014C P014D P014E P014F P0150 P0151 P0152 P2096 P2097 P2098 P2099 Air fuel ratio (A/F) sensor 1</li> </ul>	
	<ul> <li>P0137 P0138 P0139 P0157 P0158 P0159 Heated oxygen sensor 2</li> <li>P0441 EVAP control system purge flow monitoring</li> <li>P0442 P0444 P0445 EVAP conjugation purge volume control colonaid volume</li> </ul>	
	<ul> <li>P0443 P0444 P0445 EVAP canister purge volume control solenoid valve</li> <li>P0447 P0448 EVAP canister vent control valve</li> <li>P0451 P0452 P0453 EVAP control system pressure sensor</li> </ul>	
	<ul> <li>P0603 ECM power supply</li> <li>P0710 P0715 P0720 P0740 P0744 P0745 P0746 P0776 P0778 P0840 P0845 P1740 CVT related sensors, solenoid valves</li> </ul>	
	<ul><li>and switches</li><li>P1217 Engine over temperature (OVERHEAT)</li></ul>	
	<ul> <li>P1777 P1778 CVT step motor</li> <li>P1800 P1801 VIAS control solenoid valve</li> </ul>	
	<ul> <li>P1805 Brake switch</li> <li>P2100 P2103 Throttle control motor relay</li> <li>P2101 Electric throttle control function</li> </ul>	
-	P2118 Throttle control motor	-
3	<ul> <li>P0011 P0021 Intake valve timing control</li> <li>P0171 P0172 P0174 P0175 Fuel injection system function</li> <li>P0300 - P0306 Misfire</li> </ul>	
	<ul> <li>P0420 P0430 Three way catalyst function</li> <li>P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK)</li> </ul>	
	<ul> <li>P0506 P0507 Idle speed control system</li> <li>P050A P050E Cold start control</li> </ul>	
	<ul> <li>P1148 P1168 Closed loop control</li> <li>P1212 TCS communication line</li> </ul>	
	<ul> <li>P1564 ASCD steering switch</li> <li>P1572 ASCD brake switch</li> </ul>	
	<ul> <li>P1574 ASCD vehicle speed sensor</li> <li>P1715 Primary speed sensor</li> </ul>	

ECM

# < ECU DIAGNOSIS INFORMATION >

# DTC Index

[VQ35DE]

INFOID:000000009650987

×:Applicable —: Not applicable

						••	
	°C*1	Items	SRT			Permanent	Refer-
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	(CONSULT screen terms)	code	Trip	MIL	DTC group <sup>*4</sup>	ence page
U0100	0100 <sup>*5</sup>	LOST COMM (ECM A)		1	×	В	<u>TM-48</u>
U0101	0101 <sup>*5</sup>	LOST COMM (ECM) —		1	×	В	<u>EC-167</u>
U1001	1001 <sup>*5</sup>	CAN COMM CIRCUIT		2			<u>EC-168</u>
P0000	0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	_	_	Blinking <sup>*8</sup>	_	_
P0011	0011	INT/V TIM CONT-B1	×	2	×	В	EC-169
P0021	0021	INT/V TIM CONT-B2	×	2	×	В	EC-169
P0031	0031	A/F SEN1 HTR (B1)		2	×	В	EC-172
P0032	0032	A/F SEN1 HTR (B1)	_	2	×	В	EC-172
P0037	0037	HO2S2 HTR (B1)	_	2	×	В	<u>EC-174</u>
P0038	0038	HO2S2 HTR (B1)		2	×	В	<u>EC-174</u>
P0051	0051	A/F SEN1 HTR (B2)		2	×	В	<u>EC-172</u>
P0052	0052	A/F SEN1 HTR (B2)		2	×	В	EC-172
P0057	0057	HO2S2 HTR (B2)		2	×	В	<u>EC-174</u>
P0058	0058	HO2S2 HTR (B2)		2	×	В	<u>EC-174</u>
P0075	0075	INT/V TIM V/CIR-B1		2	×	В	<u>EC-177</u>
P0081	0081	INT/V TIM V/CIR-B2		2	×	В	<u>EC-177</u>
P0101	0101	MAF SEN/CIRCUIT-B1		2	×	В	<u>EC-179</u>
P0102	0102	MAF SEN/CIRCUIT-B1	_	1	×	В	<u>EC-184</u>
P0103	0103	MAF SEN/CIRCUIT-B1		1	×	В	<u>EC-184</u>
P0111	0111	IAT SENSOR 1 B1		2	×	A	<u>EC-189</u>
P0112	0112	IAT SEN/CIRCUIT-B1	_	2	×	В	<u>EC-191</u>
P0113	0113	IAT SEN/CIRCUIT-B1	_	2	×	В	<u>EC-191</u>
P0116	0116	ECT SEN/CIRC	_	2	×	A	EC-193
P0117	0117	ECT SEN/CIRC		1	×	В	<u>EC-195</u>
P0118	0118	ECT SEN/CIRC	_	1	×	В	<u>EC-195</u>
P0122	0122	TP SEN 2/CIRC-B1		1	×	В	<u>EC-197</u>
P0123	0123	TP SEN 2/CIRC-B1		1	×	В	<u>EC-197</u>
P0125	0125	ECT SENSOR		2	×	В	<u>EC-199</u>
P0127	0127	IAT SENSOR-B1		2	×	В	<u>EC-201</u>
P0128	0128	THERMSTAT FNCTN		2	×	A	<u>EC-203</u>
P0130	0130	A/F SENSOR1 (B1)	_	2	×	A	<u>EC-206</u>
P0131	0131	A/F SENSOR1 (B1)		2	×	В	<u>EC-210</u>
P0132	0132	A/F SENSOR1 (B1)	_	2	×	В	EC-213
P0137	0137	HO2S2 (B1)	×	2	×	A	<u>EC-216</u>
P0138	0138	HO2S2 (B1)	×	2	×	A	EC-222
P0139	0139	HO2S2 (B1)	×	2	×	A	<u>EC-229</u>
P014C	014C	A/F SENSOR1 (B1)	×	2	×	A	EC-235
P014D	014D	A/F SENSOR1 (B1)	×	2	×	А	EC-235
	1	1	1	1	1	1	

#### < ECU DIAGNOSIS INFORMATION >

DT	C <sup>*1</sup>	16	ODT			Permanent	Defer	А
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	<ul> <li>Items</li> <li>(CONSULT screen terms)</li> </ul>	SRT code	Trip	MIL	DTC group <sup>*4</sup>	Refer- ence page	A
P014E	014E	A/F SENSOR1 (B2)	×	2	×	А	<u>EC-235</u>	EC
P014F	014F	A/F SENSOR1 (B2)	×	2	×	А	EC-235	
P0150	0150	A/F SENSOR1 (B2)	—	2	×	А	<u>EC-206</u>	
P0151	0151	A/F SENSOR1 (B2)	—	2	×	В	EC-210	С
P0152	0152	A/F SENSOR1 (B2)	_	2	×	В	EC-213	
P0157	0157	HO2S2 (B2)	×	2	×	А	EC-216	D
P0158	0158	HO2S2 (B2)	×	2	×	А	EC-222	
P0159	0159	HO2S2 (B2)	×	2	×	А	<u>EC-229</u>	
P015A	015A	A/F SENSOR1 (B1)	×	2	×	А	<u>EC-235</u>	Е
P015B	015B	A/F SENSOR1 (B1)	×	2	×	А	<u>EC-235</u>	
P015C	015C	A/F SENSOR1 (B2)	×	2	×	А	<u>EC-235</u>	F
P015D	015D	A/F SENSOR1 (B2)	×	2	×	А	EC-235	
P0171	0171	FUEL SYS-LEAN-B1	—	2	×	В	<u>EC-241</u>	
P0172	0172	FUEL SYS-RICH-B1	—	2	×	В	<u>EC-245</u>	G
P0174	0174	FUEL SYS-LEAN-B2	—	2	×	В	<u>EC-241</u>	
P0175	0175	FUEL SYS-RICH-B2	—	2	×	В	<u>EC-245</u>	ш
P0181	0181	FTT SENSOR	—	2	×	A and B	<u>EC-28</u>	Н
P0182	0182	FTT SEN/CIRCUIT	—	2	×	В	<u>EC-253</u>	
P0183	0183	FTT SEN/CIRCUIT	—	2	×	В	<u>EC-253</u>	
P0196	0196	EOT SENSOR	—	2	×	A and B	<u>EC-255</u>	
P0197	0197	EOT SEN/CIRC	—	2	×	В	<u>EC-259</u>	
P0198	0198	EOT SEN/CIRC	—	2	×	В	<u>EC-259</u>	J
P0222	0222	TP SEN 1/CIRC-B1	—	1	×	В	<u>EC-261</u>	
P0223	0223	TP SEN 1/CIRC-B1	—	1	×	В	<u>EC-261</u>	К
P0300	0300	MULTI CYL MISFIRE	—	1 or 2	×	В	EC-263	
P0301	0301	CYL 1 MISFIRE	—	1 or 2	×	В	<u>EC-263</u>	
P0302	0302	CYL 2 MISFIRE	—	1 or 2	×	В	EC-263	
P0303	0303	CYL 3 MISFIRE	—	1 or 2	×	В	EC-263	
P0304	0304	CYL 4 MISFIRE	_	1 or 2	×	В	<u>EC-263</u>	M
P0305	0305	CYL 5 MISFIRE	_	1 or 2	×	В	<u>EC-263</u>	
P0306	0306	CYL 6 MISFIRE	_	1 or 2	×	В	<u>EC-263</u>	
P0327	0327	KNOCK SEN/CIRC-B1		2		_	<u>EC-269</u>	Ν
P0328	0328	KNOCK SEN/CIRC-B1	—	2	—	—	<u>EC-269</u>	
P0332	0332	KNOCK SEN/CIRC-B2	_	2	_	_	<u>EC-269</u>	0
P0333	0333	KNOCK SEN/CIRC-B2		2		_	<u>EC-269</u>	0
P0335	0335	CKP SEN/CIRCUIT	—	2	×	В	<u>EC-271</u>	
P0340	0340	CMP SEN/CIRC-B1	_	2	×	В	<u>EC-274</u>	Ρ
P0345	0345	CMP SEN/CIRC-B2		2	×	В	<u>EC-274</u>	
P0420	0420	TW CATALYST SYS-B1	×	2	×	А	<u>EC-277</u>	
P0430	0430	TW CATALYST SYS-B2	×	2	×	А	<u>EC-277</u>	
P0441	0441	EVAP PURG FLOW/MON	×	2	×	А	<u>EC-282</u>	
P0443	0443	PURG VOLUME CONT/V	—	2	×	A	<u>EC-26</u>	

#### < ECU DIAGNOSIS INFORMATION >

DTC	C <sup>*1</sup>		0.0.7			Dermanant	Defer
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	Items (CONSULT screen terms)	SRT code	Trip	MIL	Permanent DTC group <sup>*4</sup>	Refer- ence page
P0444	0444	PURG VOLUME CONT/V	_	2	×	В	EC-292
P0445	0445	PURG VOLUME CONT/V	_	2	×	В	EC-292
P0447	0447	VENT CONTROL VALVE	_	2	×	В	<u>EC-26</u>
P0448	0448	VENT CONTROL VALVE	_	2	×	В	<u>EC-299</u>
P0451	0451	EVAP SYS PRES SEN	_	2	×	А	<u>EC-26</u>
P0452	0452	EVAP SYS PRES SEN	_	2	×	В	EC-306
P0453	0453	EVAP SYS PRES SEN	—	2	×	В	EC-310
P0456	0456	EVAP VERY SML LEAK	×*7	2	×	А	EC-315
P0460	0460	FUEL LEV SEN SLOSH	_	2	×	A	<u>EC-321</u>
P0461	0461	FUEL LEVEL SENSOR	_	2	×	В	EC-322
P0462	0462	FUEL LEVL SEN/CIRC	_	2	×	В	<u>EC-324</u>
P0463	0463	FUEL LEVL SEN/CIRC	_	2	×	В	EC-324
P0500	0500	VEH SPEED SEN/CIRC*6	_	2	×	В	EC-325
P0506	0506	ISC SYSTEM	_	2	×	В	EC-327
P0507	0507	ISC SYSTEM	_	2	×	В	<u>EC-329</u>
P050A	050A	COLD START CONTROL	_	2	×	A	EC-331
P050E	050E	COLD START CONTROL	_	2	×	A	EC-331
P0603	0603	ECM BACK UP/CIRCUIT	_	2	× or —	В	EC-333
P0605	0605	ECM	_	1 or 2	× or —	В	<u>EC-335</u>
P0607	0607	ECM	_	1	×	В	EC-336
P0643	0643	SENSOR POWER/CIRC	_	1	×	В	EC-337
P0705	0705	T/M RANGE SENSOR A	_	2	×	В	<u>TM-80</u>
P0710	0710	FLUID TEMP SENSOR A <sup>*9</sup>	_	1	×	В	<u>TM-83</u>
P0715	0715	INPUT SPEED SENSOR A	_	2	×	В	TM-86
P0720	0720	OUTPUT SPEED SEN- SOR <sup>*6</sup>	_	2	×	В	<u>TM-88</u>
P0740	0740	TORQUE CONVERTER	_	2	×	В	<u>TM-92</u>
P0744	0744	TORQUE CONVERTER	_	2	×	В	<u>TM-94</u>
P0745	0745	PC SOLENOID A	_	2	×	В	<u>TM-96</u>
P0746	0746	PC SOLENOID A	_	1	×	В	<u>TM-98</u>
P0776	0776	PC SOLENOID B	_	2	×	В	<u>TM-100</u>
P0778	0778	PC SOLENOID B	_	2	×	В	<u>TM-102</u>
P0840	0840	FLUID PRESS SEN/SW A	_	2	×	В	<u>TM-104</u>
P0845	0845	FLUID PRESS SEN/SW B	_	2	×	В	<u>TM-109</u>
P0850	0850	P-N POS SW/CIRCUIT	_	2	×	В	EC-339
P1148	1148	CLOSED LOOP-B1	—	1	×	А	EC-342
P1168	1168	CLOSED LOOP-B2	—	1	×	А	EC-342
P1212	1212	TCS/CIRC	_	2	—	—	<u>EC-343</u>
P1217	1217	ENG OVER TEMP	—	1	×	В	<u>EC-344</u>
P1225	1225	CTP LEARNING-B1	_	2	—	—	<u>EC-348</u>
P1226	1226	CTP LEARNING-B1		2			<u>EC-349</u>
P1550	1550	BAT CURRENT SENSOR	_	2	_	_	<u>EC-350</u>

#### < ECU DIAGNOSIS INFORMATION >

#### [VQ35DE]

DTC	C*1	Items	SRT			Permanent	Refer-	
CONSULT GST <sup>*2</sup>	ECM <sup>*3</sup>	(CONSULT screen terms)	code	Trip	MIL	DTC group <sup>*4</sup>	ence page	
P1551	1551	BAT CURRENT SENSOR		2	_	—	EC-352	E
P1552	1552	BAT CURRENT SENSOR		2		—	EC-352	
P1553	1553	BAT CURRENT SENSOR		2	—	—	<u>EC-354</u>	
P1554	1554	BAT CURRENT SENSOR		2	_	—	EC-356	-
P1556	1556	BAT TMP SEN/CIRC		2		_	<u>EC-359</u>	
P1557	1557	BAT TMP SEN/CIRC		2		—	EC-359	-
P1564	1564	ASCD SW		1	_	—	EC-362	
P1572	1572	ASCD BRAKE SW		1		—	<u>EC-365</u>	
P1574	1574	ASCD VHL SPD SEN	_	1	_	_	<u>EC-372</u>	
P1610	1610	LOCK MODE		2	_	_	<u>SEC-60</u>	
P1611	1611	ID DISCORD, IMM-ECM		2	_	_	<u>SEC-61</u>	
P1612	1612	CHAIN OF ECM-IMMU	_	2	_	_	<u>SEC-62</u>	
P1650	1650	STR MTR RELAY2	_	2	× or —	В	EC-374	
P1651	1651	STR MTR RELAY	_	2	×	В	EC-377	
P1652	1652	STR MTR SYS COMM	_	1	×	В	EC-379	
P1700	1700	CVT C/U FUNCT		1		_	EC-381	
P1715	1715	IN PULY SPEED		2		_	EC-382	
P1740	1740	SLCT SOLENOID	_	2	×	В	TM-123	
P1777	1777	STEP MOTOR		1	×	В	TM-125	
P1778	1778	STEP MOTOR		2	×	В	TM-128	
P1800	1800	VIAS S/V-1		2		_	EC-383	
P1801	1801	VIAS S/V-2		2		_	EC-24	
P1805	1805	BRAKE SW/CIRCUIT		2			EC-387	
P2096	2096	A/F SENSOR1 (B1)		2	×	А	EC-391	
P2097	2097	A/F SENSOR1 (B1)		2	×	А	EC-391	
P2098	2098	A/F SENSOR1 (B2)		2	×	А	EC-391	
P2099	2099	A/F SENSOR1 (B2)		2	×	А	EC-391	
P2100	2100	ETC MOT PWR-B1		1	×	В	EC-395	
P2101	2101	ETC FNCTN/CIRC-B1		1	×	В	EC-397	
P2103	2103	ETC MOT PWR		1	×	В	EC-395	
P2118	2118	ETC MOT-B1		1	×	В	EC-400	
P2119	2119	ETC ACTR-B1		1	×	В	EC-402	
P2122	2122	APP SEN 1/CIRC		1	×	В	EC-404	
P2123	2123	APP SEN 1/CIRC		1	×	В	EC-404	
P2127	2127	APP SEN 2/CIRC		1	×	В	EC-406	
P2128	2128	APP SEN 2/CIRC		1	×	В	EC-406	
P2135	2135	TP SENSOR-B1		1	×	В	EC-409	
P2138	2138	APP SENSOR		1	×	В	EC-411	

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

\*2: This number is prescribed by SAE J2012/ISO 15031-6.

\*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.

\*4: Refer to EC-149, "Description", "HOW TO ERASE PERMANENT DTC".

\*5: The troubleshooting for this DTC needs CONSULT.

#### < ECU DIAGNOSIS INFORMATION >

\*7: SRT code will not be set if the self-diagnostic result is NG.

\*8: When the ECM is in the mode displays SRT status, MIL may blink. For the details, refer to "How to Display SRT Status".

\*9: When erasing this DTC, always use CONSULT or GST.

# Test Value and Test Limit

INFOID:000000009888143

[VQ35DE]

The following is the information specified in Service \$06 of SAE J1979/ISO 15031-5.

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.

These data (test value and test limit) are specified by On Board Monitor ID (OBDMID), Test ID (TID), Unit and Scaling ID and can be displayed on the GST screen.

The items of the test value and test limit will be displayed with GST screen which items are provided by the ECM. (e.g., if bank 2 is not applied on this vehicle, only the items of bank 1 are displayed)

# < ECU DIAGNOSIS INFORMATION >

# [VQ35DE]

	OBD-		570	lii	e and Test mit display)											
ltem	MID	Self-diagnostic test item	DTC	TID	Unitand Scaling ID	Description										
												P0131	83H	0BH	Minimum sensor output voltage for test cycle	
			P0131 84H 0BH	Maximum sensor output voltage for test cycle												
			P0130	85H	0BH	Minimum sensor output voltage for test cycle										
			P0130	86H	0BH	Maximum sensor output voltage for test cycle										
			P0133	87H	04H	Response rate: Response ratio (lean to rich)										
			P0133	88H	04H	Response rate: Response ratio (rich to lean)										
					P2A00 or P2096	89H	84H	The amount of shift in air fuel ratio (too lean)								
																P2A00 or P2097
			P0130	8BH	0BH	Difference in sensor output voltage										
		1H Air fuel ratio (A/F) sensor 1 (Bank 1)		P0133	8CH	83H	Response gain at the limited frequency									
HO2S	01H		P014C	8DH	04H	O2 sensor slow response - Rich to lean bank 1 sensor 1										
			P014C	8EH	04H	O2 sensor slow response - Rich to lean bank 1 sensor 1										
			P014D	8FH	84H	O2 sensor slow response - Lean to rich bank 1 sensor 1										
				O2 sensor slow response - Lean to rich bank 1 sensor 1												
			P015A	91H	01H	O2 sensor delayed response - Rich to lean bank 1 sensor 1										
			P015A	92H	01H	O2 sensor delayed response - Rich to lean bank 1 sensor 1										
			P015B	93H	01H	O2 sensor delayed response - Lean to rich bank 1 sensor 1										
			P015B	94H	01H	O2 sensor delayed response - Lean to rich bank 1 sensor 1										
			P0133	95H	04H	Response rate: Response ratio (lean to rich)										
			P0133	96H	84H	Response rate: Response ratio (rich to lean)										

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# < ECU DIAGNOSIS INFORMATION >

					e and Test	
	OBD-				mit display)	<b>-</b>
Item	MID	Self-diagnostic test item	DTC	TID	Unitand Scaling ID	Description
			P0138	07H	0CH	Minimum sensor output voltage for test cycle
		Heated oxygen sensor 2	P0137	08H	0CH	Maximum sensor output voltage for test cycle
	02H	(Bank 1)	P0138	80H	0CH	Sensor output voltage
			P0139	81H	0CH	Difference in sensor output voltage
			P0139	82H	11H	Rear O2 sensor delay response diag- nosis
			P0143	07H	0CH	Minimum sensor output voltage for test cycle
	03H	Heated oxygen sensor 3 (Bank 1)	P0144	08H	0CH	Maximum sensor output voltage for test cycle
			P0146	80H	0CH	Sensor output voltage
			P0145	81H	0CH	Difference in sensor output voltage
			P0151	83H	0BH	Minimum sensor output voltage for test cycle
			P0151	84H	0BH	Maximum sensor output voltage for test cycle
			P0150	85H	0BH	Minimum sensor output voltage for test cycle
			P0150	86H	0BH	Maximum sensor output voltage for test cycle
HO2S			P0153	87H	04H	Response rate: Response ratio (lean to rich)
			P0153	88H	04H	Response rate: Response ratio (rich to lean)
			P2A03 or P2098	89H	84H	The amount of shift in air fuel ratio (too lean)
		Air fuel ratio (A/F) sensor 1	P2A03 or P2099	8AH	84H	The amount of shift in air fuel ratio (too rich)
	05H	(Bank 2)	P0150	8BH	0BH	Difference in sensor output voltage
			P0153	8CH	83H	Response gain at the limited frequency
			P014E	8DH	04H	O2 sensor slow response - Rich to lean bank 2 sensor 1
			P014E	8EH	04H	O2 sensor slow response - Rich to lean bank 2 sensor 1
			P014F	8FH	84H	O2 sensor slow response - Lean to rich bank 2 sensor 1
			P014F	90H	84H	O2 sensor slow response - Lean to rich bank 2 sensor 1
			P015C	91H	01H	O2 sensor delayed response - Rich to lean bank 2 sensor 1
			P015C	92H	01H	O2 sensor delayed response - Rich to lean bank 2 sensor 1
			P015D	93H	01H	O2 sensor delayed response - Lean to rich bank 2 sensor 1

# < ECU DIAGNOSIS INFORMATION >

	OBD-			li	e and Test mit display)	
Item	MID	Self-diagnostic test item	DTC	TID	Unitand Scaling ID	Description
			P015D	94H	01H	O2 sensor delayed response - Lean to rich bank 2 sensor 1
	05H	Air fuel ratio (A/F) sensor 1 (Bank 2)	P0153	95H	04H	Response rate: Response ratio (lean to rich)
			P0153	96H	84H	Response rate: Response ratio (rich to lean)
			P0158	07H	0CH	Minimum sensor output voltage for test cycle
		Heated oxygen sensor 2	P0157	08H	0CH	Maximum sensor output voltage for test cycle
HO2S	06H	(Bank 2)	P0158	80H	0CH	Sensor output voltage
			P0159	81H	0CH	Difference in sensor output voltage
			P0159	82H	11H	Rear O2 sensor delay response diag- nosis
			P0163	07H	0CH	Minimum sensor output voltage for test cycle
	07H	Heated oxygen sensor 3 (Bank2)	P0164	08H	0CH	Maximum sensor output voltage for test cycle
				P0166	80H	0CH
			P0165	81H	0CH	Difference in sensor output voltage
	21H		P0420	80H	01H	O2 storage index
		1H Three way catalyst function (Bank1)	P0420	82H	01H	Switching time lag engine exhaust in- dex value
			P2423	83H	0CH	Difference in 3rd O2 sensor output voltage
CATA-			P2423	84H	84H	O2 storage index in HC trap catalyst
LYST			P0430	80H	01H	O2 storage index
	22H	Three way catalyst function	P0430	82H	01H	Switching time lag engine exhaust in- dex value
		(Bank2)	P2424	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2424	84H	84H	O2 storage index in HC trap catalyst
			P0400	80H	96H	Low flow faults: EGR temp change rate (short term)
			P0400	81H	96H	Low flow faults: EGR temp change rate (long term)
EGR SYSTEM	31H	H EGR function	P0400	82H	96H	Low flow faults: Difference between max EGR temp and EGR temp under idling condition
			P0400	83H	96H	Low flow faults: Max EGR temp
			P1402	84H	96H	High Flow Faults: EGR temp increase rate

# < ECU DIAGNOSIS INFORMATION >

					e and Test mit			
lto ro	OBD-	Colf diagnostic test item	DTO		display)	Description		
ltem	MID	Self-diagnostic test item	DTC	TID	Unitand Scaling ID	Description		
			P0011	80H	9DH	VTC intake function diagnosis (VTC alignment check diagnosis)		
			P0014	81H	9DH	VTC exhaust function diagnosis (VTC alignment check diagnosis)		
			P0011	82H	9DH	VTC intake function diagnosis (VTC drive failure diagnosis)		
	35H	VVT Monitor (Bank1)	P0014	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)		
	0011		P100A	84H	10H	VEL slow response diagnosis		
			P1090	85H	10H	VEL servo system diagnosis		
			P0011	86H	9DH	VTC intake intermediate lock function diagnosis (VTC intermediate position alignment check diagnosis)		
VVT			Advanced: P052A Retarded: P052B	87H	9DH	VTC intake intermediate lock system diagnosis (VTC intermediate lock posi- tion check diagnosis)		
SYSTEM		VVT Monitor (Bank2)	P0021	80H	9DH	VTC intake function diagnosis (VTC alignment check diagnosis)		
			P0024	81H	9DH	VTC exhaust function diagnosis (VTC alignment check diagnosis)		
			P0021	82H	9DH	VTC intake function diagnosis (VTC drive failure diagnosis)		
	36H		P0024	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)		
	0011		P100B	84H	10H	VEL slow response diagnosis		
			P1093	85H	10H	VEL servo system diagnosis		
			P0021	86H	9DH	VTC intake intermediate lock function diagnosis (VTC intermediate position alignment check diagnosis)		
			Advanced: P052C Retarded: P052D	87H	9DH	VTC intake intermediate lock system diagnosis (VTC intermediate lock posi- tion check diagnosis)		
	39H	EVAP control system leak (Cap Off)	P0455	80H	0CH	Difference in pressure sensor output voltage before and after pull down		
	3BH	EVAP control system leak (Small leak)	P0442	80H	05H	Leak area index (for more than 0.04 inch)		
EVAP			P0456	80H	05H	Leak area index (for more than 0.02 inch)		
SYSTEM	3CH	EVAP control system leak (Very small leak)	P0456	81H	FDH	Maximum internal pressure of EVAP system during monitoring		
			P0456	82H	FDH	Internal pressure of EVAP system at the end of monitoring		
	3DH	Purge flow system	P0441	83H	0CH	Difference in pressure sensor output voltage before and after vent control valve close		

### < ECU DIAGNOSIS INFORMATION >

## [VQ35DE]

	OBD- MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		
Item				TID	Unitand Scaling ID	Description
O2 SEN- SOR HEATER	41H	A/F sensor 1 heater (Bank 1)	Low Input: P0031 High Input: P0032	81H	0BH	Converted value of heater electric cur- rent to voltage
	42H	Heated oxygen sensor 2 heat- er (Bank 1)	Low Input: P0037 High Input: P0038	80H	0CH	Converted value of heater electric cur- rent to voltage
	43H	Heated oxygen sensor 3 heat- er (Bank 1)	P0043	80H	0CH	Converted value of heater electric cur- rent to voltage
	45H	A/F sensor 1 heater (Bank 2)	Low Input: P0051 High Input: P0052	81H	0BH	Converted value of heater electric cur- rent to voltage
	46H	Heated oxygen sensor 2 heat- er (Bank 2)	Low Input: P0057 High Input: P0058	80H	0CH	Converted value of heater electric cur- rent to voltage
	47H	Heated oxygen sensor 3 heat- er (Bank 2)	P0063	80H	0CH	Converted value of heater electric cur- rent to voltage
SEC- OND- ARY AIR	71H	Secondary air system	P0411	80H	01H	Secondary air injection system incor- rect flow detected
			Bank1: P0491 Bank2: P0492	81H	01H	Secondary air injection system insuffi- cient flow
			P2445	82H	01H	Secondary air injection system pump stuck off
			P2448	83H	01H	Secondary air injection system high airflow
			Bank1: P2440 Bank2: P2442	84H	01H	Secondary air injection system switch- ing valve stuck open
			P2440	85H	01H	Secondary air injection system switch- ing valve stuck open
			P2444	86H	01H	Secondary air injection system pump stuck on
FUEL SYSTEM	81H	Fuel injection system function (Bank 1)	P0171 or P0172	80H	2FH	Long term fuel trim
			P0171 or P0172	81H	24H	The number of lambda control clamped
			P117A	82H	03H	Cylinder A/F imbalance monitoring
	82H	Fuel injection system function (Bank 2)	P0174 or P0175	80H	2FH	Long term fuel trim
			P0174 or P0175	81H	24H	The number of lambda control clamped
			P117B	82H	03H	Cylinder A/F imbalance monitoring

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### < ECU DIAGNOSIS INFORMATION >

Item	OBD- MID	Self-diagnostic test item	DTC	lir	e and Test mit display) Unitand	Description
				TID	Scaling ID	
			P0301	80H	24H	Misfiring counter at 1000 revolution of the first cylinder
			P0302	81H	24H	Misfiring counter at 1000 revolution of the second cylinder
			P0303	82H	24H	Misfiring counter at 1000 revolution of the third cylinder
			P0304	83H	24H	Misfiring counter at 1000 revolution of the fourth cylinder
			P0305	84H	24H	Misfiring counter at 1000 revolution of the fifth cylinder
			P0306	85H	24H	Misfiring counter at 1000 revolution of the sixth cylinder
			P0307	86H	24H	Misfiring counter at 1000 revolution of the seventh cylinder
			P0308	87H	24H	Misfiring counter at 1000 revolution of the eighth cylinder
			P0300	88H	24H	Misfiring counter at 1000 revolution of the multiple cylinders
MISSIDE			P0301	89H	24H	Misfiring counter at 200 revolution of the first cylinder
MISFIRE	A1H	Multiple cylinder misfires	P0302	8AH	24H	Misfiring counter at 200 revolution of the second cylinder
			P0303	8BH	24H	Misfiring counter at 200 revolution of the third cylinder
			P0304	8CH	24H	Misfiring counter at 200 revolution of the fourth cylinder
			P0305	8DH	24H	Misfiring counter at 200 revolution of the fifth cylinder
			P0306	8EH	24H	Misfiring counter at 200 revolution of the sixth cylinder
			P0307	8FH	24H	Misfiring counter at 200 revolution of the seventh cylinder
			P0308	90H	24H	Misfiring counter at 200 revolution of the eighth cylinder
			P0300	91H	24H	Misfiring counter at 1000 revolution of the single cylinder
			P0300	92H	24H	Misfiring counter at 200 revolution of the single cylinder
			P0300	93H	24H	Misfiring counter at 200 revolution of the multiple cylinders

# < ECU DIAGNOSIS INFORMATION >

## [VQ35DE]

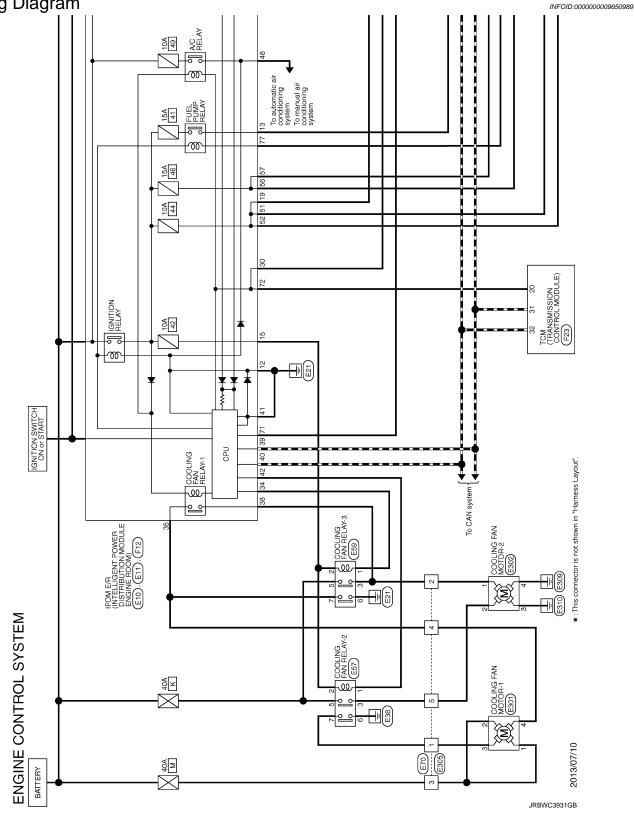
	OBD- MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
ltem						
				TID	Unitand Scaling ID	Description
MISFIRE	A2H	No. 1 cylinder misfire	P0301	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driv- ing cycles
			P0301	0CH	24H	Misfire counts for last/current driving cycles
	A3H	No. 2 cylinder misfire	P0302	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driv- ing cycles
			P0302	0CH	24H	Misfire counts for last/current driving cycles
	A4H	No. 3 cylinder misfire	P0303	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driv- ing cycles
			P0303	0CH	24H	Misfire counts for last/current driving cycles
	A5H	No. 4 cylinder misfire	P0304	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driv- ing cycles
			P0304	0CH	24H	Misfire counts for last/current driving cycles
	A6H	No. 5 cylinder misfire	P0305	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driv- ing cycles
			P0305	0CH	24H	Misfire counts for last/current driving cycles
	A7H	No. 6 cylinder misfire	P0306	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driv- ing cycles
			P0306	0CH	24H	Misfire counts for last/current driving cycles
	A8H	No. 7 cylinder misfire	P0307	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driv- ing cycles
			P0307	0CH	24H	Misfire counts for last/current driving cycles
	A9H	No. 8 cylinder misfire	P0308	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driv- ing cycles
			P0308	0CH	24H	Misfire counts for last/current driving cycles

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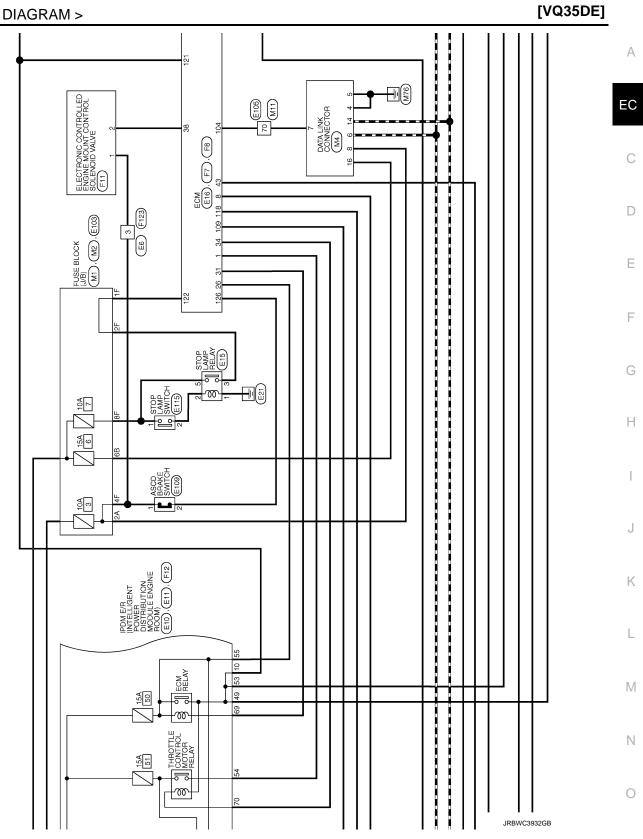
# WIRING DIAGRAM ENGINE CONTROL SYSTEM

Wiring Diagram



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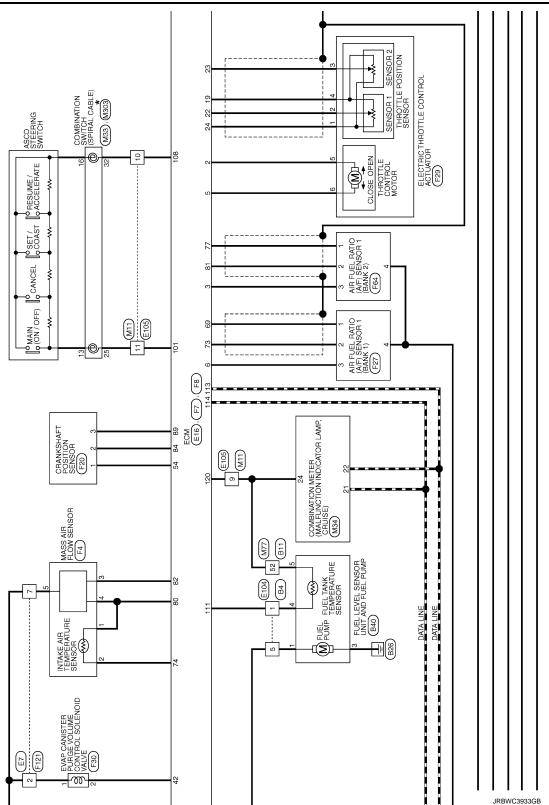




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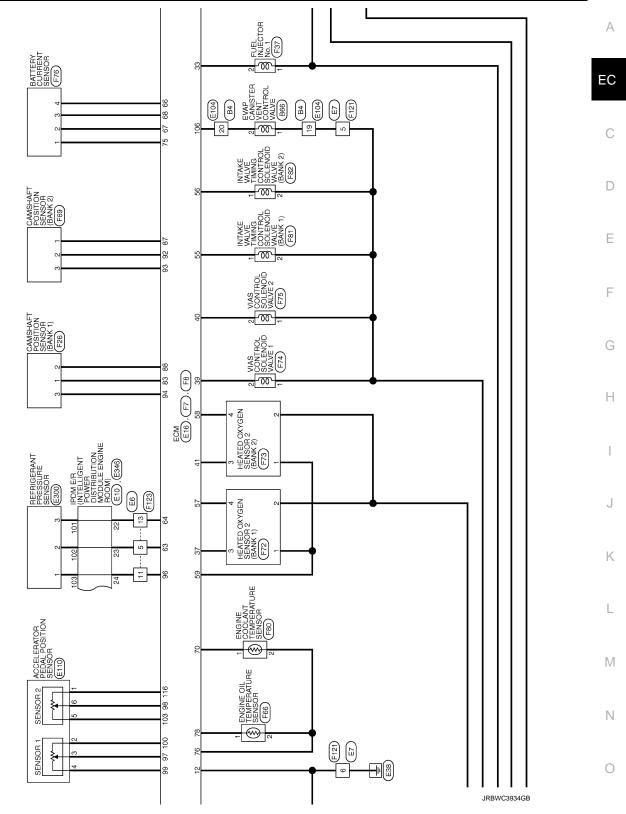
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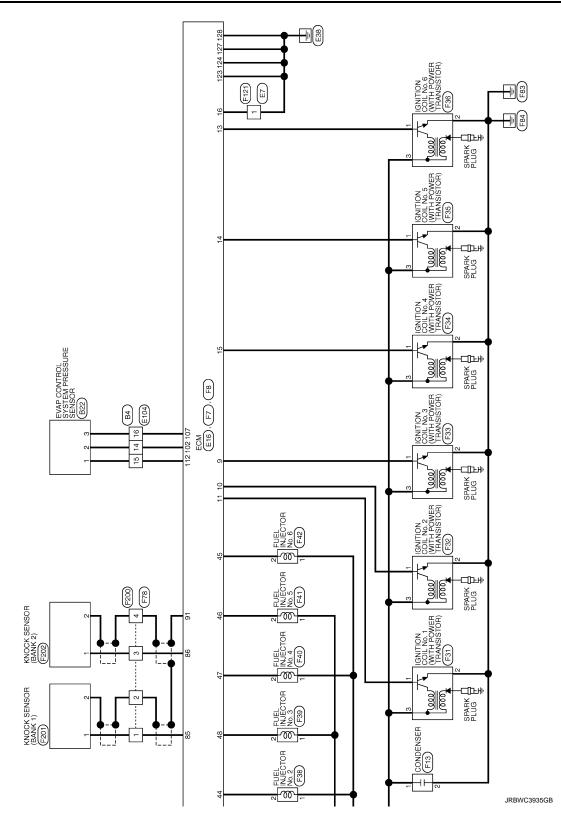
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Connector No.         B66           Gornector Name         Eve DAMSTER VENT CONTROL VALVE           Corrector Type         EVE DAMSTER VENT CONTROL VALVE           Corrector Type         E0275-155	Turninal         Color Of New         Signal Nume (Specification)           1         0         0         -           2         36         -         -           Connector Num         File         -         -           Connector Num         File         -         -           Connector Num         Num         Num         -           Num         Num         Signal Nume (Specification)         -           1         1         1         -         -           1         1         1         -         -           1         0         -         -         -           1         0         -         -         -           1         0         -         -         -           1         0         -         -         -           1         0         -         -         -           1         0         -         -         -           1         0         -         -         -           1         0         -         -         -           1         0         -         -         -           1<	
Oometor Na.         822           Garmetor Name         EVA FORTAL SYSTEM PRESSURE ERISOR           Corrector Type         EVAF OFTITION	Terminal No.     Coort     Signal Nume [Specification]       1     V     -       2     LO     -       3     0     -       Corrector Name     B40       Corrector Name     FLE       Corrector Name     Corrector Name       Name     Corrector Name       Name     Corrector Name       Name     Corrector Name       Signal Name     Corrector Nam </td <td></td>	
	54         P         -           57         1         -         -           58         1         -         -         -           59         1         -         -         -         -           59         1         -         -         -         -           59         1         -         -         -         -           50         0         0         -         -         -           51         1         4         -         -         -           52         1         8         -         -         -           53         1         1         -         -         -         -           54         1         1         -         -         -         -         -           54         1         1         1         -         <	
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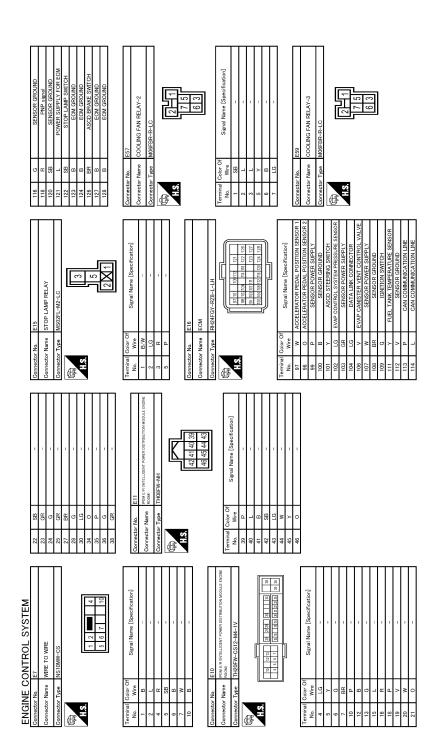
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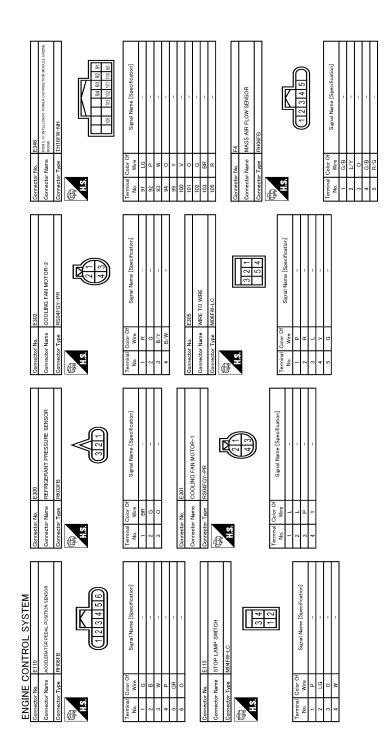
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esification	EC
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Connector No.         Connector No.           Connector Name         Connector Name           Name         Name </td <td>Н</td>	Н
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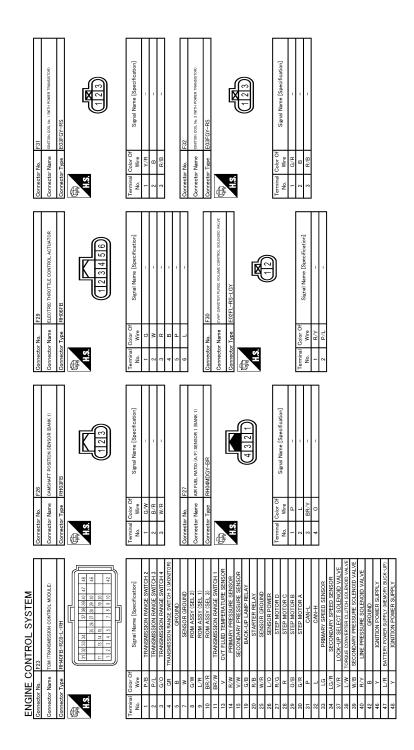
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Mo.         FB           Name         EOM           Type         RH40FER-R29-L14H           Type         RH40FER-R29-L14H           Reg         RE           Obsr         R           V         RM0FEB           W         Signal Munic Specification           W         Signal Munic Specification           W         RESIGN FOWER STREPS LIVE           V         RM0FEB-R29-L14H           R         RM0FEB-R29-L14H           R         RM0FEB-R29-L14H           R         RM0FEB-R29-L14H           R         RM0FEB-R2010E           W         RSS00 FOWER STREPS LIVE           V         RM0FEB-R2010E           W         BA           R         REFERENCE           R         REFERENCE           V         RM0FEB-R2010E           W         BA/TEEN CURFENTURE SENSOR           V         RESISTOR FOWER SUPPLICE           V         RESISTOR FOWER SUPPLICE           R         AFTERN CURFENTURE SENSOR           V         RESISTOR FOWER SUPPLICE           V         RESISTOR FOWER SUPPLICE           V         RESISTOR FOWER SUPPLICE           R	J
Connector No.         Connector Name           Connector Name         Connector Name           Si         N	K
Pitch       Fitch       Render-regated       Render-regated <td>L</td>	L
PT F7 F7 F7 F7 F6 F6 F6 F6 F6 F7 F7 F7 F7 F7 F7 F7 F7 F7 F7	M
ENGINE     CONTROL     SYSTEM       Correnter Name     EVA       Presson     EVA <td>Ν</td>	Ν

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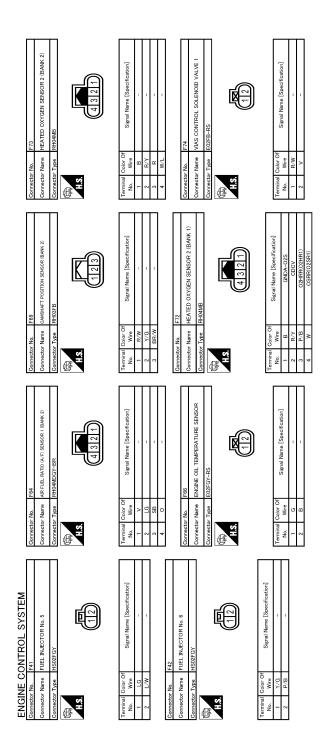


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Ea         Ea           FUEL INLECTOR No. 3         HISDREGY           HISDREGY         Signal Name (Specification)           Signal Name (Specification)         -	С
Connector No.     F30       Connector Name     UEL INJECTOR No. 3       Connector Name     UEL INJECTOR No. 4	D
LECTOR No. 1 LECTOR No. 2 LECTOR No. 2 LECTOR No. 2 LECTOR No. 2 LECTOR No. 2 LECTOR No. 2 LECTOR No. 1 LECTOR No. 2 LECTOR NO. 2 LE	E
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Connector No.     Connector No.       Connector Name     Connector Name       Connector Name     Connector Name       Connector Name     Connector Name       Connector Name     Connector Name       No.     Connector Name       No.     Connector Name       No.     No.       No.     No.       No.     No.       No.     No.       No.     No.	Н
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Connector No.         F35           Connector Name         Connector Name	J
All ANTENA A. La Mark nouer Tawaer too Regent Name (Specification) Signal Name (Specification) Signal Name (Specification)	L
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BIGINE CONTROL SYSTEM       Connector Name     with rown numerication       Connector Name     Connector Name       Connector Name       Connector Name     Connect	Ν
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# ENGINE CONTROL SYSTEM



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	featteni	EC
F121 WIRE TO WIRE INSIOFW-GS	Signal Name (Specification)	С
Connector No. F121 Connector Name WIRE Connector Type NS10F	Terminal         Color           Address         Address           Nore         B/1           Nore         B/1           Nore         B/1           Demonstration         Color           Demonstration         B/1           Demonstration         B/1           Demonstration         B/1           Demonstration         B/1           Demonstration         B/1           Nore         Connection           Demonstration         B/1           Nore         Connection           Demonstration         Color           Nore         Connection	D
		E
F81 Invest vure Tanko contract acutado vurte faker 1. E02FG-RS-LGY	Signal Name [Specification]	F
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Connector No. Corrector Name Connector Type	Terminal Color Of No. Wire Connector Name Connector Name Connector Type A.S. A.S. A.S. A.S. A.M. Connector Name Connector Name	Н
	Signal Name (Saeeffication) EB0 EB0 EB0 EB0 EB0 EB0 EB0 EB0	I
178 WIRE TO WIRE RSO4FL-B		J
Connector No. Connector Name Corrector Type	Terminal     Color of Nuc       1     Nuc       2     3       3     54/HLD       4     58/HLD       5     54/HLD       6     6       6     6       7     9       9     7       1     0       1     0       1     0       1     0       1     0       1     1       1     1	K
	r Skeedication	L
ONTROL SYSTEM Fis vas control solenoid valve 2 Eozte-ris	Signal Name [Specification]	Μ
ENGINE CONTROL SYSTEM Corrector Nume VAS CONTROL SOLENOD VAL Corrector Type EO2FB-FIS	Terminal     Oxfor     Signal Name [Specification of the signal Name [Spe	Ν
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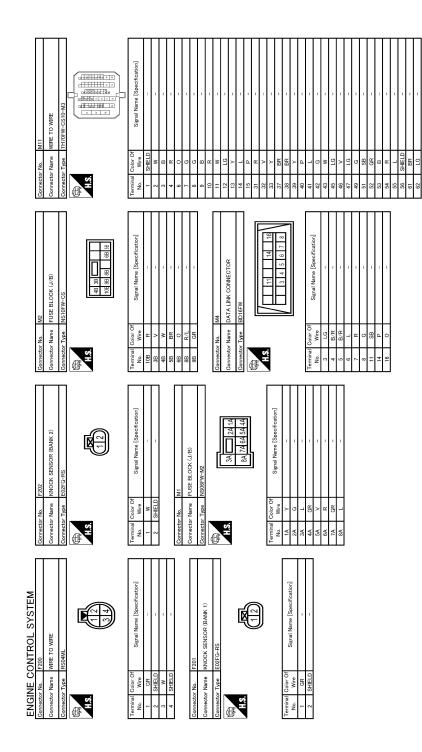
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# ENGINE CONTROL SYSTEM

< WIRING DIAGRAM >

[VQ35DE]



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77         0         -           78         LG         -           79         R         -           81         L         -           82         V         -           83         Y         -           83         Y         -           80         P         -           80         P         -           90         P         -           90         P         -		
Corrector No. M/7 Corrector Name WIRE TO WIRE Connector Type THEORYM-CSS19	Tarminal         Concort of New         Signal Name (Specification)           No.         VM         -         -           12         V         -         -         -           13         V         -         -         -         -           23         EB         -         -         -         -         -           31         SHEID         -         -         -         -         -         -           31         SHEID         - </td <td></td>	
Corrector No.         M34           Connector Name         COMBINATION METER           Connector Type         TH40FW-NH           Connector Type         TH40FW-NH           Connector Type         TH40FW-NH           Connector Type         TH40FW-NH	Truminal No.         Signal Name (Specification)           No.         B.TTERP DWEES SUPPLY           1         0         B.TTERP DWEES SUPPLY           2         Y         DIMTON SIGNAL           3         B         GROUND           6         B.P         TLUMMATINO CONTENCISIONAL           1         Q         RELEAR           1         GROUND         GROUND           1         Q         MEMATINO CONTENCISIONAL           11         Q         MEMATINO CONTENCISIONAL           12         Y         LLUMMATINO CONTENCISIONAL           13         Y         LLUMMATINO CONTENCISIONAL           14         V         LLUMMATINO CONTENCISIONAL           13         Y         LLUMMATINO CONTENCISIONAL           14         V         LLUMMATINO CONTENCISIONAL           15         B         CAN-L           16         L         Actuanticon Reconcenter Reconcenter Standal           13         Y         LLUMMATINO CONTENCISIONAL           14         V         LLUMMATINO CONTENCISIONAL           15         B         Actuanticon Reconcenter Reconcenter Standal           14         V         LLUMMATINO CONTENCISIONAL	
ENGINE CONTROL SYSTEM ENGINE CONTROL SYSTEM ES W/L	76         V         -           78         W         -         -           78         W         -         -           79         L         N         -         -           79         L         N         -         -         -           79         L         N         -         -         -         -           79         L         M3         -	

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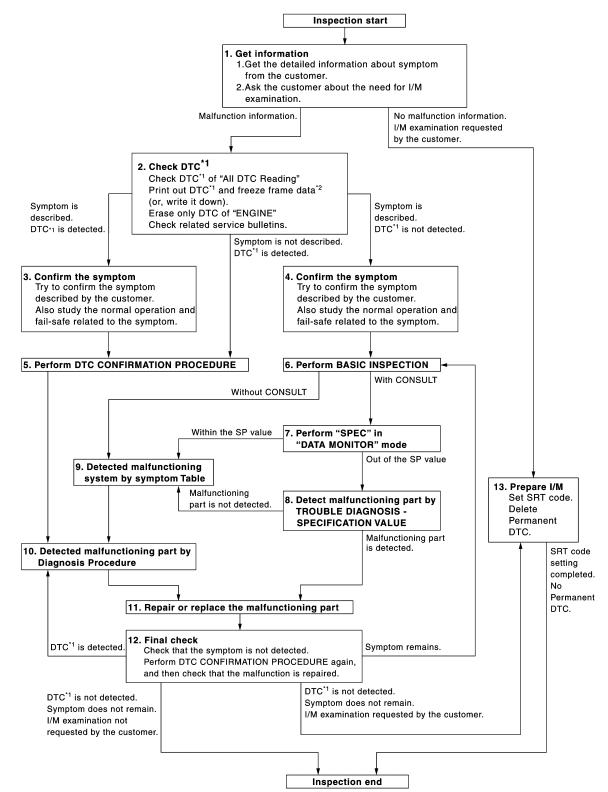
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# BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

**OVERALL SEQUENCE** 



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INFOID:000000009650990

< BASIC INSPECTION >

*1: Include 1st trip DTC.	A
*2: Include 1st trip freeze frame data.	
DETAILED FLOW	EC
1.GET INFORMATION FOR SYMPTOM	
<ol> <li>Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the "Diagnostic Work Sheet". (Refer to <u>EC-127</u>, "<u>Diagnostic</u> <u>Work Sheet</u>".)</li> </ol>	С
2. Ask if the customer requests I/M examination.	
Malfunction information, obtained>>GO TO 2.	D
No Malfunction information, but a request for I/M examination>>GO TO 13.	
2.CHECK DTC	E
1. Check DTC of "All DTC Reading".	
2. Perform the following procedure if DTC is displayed.	_
<ul> <li>Record DTC and freeze frame data. (Print them out with CONSULT or GST.)</li> <li>Erase only DTC of "ENGINE".</li> </ul>	F
With CONSULT: Refer to "How to Erase DTC and 1st Trip DTC" in <u>EC-69, "CONSULT Function"</u> .	
Without CONSULT: Refer to "How to Erase Self-diagnostic Results" in <u>EC-66</u> , "On Board Diagnosis	(
Function".	
<ul> <li>Turn ignition switch OFF.</li> <li>Study the relationship between the cause detected by DTC and the symptom described by the customer.</li> </ul>	
<ul> <li>(Symptom Table is useful. Refer to <u>EC-450, "Symptom Table"</u>.)</li> <li>Check related service bulletins for information.</li> </ul>	ŀ
Are any symptoms described and any DTCs detected?	
Symptom is described, DTC is detected>>GO TO 3.	
Symptom is described, DTC is not detected>>GO TO 4.	
Symptom is not described, DTC is detected>>GO TO 5.	
3.CONFIRM THE SYMPTOM	
Try to confirm the symptom described by the customer (except MIL ON). Also study the normal operation and fail-safe related to the symptom. Refer to <u>EC-454</u> , " <u>Description</u> " and <u>EC-</u>	
92, "Fail-safe".	k
Diagnosis Work Sheet is useful to verify the incident.	
Verify relation between the symptom and the condition when the symptom is detected.	1
	-
>> GO TO 5.	
4.CONFIRM THE SYMPTOM	N
Try to confirm the symptom described by the customer. Also study the normal operation and fail-safe related to the symptom. Refer to <u>EC-454</u> , "Description" and <u>EC-</u>	
92, "Fail-safe".	Ν
Diagnosis Work Sheet is useful to verify the incident.	1
Verify relation between the symptom and the condition when the symptom is detected.	
	C
>> GO TO 6.	
<b>5.</b> PERFORM DTC CONFIRMATION PROCEDURE	_
Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is	F
detected again. If two or more DTCs are detected, refer to <u>EC-94, "DTC Inspection Priority Chart"</u> and determine trouble	
diagnosis order.	

### NOTE:

• Freeze frame data is useful if the DTC is not detected.

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

 Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.

If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIR-MATION PROCEDURE.

### Is DTC detected?

YES >> GO TO 10.

NO >> Check according to GI-42, "Intermittent Incident".

**Ó.**PERFORM BASIC INSPECTION

Perform EC-129, "Work Procedure".

Do you have CONSULT?

YES >> GO TO 7. NO >> GO TO 9.

NU >> GU IU : 7

7.PERFORM SPEC IN DATA MONITOR MODE

### (B) With CONSULT

Make sure that "MAS A/F SE-B1", "MAS A/F SE-B2", "B/FUEL SCHDL", "A/F ALPHA-B1" and "A/F ALPHA-B2" are within the SP value using CONSULT "SPEC" in "DATA MONITOR" mode of "ENGINE". Refer to <u>EC-155</u>, "Component Function Check".

Is the measurement value within the SP value?

YES >> GO TO 9.

NO >> GO TO 8.

f 8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to EC-156, "Diagnosis Procedure".

Is a malfunctioning part detected?

YES >> GO TO 11.

NO >> GO TO 9.

**9.** DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to <u>EC-450. "Symptom Table"</u> based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptoms.

### >> GO TO 10.

# **10.** DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system. **NOTE:** 

The Diagnosis Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnosis Procedure. For details, refer to <u>GI-45</u>, "<u>Circuit Inspection</u>".

Is a malfunctioning part detected?

YES >> GO TO 11.

NO >> Monitor input data from related sensors or check voltage of related ECM terminals using CON-SULT. Refer to <u>EC-79, "Reference Value"</u>.

# **11.**REPAIR OR REPLACE THE MALFUNCTIONING PART

- 1. Repair or replace the malfunctioning part.
- Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
- Check DTC. If DTC is displayed, erase it.
   With CONSULT: Refer to "How to Erase DTC and 1st Trip DTC" in <u>EC-69, "CONSULT Function"</u>.
   Without CONSULT: Refer to "How to Erase Self-diagnostic Results" in <u>EC-66, "On Board Diagnosis Function"</u>.

>> GO TO 12.

# DIAGNOSIS AND REPAIR WORKFLOW

### < BASIC INSPECTION >

[VQ35DE]

### 12.FINAL CHECK А When DTC was detected in step 2, perform DTC CONFIRMATION PROCEDURE or Component Function Check again, and then make sure that the malfunction have been completely repaired. When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure EC that the symptom is not detected. Is DTC detected and does symptom remain? YES-1 >> DTC is detected: GO TO 10. YES-2 >> Symptom remains: GO TO 6. NO-1 >> No request for I/M examination from the customer: Before returning the vehicle to the customer, always erase unnecessary DTC in ECM and TCM (🕅 With CONSULT: Refer to "How to Read D DTC and 1st Trip DTC" in EC-69, "CONSULT Function", (R) Without CONSULT: Refer to "How to Read Self-diagnostic Results" in EC-66, "On Board Diagnosis Function"). NO-2 >> I/M examination, requested from the customer: GO TO 13. **13.**PREPARE FOR I/M EXAMINATION Ε 1. Set SRT codes. Refer to EC-143, "Description". Erase permanent DTCs. Refer to <u>EC-149</u>, "Description". F >> INSPECTION END. Diagnostic Work Sheet INFOID:000000009650991 DESCRIPTION Н There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make trou-**KEY POINTS** bleshooting faster and more accurate. In general, each customer feels differently about symptoms. It is WHAT ..... Vehicle & engine model important to fully understand the symptoms or conditions for a cus-WHEN ..... Date, Frequencies tomer complaint. WHERE ..... Road conditions Utilize a diagnostic worksheet like the WORKSHEET SAMPLE HOW ..... Operating conditions, below in order to organize all the information for troubleshooting. Weather conditions, Some conditions may cause the MIL to illuminate or blink, and DTC Symptoms to be detected. Examples: • Vehicle ran out of fuel, which caused the engine to misfire. Κ SEE9071 · Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere. L Μ

Revision: 2014 May

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# DIAGNOSIS AND REPAIR WORKFLOW

### < BASIC INSPECTION >

Customer name MR/MS		Model & Year	VIN	
Engine #		Trans.	Mileage	
Incident Date		Manuf. Date	In Service Date	
Fuel and fuel filler cap		<ul> <li>Vehicle ran out of fuel causing misfire</li> <li>Fuel filler cap was left off or incorrectly screwed on.</li> </ul>		
	☐ Startability	Impossible to start		
Symptoms	Idling	□ No fast idle □ Unstable □ H □ Others [	High idle ☐ Low idle ]	
-, -, -, -, -, -, -, -, -, -, -, -, -, -	Driveability	Stumble Surge Knock Lack of power Intake backfire Others [ ]		
	Engine stall	At the time of start While idling While accelerating While dece Just after stopping While loadi	lerating	
Incident occur	rence	□ Just after delivery       □ Recently         □ In the morning       □ At night       □ In the daytime		
Frequency		All the time Under certain conditions Sometimes		
Weather cond	itions	Not affected		
	Weather	Fine Raining Snowing	Others [ ]	
	Temperature	Hot Warm Cool	] Cold 🗌 Humid <sup>°</sup> F	
Engine conditions		Cold During warm-up     Engine speed     L     1     0     2,000	After warm-up   _   4,000 6,000 8,000 rpm	
Road conditions		🗌 In town 🗌 In suburbs 🗌 Hig	hway 🗌 Off road (up/down)	
Driving conditions		Not affected         At starting       While idling       At racing         While accelerating       While cruising         While decelerating       While turning (RH/LH)         Vehicle speed       1       1       1         0       10       20       30       40       50       60       MPH		

Not turned on

Turned on

MTBL0017

Malfunction indicator lamp

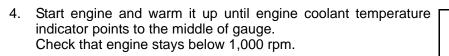
### < BASIC INSPECTION >

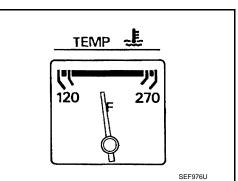
# BASIC INSPECTION

# Work Procedure

# **1.**INSPECTION START

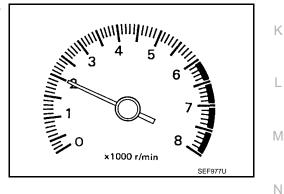
- 1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
- 2. Open engine hood and check the following:
- Harness connectors for improper connections
- Wiring harness for improper connections, pinches and cut
- Vacuum hoses for splits, kinks and improper connections
- Hoses and ducts for leakage
- Air cleaner clogging
- Gasket
- 3. Check that electrical or mechanical loads are not applied.
- Head lamp switch is OFF.
- Air conditioner switch is OFF.
- Rear window defogger switch is OFF.
- Steering wheel is in the straight-ahead position, etc.





- 5. Run engine at approximately 2,000 rpm for approximately 2 minutes under no load.
- 6. Check that no DTC is displayed with CONSULT or GST.
- Are any DTCs detected?

YES	>> GO TO 2.
NO	>> GO TO 3.



# 2.REPAIR OR REPLACE

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

### >> GO TO 3

# **3.**CHECK TARGET IDLE SPEED

1. Run engine at approximately 2,000 rpm for approximately 2 minutes under no load.

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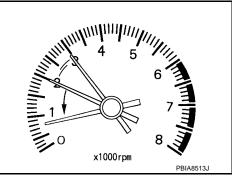
# **BASIC INSPECTION**

### < BASIC INSPECTION >

- Rev engine (2,000 to 3,000 rpm) 2 or 3 times under no load, then run engine at idle speed for approximately 1 minute.
- Check idle speed.
   For procedure, refer to <u>EC-455, "Work Procedure"</u>.
   For specification, refer to <u>EC-461, "Idle Speed"</u>.

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> GO TO 4.



**4.** PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

- 1. Stop engine.
- 2. Perform EC-135, "Work Procedure".

>> GO TO 5.

# 5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-136, "Work Procedure".

>> GO TO 6.

**6.**PERFORM IDLE AIR VOLUME LEARNING

Perform EC-137, "Work Procedure".

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 7.

NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.

**7.**CHECK IDLE SPEED AGAIN

1. Start engine and warm it up to normal operating temperature.

Check idle speed.
 For procedure, refer to <u>EC-455, "Work Procedure"</u>.
 For specification, refer to <u>EC-461, "Idle Speed"</u>.

Is the inspection result normal?

YES >> GO TO 10. NO >> GO TO 8.

NO >> GO IO 8.

8. DETECT MALFUNCTIONING PART

Check the Following.

- Check camshaft position sensor (PHASE) and circuit. Refer to EC-274, "Diagnosis Procedure".
- Check crankshaft position sensor (POS) and circuit. Refer to EC-271, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace malfunctioning part. Then GO TO 4.

9. CHECK ECM FUNCTION

- 1. Substitute with a non-malfunctioning ECM to check ECM function. (ECM may be the cause of the incident, although this is rare.)
- Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to <u>SEC-58, "ECM : Work Procedure"</u>.

>> GO TO 4.

**10.**CHECK IGNITION TIMING

- 1. Run engine at idle.
- Check ignition timing with a timing light. For procedure, refer to <u>EC-456</u>, "Work Procedure".

# **BASIC INSPECTION**

BASIC INSPECTION		
< BASIC INSPECTION >	[VQ35DE]	
For specification, refer to EC-461, "Ignition Timing".		
Is the inspection result normal?		А
YES >> GO TO 19. NO >> GO TO 11.	-	
		EC
11.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING		
<ol> <li>Stop engine.</li> <li>Perform <u>EC-135, "Work Procedure"</u>.</li> </ol>		
		С
>> GO TO 12.		
12.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING		D
Perform <u>EC-136, "Work Procedure"</u> .		
>> GO TO 13.		Е
13. PERFORM IDLE AIR VOLUME LEARNING		
Perform <u>EC-137, "Work Procedure"</u> .		F
Is Idle Air Volume Learning carried out successfully?		
YES >> GO TO 14.		
NO >> Follow the instruction of Idle Air Volume Learning. Then GO TO 4.		G
14.CHECK IDLE SPEED AGAIN		
<ol> <li>Start engine and warm it up to normal operating temperature.</li> <li>Check idle speed.</li> </ol>		Н
For procedure, refer to EC-455, "Work Procedure".		
For specification, refer to <u>EC-461, "Idle Speed"</u> . <u>Is the inspection result normal?</u>		
YES $>>$ GO TO 15.		
NO >> GO TO 17.		J
15. CHECK IGNITION TIMING AGAIN		0
1. Run engine at idle.		
<ol> <li>Check ignition timing with a timing light. For procedure, refer to <u>EC-456, "Work Procedure"</u>.</li> </ol>		Κ
For specification, refer to EC-461, "Ignition Timing".		
Is the inspection result normal?		L
YES >> GO TO 19. NO >> GO TO 16.		
16. CHECK TIMING CHAIN INSTALLATION		M
Check timing chain installation. Refer to EM-82, "Inspection".		
Is the inspection result normal?		NI
YES >> GO TO 17.		Ν
NO >> Repair the timing chain installation. Then GO TO 4. 17.DETECT MALFUNCTIONING PART		
		0
<ul> <li>Check the following.</li> <li>Check camshaft position sensor (PHASE) and circuit. Refer to <u>EC-274, "Diagnosis Procedure"</u>.</li> </ul>		
<ul> <li>Check crankshaft position sensor (POS) and circuit. Refer to <u>EC-271, "Diagnosis Procedure"</u>.</li> </ul>		Ρ
Is the inspection result normal?		
YES >> GO TO 18. NO >> Repair or replace malfunctioning part. Then GO TO 4.		
18. CHECK ECM FUNCTION		
1. Substitute with a non-malfunctioning ECM to check ECM function. (ECM may be the cause of	the incident.	

1. Substitute with a non-malfunctioning ECM to check ECM function. (ECM may be the cause of the incident, although this is rare.)

# **BASIC INSPECTION**

### < BASIC INSPECTION >

 Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to <u>EC-133, "Work Procedure"</u>.

>> GO TO 4.

19.INSPECTION END

If ECM is replaced during this BASIC INSPECTION procedure, perform EC-133, "Work Procedure".

>> INSPECTION END

# ADDITIONAL SERVICE WHEN REPLACING ECM

< BASIC INSPECTION > [VQ35DE]	1
ADDITIONAL SERVICE WHEN REPLACING ECM	-
Description	A 93
When replacing ECM, the following procedure must be performed. (For details, refer to <u>EC-133, "Work Proce</u> <u>dure"</u> .)	EC
PROGRAMMING OPERATION	
<b>NOTE:</b> After replacing with a blank ECM, programming is required to write ECM information. Be sure to follow the pro cedure to perform the programming.	- C
BEFORE REPLACEMENT When replacing ECM, perform "SAVING DATA FOR REPLC CPU" in "WORK SUPPORT" of "ENGINE" by	D
using CONSULT to save current ECM data before replacement.	E
AFTER REPLACEMENT After replacing ECM, the following items must be performed:	
<ul> <li>Write data after replace CPU</li> <li>Accelerator pedal released position learning</li> </ul>	F
<ul><li>Throttle valve closed position learning</li><li>Idle air volume learning</li></ul>	
Work Procedure	<sub>4</sub> G
1.SAVE ECM DATA	
<ul> <li>With CONSULT</li> <li>Turn ignition switch OFF.</li> </ul>	- H
<ol> <li>Reconnect all harness connectors disconnected.</li> <li>Turn ignition switch ON.</li> <li>Select "SAVING DATA FOR REPLC CPU" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.</li> </ol>	Ι
5. Follow the instruction of CONSULT display. <b>NOTE:</b>	J
<ul> <li>Necessary data in ECM is copied and saved to CONSULT.</li> <li>Go to Step 2 regardless of with or without success in saving data.</li> </ul>	5
>> GO TO 2	Κ
2.CHECK ECM PART NUMBER	
Check ECM part number to see whether it is blank ECM or not.	L
<ul> <li>NOTE:</li> <li>Part number of blank ECM is 23703 - xxxxx.</li> </ul>	
<ul> <li>Check part number when ordering ECM or the one included in the label on the container box.</li> <li>Is the ECM a blank ECM?</li> </ul>	$\mathbb{M}$
YES >> GO TO 3.	
NO >> GO TO 5. 3.SAVE ECM PART NUMBER	Ν
Read out the part number from the old ECM and save the number, following the programming instructions	-
Refer to CONSULT Operation Manual. NOTE:	0
<ul> <li>The ECM part number is saved in CONSULT.</li> <li>Even when ECM part number is not saved in CONSULT, go to 4.</li> </ul>	Ρ
>> GO TO 4.	
4.PERFORM ECM PROGRAMMING	
After replacing ECM, perform the ECM programming. Refer to CONSULT Operation Manual. <b>NOTE:</b> • Refer to EC-460, "Removal and Installation" for replacement of ECM	-

Revision: 2014 May

• Refer to EC-460, "Removal and Installation" for replacement of ECM.

# ADDITIONAL SERVICE WHEN REPLACING ECM

< BASIC INSPECTION >

- During programming, maintain the following conditions:
- Ignition switch: ON
- Electric load: OFF
- Brake pedal: Not depressed
- Battery voltage: 12 13.5 V (Be sure to check the value of battery voltage by selecting "BATTERY VOLT" in "Data monitor" of CONSULT.)

>> GO TO 6.

### **5.**REPLACE ECM

Replace ECM. Refer to EC-460, "Removal and Installation".

>> GO TO 6.

**6.** PERFORM INITIALIZATION OF IVIS (NATS) SYSTEM AND REGISTRATION OF ALL IVIS (NATS) IGNITION KEY IDS

Refer to SEC-58, "ECM : Work Procedure".

>> GO TO 7.

**7.**CHECK ECM DATA STATUS

Check if the data is successfully copied from the ECM at Step 1 (before replacement) and saved in CONSULT. Is the data saved successfully?

 $\begin{array}{ll} \text{YES} & >> \text{GO TO 8.} \\ \text{NO} & >> \text{GO TO 9.} \\ \textbf{8.} \text{WRITE ECM DATA} \end{array}$ 

()With CONSULT

1. Select "WRITING DATA FOR REPLC CPU" in "WORK SUPPORT" mode of "ENGINE" using CONSULT.

2. Follow the instruction of CONSULT display.

### NOTE:

The data saved by "SAVING DATA FOR REPLC CPU" is written to ECM.

>> GO TO 10.

**9.**PERFORM VIN REGISTRATION

Refer to EC-140, "Work Procedure".

>> GO TO 10.

**10.**PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Perform Accelerator Pedal Released Position Learning. Refer to EC-135, "Work Procedure".

>> GO TO 11.

**11.** PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform Throttle Valve Closed Position Learning. Refer to EC-136, "Work Procedure".

>> GO TO 12.

12.PERFORM IDLE AIR VOLUME LEARNING

Perform Idle Air Volume Learning. Refer to EC-137, "Work Procedure".

>> END

# ACCELERATOR PEDAL RELEASED POSITION LEARNING

### < BASIC INSPECTION >

# ACCELERATOR PEDAL RELEASED POSITION LEARNING

# Description

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Accelerator Pedal Released Position Learning is a function of ECM to learn the fully released position of the EC accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time the harness connector of the accelerator pedal position sensor or ECM is disconnected.

# Work Procedure

START		
Check that accelerator pedal is fully released.		

- 1. 2. Turn ignition switch ON and wait at least 2 seconds.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON and wait at least 2 seconds. 4.
- Turn ignition switch OFF and wait at least 10 seconds. 5.

>> END

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INFOID:000000009650995

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# THROTTLE VALVE CLOSED POSITION LEARNING

< BASIC INSPECTION >

# THROTTLE VALVE CLOSED POSITION LEARNING

# Description

INFOID:000000009650997

[VQ35DE]

Throttle Valve Closed Position Learning is a function of ECM to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time the harness connector of electric throttle control actuator or ECM is disconnected or electric throttle control actuator is cleaned.

### Work Procedure

INFOID:000000009650998

# **1.**START

### (I) WITH CONSULT

- 1. Turn ignition switch ON.
- 2. Select "CLSD THL POS LEARN" in "WORK SUPPORT" mode.
- 3. Follow the instructions on the CONSULT display.
- 4. Turn ignition switch OFF and wait at least 10 seconds.

Check that throttle valve moves during the above 10 seconds by confirming the operating sound.

- **WITHOUT CONSULT**
- 1. Start the engine.
  - NOTE:

Coolant temperature is less than 25°C (77°F) before engine starts.

2. Warm up the engine.

NOTE:

Warm up the engine until "COOLAN TEMP/S" on "DATA MONITOR" of CONSULT reaches more than 65°C (149°F).

3. Turn ignition switch OFF and wait at least 10 seconds.

### NOTE:

Check that throttle valve moves during the above 10 seconds by confirming the operating sound.

>> END

# **IDLE AIR VOLUME LEARNING**

Idle Air Volume Learning is a function of ECM to learn the idle air volume that keeps engine idle speed within

- started the head lamp will not illuminate. Steering wheel: Neutral (Straight-ahead position) Vehicle speed: Stopped Transmission: Warmed-up - With CONSULT: Drive vehicle until "ATF TEMP SEN" in "DATA MONITOR" mode of "CVT" system indicates less than 0.9 V. - Without CONSULT: Drive vehicle for 10 minutes. Will CONSULT be used? YES >> GO TO 2. NO >> GO TO 3. 2. PERFORM IDLE AIR VOLUME LEARNING (P)With CONSULT 1. Perform EC-135, "Work Procedure".
- Perform EC-136, "Work Procedure". 2.
- 3. Start engine and warm it up to normal operating temperature.
- Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode. 4.
- Touch "START" and wait 20 seconds. 5.
- Is "CMPLT" displayed on CONSULT screen?
- YES >> GO TO 4.
- NO >> GO TO 5.

 ${\it 3.}$  perform idle air volume learning

### Without CONSULT NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- 1. Perform EC-135, "Work Procedure".
- Perform EC-136, "Work Procedure". 2.
- Start engine and warm it up to normal operating temperature. 3.
- Turn ignition switch OFF and wait at least 10 seconds. 4.
- Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds. 5.
- 6. Repeat the following procedure quickly 5 times within 5 seconds.
- Fully depress the accelerator pedal.
- Fully release the accelerator pedal.
- Wait 7 seconds, fully depress the accelerator pedal for approx. 20 seconds until the MIL stops blinking 7. and turns ON.
- 8. Fully release the accelerator pedal within 3 seconds after the MIL turns ON.

### EC-137

[VQ35DE]

INFOID:000000009650999

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# the specific range. It must be performed under the following conditions: • Each time the electric throttle control actuator or ECM is replaced. Idle speed or ignition timing is out of the specification. INFOID:000000009651000 D Check 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 12.9 V (At idle) Engine coolant temperature: 70 - 100°C (158 - 212°F) Selector lever position: P or N Electric load switch: OFF F (Air conditioner, head lamp, rear window defogger) On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is Н Κ Μ Ν Ρ

Description

Work Procedure

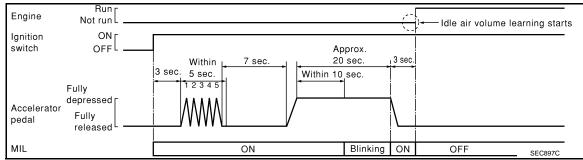
1.PRECONDITIONING

**IDLE AIR VOLUME LEARNING** 

# IDLE AIR VOLUME LEARNING

### < BASIC INSPECTION >

- 9. Start engine and let it idle.
- 10. Wait 20 seconds.



### >> GO TO 4.

### **4.**CHECK IDLE SPEED AND IGNITION TIMING

Rev up the engine 2 or 3 times and check that idle speed and ignition timing are within the specifications. For procedure, refer to <u>EC-455</u>, "Work Procedure" and <u>EC-456</u>, "Work Procedure". For specifications, refer to <u>EC-461</u>, "Idle <u>Speed</u>" and <u>EC-461</u>, "Ignition Timing".

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART-I

### Check the following

- Check that throttle valve is fully closed.
- Check PCV valve operation.
- Check that downstream of throttle valve is free from air leakage.

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair or replace malfunctioning part.

**6.**DETECT MALFUNCTIONING PART-II

Engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.

It is useful to perform "TROUBLE DIAGNOSIS - SPECIFICATION VALUE". Refer to <u>EC-155</u>, "<u>Description</u>". If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning again:

Engine stalls.

Engine stalls.

Incorrect idle.

>> INSPECTION END

## MIXTURE RATIO SELF-LEARNING VALUE CLEAR

### < BASIC INSPECTION >

# MIXTURE RATIO SELF-LEARNING VALUE CLEAR

### Description

This describes show to erase the mixture ratio self-learning value. For the actual procedure, follow the instructions in "Diagnosis Procedure".

### Work Procedure

### С 1.START (P)With CONSULT D 1. Start engine and warm it up to normal operating temperature. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT. 2. Clear mixture ratio self-learning value by touching "CLEAR". 3. With GST Е Start engine and warm it up to normal operating temperature. 1. Turn ignition switch OFF. 2. Disconnect mass air flow sensor harness connector. 3. F Restart engine and let it idle for at least 5 seconds. 4. 5. Stop engine and reconnect mass air flow sensor harness connector. Select Service \$03 with GST. Check that DTC P0102 is detected. 6. Select Service \$04 with GST to erase the DTC P0102. 7. >> END Н

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# **VIN REGISTRATION**

### < BASIC INSPECTION >

# VIN REGISTRATION

# Description

VIN Registration is an operation to register VIN in ECM. It must be performed each time ECM is replaced. **NOTE:** 

Accurate VIN which is registered in ECM may be required for Inspection & Maintenance (I/M).

# Work Procedure

INFOID:000000009651004

INFOID:000000009651003

# 1.CHECK VIN

Check the VIN of the vehicle and note it. Refer to GI-33, "Information About Identification or Model Code".

>> GO TO 2.

2. PERFORM VIN REGISTRATION

### With CONSULT

- 1. Turn ignition switch ON with engine stopped.
- 2. Select "VIN REGISTRATION" in "WORK SUPPORT" mode.
- 3. Follow the instructions on the CONSULT display.

>> END

# FUEL PRESSURE

# < BASIC INSPECTION >

# FUEL PRESSURE

### Work Procedure

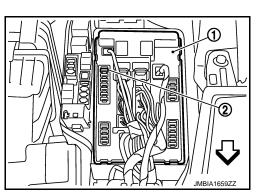
### FUEL PRESSURE RELEASE

### (P) With CONSULT

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

### **Without CONSULT**

- 1. Remove fuel pump fuse (2) located in IPDM E/R (1).
- 2. Start engine.
- 3. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 4. Turn ignition switch OFF.
- 5. Reinstall fuel pump fuse after servicing fuel system.



### FUEL PRESSURE CHECK

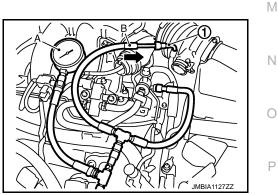
### **CAUTION:**

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

- Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because this models do not have fuel return system.
- Be careful not to scratch or get the fuel hose connection area dirty when servicing, so that the quick connector o-ring maintains seal ability.
- Use Fuel Pressure Gauge Kit [SST: (J-44321)] and Fuel Pressure Adapter [SST: (J-44321-6)] to check fuel pressure.
- 1. Release fuel pressure to zero.
- 2. Remove fuel hose using Quick Connector Release [SST: (J-45488)].
  - Do not twist or kink fuel hose because it is plastic hose.
  - Do not remove fuel hose (1) from quick connector.
  - Keep fuel hose connections clean.
- 3. Install Fuel Pressure Adapter [SST: (J-44321-6)] (B) and Fuel Pressure Gauge kit [SST: (J44321)] (A) as shown in figure.
  - Do not distort or bend fuel rail tube when installing fuel pressure gauge adapter.
  - When reconnecting fuel hose, check the original fuel hose for damage and abnormality.
- 4. Turn ignition switch ON (reactivate fuel pump) and check for fuel leakage.
- 5. Start engine and check for fuel leakage.
- Read the indication of fuel pressure gauge kit [SST: (J-44321)].
  - During fuel pressure check, check for fuel leakage from fuel connection every 3 minutes.

### At idling : Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)

7. If result is unsatisfactory, go to next step.



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# FUEL PRESSURE

### < BASIC INSPECTION >

- Check the following.
- Fuel hoses and fuel tubes for clogging
- Fuel filter for clogging
- Fuel pump

8.

- Fuel pressure regulator for clogging
- 9. If OK, replace fuel pressure regulator. If NG, repair or replace malfunctioning part.
- 10. Before disconnecting Fuel Pressure Gauge kit [SST: (J-44321)] and Fuel Pressure Adapter [SST: (J-44321-6)], release fuel pressure to zero.

# HOW TO SET SRT CODE

### < BASIC INSPECTION >

# HOW TO SET SRT CODE

# Description

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[VQ35DE]

### OUTLINE

In order to set all SRTs, the self-diagnoses as in the "SRT ITEM" table must have been performed at least once. Each diagnosis may require actual driving for a long period of time under various conditions.

### SRT ITEM

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

SRT item <sup>*1</sup> (CONSULT indication)	Performance Priority <sup>*2</sup>	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	1	Three way catalyst function	P0420, P0430
EVAP SYSTEM	1	EVAP control system purge flow monitoring	P0441
		EVAP control system	P0456
HO2S	1	Air fuel ratio (A/F) sensor 1	P014C, P014D,P014E, P014F
		Heated oxygen sensor 2	P0137, P0157
		Heated oxygen sensor 2	P0138, P0158
		Heated oxygen sensor 2	P0139, P0159
EGR/VVT SYSTEM	2	Intake value timing control function	P0011, P0021

\*1: Though displayed on the CONSULT screen, "HO2S HTR" is not SRT item.

\*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.

### SRT SERVICE PROCEDURE

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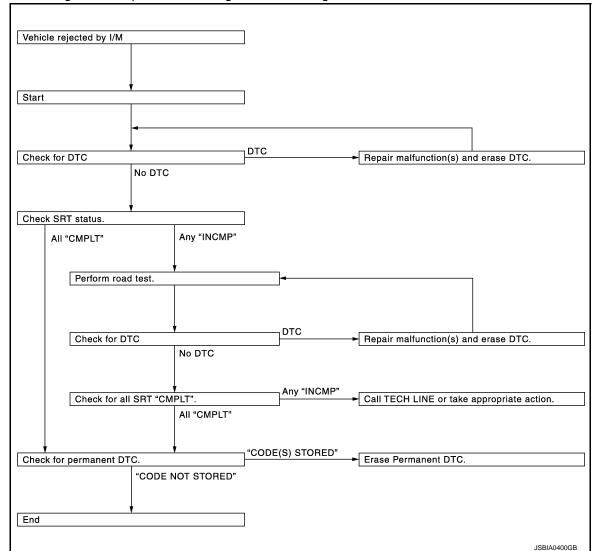
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# HOW TO SET SRT CODE

### < BASIC INSPECTION >

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



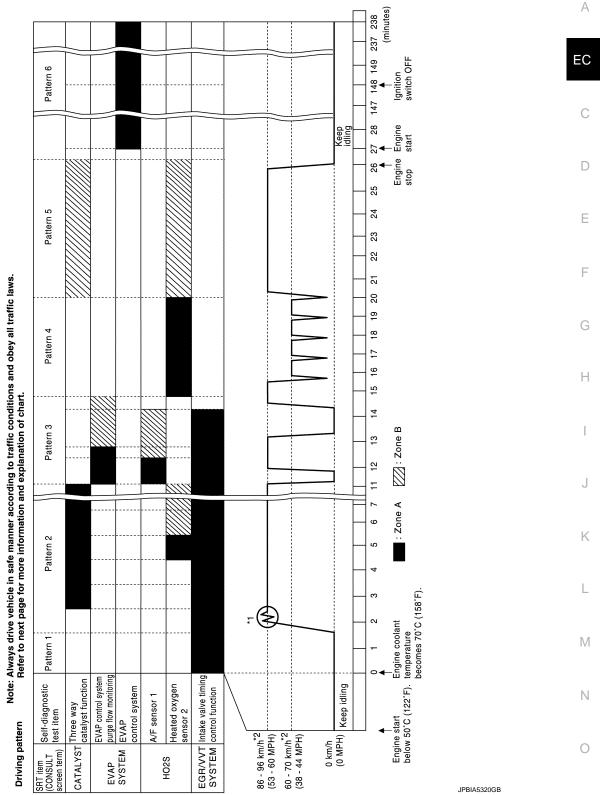
# SRT Set Driving Pattern

INFOID:000000009651007

### **CAUTION:**

#### < BASIC INSPECTION >

#### Always drive the vehicle in safe manner according to traffic conditions and obey all traffic laws.



\*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: Checking the vehicle speed with GST is advised.
- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
- "Zone A" is the fastest time where required for the diagnosis under normal conditions\*. If the diagnosis is not completed within "Zone A", the diagnosis can still be performed within "Zone B".

< BASIC INSPECTION >

- \*: Normal conditions
- Sea level
- Flat road
- Ambient air temperature: 20 30°C (68 86°F)

#### NOTE:

Diagnosis is performed as quickly as possible under normal conditions. However, under other conditions, diagnosis may also be performed. [For example: ambient air temperature other than  $20 - 30^{\circ}C$  ( $68 - 86^{\circ}F$ )]

## Work Procedure

INFOID:000000009651008

1. СНЕСК DTC

Check DTC.

Is any DTC detected?

YES >> Repair malfunction(s) and erase DTC. Refer to <u>EC-96, "DTC Index"</u>.

NO >> GO TO 2.

2.CHECK SRT STATUS

#### With CONSULT

Select "SRT STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT.

Without CONSULT

Perform "SRT status" mode with EC-66, "On Board Diagnosis Function".

With GST

Select Service \$01 with GST.

#### Is SRT code(s) set?

- YES >> GO TO 12.
- NO-1 >> With CONSULT: GO TO 3.
- NO-2 >> Without CONSULT: GO TO 4.

**3.** DTC CONFIRMATION PROCEDURE

1. Select "SRT WORK SUPPORT" in "DTC & SRT CONFIRMATION" mode with CONSULT.

- For SRT(s) that is not set, perform the corresponding "DTC CONFIRMATION PROCEDURE" according to the "Performance Priority" in the "SRT ITEM" table. Refer to <u>EC-143</u>, "<u>Description</u>".
- 3. Check DTC.

Is any DTC detected?

- YES >> Repair malfunction(s) and erase DTC. Refer to <u>EC-96. "DTC Index"</u>.
- NO >> GO TO 11.

#### **4.**PERFORM ROAD TEST

- Check the "Performance Priority" in the "SRT ITEM" table. Refer to EC-143, "Description".
- Perform the most efficient SRT set driving pattern to set the SRT properly. Refer to <u>EC-144</u>, <u>"SRT Set Driv-ing Pattern"</u>.

In order to set all SRTs, the SRT set driving pattern must be performed at least once.

>> GO TO 5.

# 5.PATTERN 1

- 1. Check the vehicle condition;
- Engine coolant temperature is –10 to 35°C (14 to 95°F).
- Fuel tank temperature is more than 0°C (32°F).
- 2. Start the engine.
- 3. Keep engine idling until the engine coolant temperature is greater than 70°C (158°F)

#### NOTE:

- ECM terminal voltage is follows;
- Engine coolant temperature
- −10 to 35°C (14 to 95°F): 3.0 − 4.3 V
- 70°(158°F): Less than 4.1 V
- Fuel tank temperature: Less than 1.4 V
- Refer to EC-79, "Reference Value".

## EC-146

< BASIC INSPECTION >

#### А >> GO TO 6. 6.PATTERN 2 1. Drive the vehicle. And depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then EC 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. NOTE: Checking the vehicle speed with GST is advised. 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. D >> GO TO 7. 7.PATTERN 3 Е • Operate vehicle following the driving pattern shown in the figure. Release the accelerator pedal during deceleration of vehicle speed 86 - 96 km/h from 90 km/h (56 MPH) to 0 km/h (0 MPH). (53 - 60 MPH) >> GO TO 8. 0 km/h (0 MPH) 30 S **1 MIN** 1 MIN Н PBIB2244E 8. PATTERN 4 • Operate vehicle, following the driving pattern shown in the figure. - Drive the vehicle in a proper gear at 60 km/h (38 MPH) and main-60 - 70 km/h tain the speed. (38 - 44 MPH) - Release the accelerator pedal fully at least 5 seconds. - Repeat the above two steps at least 5 times. >> GO TO 9. Κ 0 km/h (0 MPH) 1min 1min 1min i 1min i 1min 5sec 5sec 5sec 5sec 5sec JSBIA0160GE 9. PATTERN 5 M • The accelerator pedal must be held very steady during steady-state driving. If the accelerator pedal is moved, the test must be conducted again. Ν >> GO TO 10. 10.PATTERN 6 1. Start the engine and wait at least 2 hours. Turn ignition OFF and wait at least 90 minutes. 2. Ρ >> GO TO 11. 11.CHECK SRT STATUS With CONSULT Select "SRT STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT. Without CONSULT Perform "SRT status" mode with EC-66, "On Board Diagnosis Function".

Revision: 2014 May

# EC-147

< BASIC INSPECTION >

With GST
 Select Service \$01 with GST.
 <u>Is SRT(s) set?</u>
 YES >> GO TO 12.
 NO >> Call TECH LINE or take appropriate action.
 12.CHECK PERMANENT DTC

#### NOTE:

Permanent DTC cannot be checked with a tool other than CONSULT or GST.

With CONSULT

Select "SRT STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT.

With GST

Select Service \$0A with GST.

Is permanent DTC(s) detected?

YES >> Proceed to <u>EC-149</u>, "<u>Description</u>". NO >> END

#### < BASIC INSPECTION >

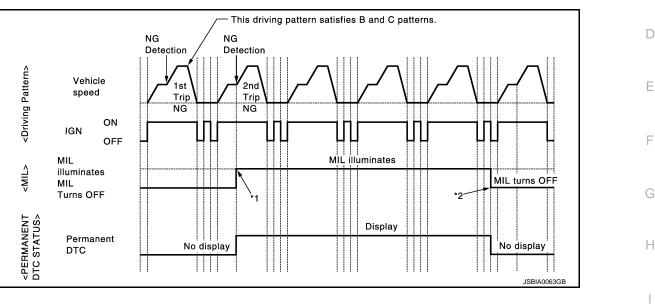
# HOW TO ERASE PERMANENT DTC

## Description

#### OUTLINE

#### When a DTC is stored in ECM

When a DTC is stored in ECM and MIL is ON, a permanent DTC is erased with MIL shutoff if the same malfunction is not detected after performing the driving pattern for MIL shutoff three times in a raw.



\*1: When the same malfunction is detected in two consecutive trips. MIL will illuminate.

\*2: MIL will turn off after vehicle is driven 3 times (driving pattern B) without any malfunctions.

#### When a DTC is not stored in ECM

The erasing method depends on a permanent DTC stored in ECM. Refer to the following table. NOTE:

Κ If the applicable permanent DTC includes multiple groups, perform the procedure of Group B first. If the permanent DTC is not erased, perform the procedure of Group A.

0*	Perform "DTC CONFIRMATION PROCEDURE" Driving pattern		pattern	Deference	
Group*	for applicable DTCs.	В	D	– Reference	
А	×	—	_	EC-150, "Work Pro- cedure (Group A)"	Μ
В	_	×	×	EC-152, "Work Pro- cedure (Group B)"	N

\*: For group, refer to EC-96, "DTC Index".

#### PERMANENT DTC ITEM

For permanent DTC items, MIL turns ON. Refer to EC-96, "DTC Index".

Ρ

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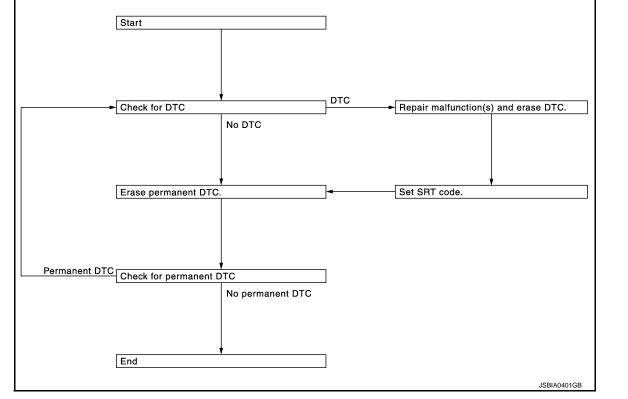
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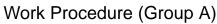
×: Applicable —: Not applicable

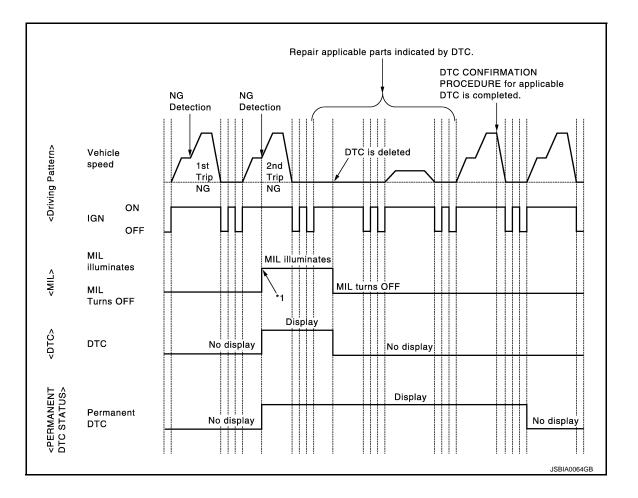
#### < BASIC INSPECTION >

## [VQ35DE]

PERMANENT DTC SERVICE PROCEDURE







#### < BASIC INSPECTION >

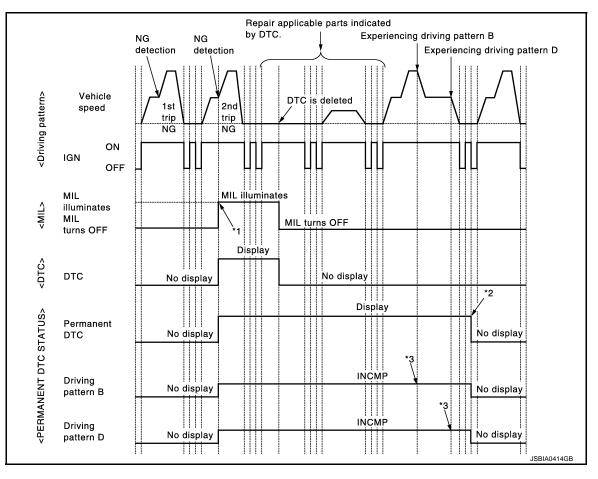
*1: When the same malfunction is de- tected in two consecutive trips, MIL will illuminate.	А
1.снеск отс	EC
Check DTC. <u>Is any DTC detected?</u> YES >> Repair malfunction(s) and erase DTC. <u>EC-66. "On Board Diagnosis Function"</u> or <u>EC-69. "CON-SULT Function"</u> . NO >> GO TO 2.	С
NO >> GO TO 2. 2.CHECK PERMANENT DTC	D
<ul> <li>With CONSULT</li> <li>1. Turn ignition switch OFF and wait at least 10 seconds.</li> <li>2. Turn ignition switch ON.</li> <li>3. Turn ignition switch OFF and wait at least 10 seconds.</li> </ul>	Е
<ol> <li>Turn ignition switch ON.</li> <li>Select "PERMANENT DTC STATUS" mode with CONSULT.</li> </ol>	F
<ul> <li>With GST</li> <li>1. Turn ignition switch OFF and wait at least 10 seconds.</li> <li>2. Turn ignition switch ON.</li> <li>3. Turn ignition switch OFF and wait at least 10 seconds.</li> <li>4. Turn ignition switch ON.</li> </ul>	G
<ol> <li>Select Service \$0A with GST.</li> <li><u>Is any permanent DTC detected?</u></li> <li>YES &gt;&gt; GO TO 3.</li> </ol>	Η
NO >> END 3.PERFORM DTC CONFIRMATION PROCEDURE	I
Perform "DTC CONFIRMATION PROCEDURE" for DTCs which are the same as permanent DTCs stored in ECM. Refer to <u>EC-96, "DTC Index"</u> .	J
>> GO TO 4. 4.CHECK PERMANENT DTC	Κ
<ul> <li>With CONSULT</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ul>	L
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> <li>Select "PERMANENT DTC STATUS" mode with CONSULT.</li> </ol>	M
<ul> <li>With GST</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ul>	Ν
5. Select Service \$0A with GST. <u>Is any permanent DTC detected?</u>	0
YES >> GO TO 1. NO >> END	Ρ

#### < BASIC INSPECTION >

# Work Procedure (Group B)

INFOID:000000009651011

[VQ35DE]



- \*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.
- \*2: After experiencing driving pattern B \*3: and D, permanent DTC is erased.

Indication does not change unless the ignition switch is turned from ON to OFF twice even after experiencing driving pattern B or D.

#### NOTE:

Drive the vehicle according to only driving patterns indicating "INCMP" in driving patterns B and D on the "PERMANENT DTC STATUS" screen.

## 1.CHECK DTC

Check DTC.

#### Is any DTC detected?

YES >> Repair malfunction(s) and erase DTC. Refer to <u>EC-66, "On Board Diagnosis Function"</u> or <u>EC-69,</u> <u>"CONSULT Function"</u>.

NO >> GO TO 2.

## 2. CHECK PERMANENT DTC

With CONSULT

- Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Select "PERMANENT DTC STATUS" mode with CONSULT.

#### With GST

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

< BASIC INSPECTION > [VQ35DE]	
<ol> <li>Turn ignition switch ON.</li> <li>Select Service \$0A with GST.</li> </ol>	А
Is any permanent DTC detected?	
	EC
3. DRIVE DRIVING PATTERN B	
<ul> <li>CAUTION:</li> <li>Always drive at a safe speed.</li> <li>Never erase self-diagnosis results.</li> <li>If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B and D is reset.</li> <li>With CONSULT</li> </ul>	C
<ol> <li>Start engine and warm it up to normal operating temperature.</li> <li>Use "PERMANENT DTC WORK SUPPORT" mode with CONSULT to drive the vehicle according to driving pattern B. Refer to <u>EC-69</u>. "<u>CONSULT Function</u>", <u>EC-63</u>. "<u>DIAGNOSIS DESCRIPTION</u> : <u>Driving Pattern</u>".</li> </ol>	E
<ul> <li>With GST</li> <li>Start engine and warm it up to normal operating temperature.</li> <li>Drive the vehicle according to driving pattern B. Refer to <u>EC-63, "DIAGNOSIS DESCRIPTION : Driving Pattern"</u>.</li> </ul>	F
	G
>> GO TO 4. 4.CHECK PERMANENT DTC	
	Н
<ul> <li>With CONSULT</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ul>	I
<ol> <li>Turn ignition switch ON.</li> <li>Select "PERMANENT DTC STATUS" mode with CONSULT.</li> <li>With GST</li> </ol>	J
1. Turn ignition switch OFF and wait at least 10 seconds.	
<ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> <li>Select Service \$0A with GST.</li> </ol>	K
Is any permanent DTC detected?	1
YES >> GO TO 5. NO >> END	
5. DRIVE DRIVING PATTERN D	M
<ul> <li>CAUTION:</li> <li>Always drive at a safe speed.</li> <li>Never erase self-diagnosis results.</li> <li>If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B and D is reset.</li> </ul>	Ν
<ol> <li>Drive the vehicle according to driving pattern D. Refer to <u>EC-63, "DIAGNOSIS DESCRIPTION : Driving</u> <u>Pattern"</u>.</li> </ol>	0
>> GO TO 6.	Р

 $6. {\sf CHECK PERMANENT DTC}$ 

- With CONSULT
  1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON. 4.

< BASIC INSPECTION >

- Select "PERMANENT DTC STATUS" mode with CONSULT. 5.
- With GST1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- Turn ignition switch OFF and wait at least 10 seconds. Turn ignition switch ON. 3.
- 4.
- 5. Select Service \$0A with GST.
- Is any permanent DTC detected?
- YES >> GO TO 1.
- NO >> END

#### < DTC/CIRCUIT DIAGNOSIS >

# DTC/CIRCUIT DIAGNOSIS TROUBLE DIAGNOSIS - SPECIFICATION VALUE

# Description

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

The SP value is used to detect malfunctions that may affect the Engine Control System, but will not illuminate 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)

## Component Function Check

# **1.**START

Check that all of the following conditions are satisfied.

- 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
- After the engine is warmed up to normal operating temperature, drive vehicle until "FLUID TEMP SE" (CVT fluid temperature sensor signal) indicates more than 60°C (140°F).
- Electrical load: Not applied
- Rear window defogger switch, air conditioner switch lighting switch are OFF. Steering wheel is straight ahead.
- Engine speed: Idle

#### >> GO TO 2.

## 2.PERFORM "SPEC" OF "DATA MONITOR" MODE

## 

NOTE:

Perform "SPEC" in "DATA MONITOR" mode in maximum scale display.

- 1. Perform "EC-129, "Work Procedure".
- Select "B/FUEL SCHDL", "A/F ALPHA-B1", "A/F ALPHA-B2" and "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode with CONSULT.
- 3. Check that monitor items are within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> Proceed to <u>EC-156. "Diagnosis Procedure"</u>.

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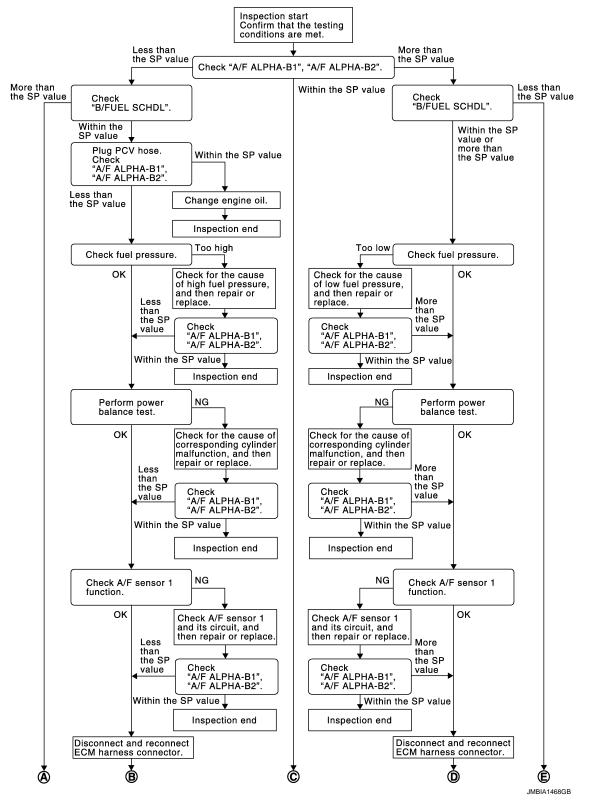
## < DTC/CIRCUIT DIAGNOSIS >

#### **Diagnosis** Procedure

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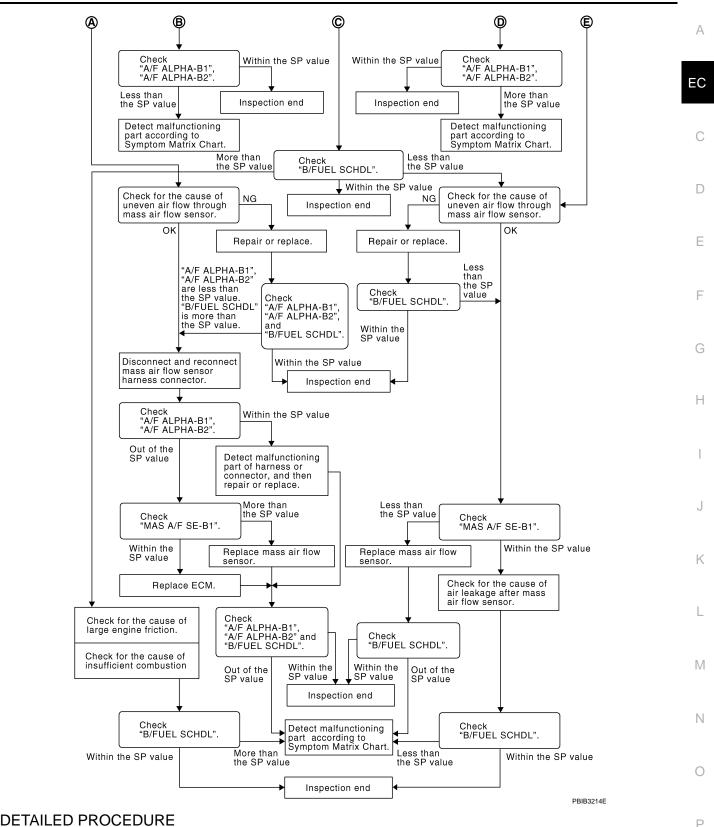
[VQ35DE]

#### **OVERALL SEQUENCE**



#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]



**1.**CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

#### With CONSULT

- 1. Start engine.
- 2. Confirm that the testing conditions are met. Refer to EC-155, "Component Function Check".
- 3. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

# EC-157

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

#### NOTE:

Check "A/F ALPHA-B1", "A/F ALPHA-B2" for approximately 1 minute because they may fluctuate. It is NG if the indication is out of the SP value even a little.

Is the measurement value within the SP value?

- YES >> GO TO 17.
- NO-1 >> Less than the SP value: GO TO 2.
- NO-2 >> More than the SP value: GO TO 3.

2.CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 4.

NO >> More than the SP value: GO TO 19.

**3.**CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 6.

NO-1 >> More than the SP value: GO TO 6.

NO-2 >> Less than the SP value: GO TO 25.

**4.**CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

- 1. Stop the engine.
- 2. Disconnect PCV hose, and then plug it.
- 3. Start engine.
- 4. Select "Ă/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

Is the measurement value within the SP value?

YES >> GO TO 5.

NO >> GO TO 6.

**5.**CHANGE ENGINE OIL

- 1. Stop the engine.
- 2. Change engine oil.

#### NOTE:

This symptom may occur when a large amount of gasoline is mixed with engine oil because of driving conditions (such as when engine oil temperature does not rise enough since a journey distance is too short during winter). The symptom will not be detected after changing engine oil or changing driving conditions.

>> INSPECTION END

#### **6.**CHECK FUEL PRESSURE

Check fuel pressure. (Refer to EC-141, "Work Procedure".)

Is the inspection result normal?

YES >> GO TO 9.

NO-1 >> Fuel pressure is too high: Replace "fuel filter and fuel pump assembly", refer to <u>FL-5</u>, "<u>Exploded</u> <u>View</u>", and then GO TO 8.

NO-2 >> Fuel pressure is too low: GO TO 7.

**1**.DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging.

Is the inspection result normal?

YES >> Replace "fuel filter and fuel pump assembly", refer to <u>FL-5. "Exploded View"</u>, and then GO TO 8.

NO >> Repair or replace malfunctioning part and then GO TO 8.

< DTC/CIRCUIT DIAGNOSIS >

8. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"
<ol> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.</li> </ol>
Is the measurement value within the SP value?
YES >> INSPECTION END NO >> GO TO 9.
9. PERFORM POWER BALANCE TEST
<ol> <li>Perform "POWER BALANCE" in "ACTIVE TEST" mode.</li> <li>Check that the each cylinder produces a momentary engine speed drop.</li> </ol>
Is the inspection result normal?
YES >> GO TO 12. NO >> GO TO 10.
10. DETECT MALFUNCTIONING PART
Check the following below.
<ul> <li>Ignition coil and its circuit (Refer to <u>EC-431, "Component Function Check"</u>.)</li> <li>Fuel injector and its circuit (Refer to <u>EC-426, "Component Function Check"</u>.)</li> </ul>
Intake air leakage
Low compression pressure (Refer to <u>EM-23, "Inspection"</u> .)      Is the inspection result normal?
YES >> Replace fuel injector, refer to <u>EM-47, "Exploded View"</u> , and then GO TO 11.
NO >> Repair or replace malfunctioning part and then GO TO 11.
<b>11.</b> CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"
<ol> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.</li> </ol>
Is the measurement value within the SP value?
YES >> INSPECTION END
NO >> GO TO 12. 12.CHECK A/F SENSOR 1 FUNCTION K
<ul> <li>Perform all DTC CONFIRMATION PROCEDURE related with A/F sensor 1.</li> <li>For DTC P0130, P0150, refer to <u>EC-206, "DTC Logic"</u>.</li> </ul>
• For DTC P0131, P0151, refer to <u>EC-210, "DTC Logic"</u> .
<ul> <li>For DTC P0132, P0152, refer to <u>EC-213, "DTC Logic"</u>.</li> <li>For DTC P014C, P014D, P014E, P014F, refer to <u>EC-235, "DTC Logic"</u>.</li> </ul>
• For DTC P2096, P2097, P2098, P2099, refer to <u>EC-391, "DTC Logic"</u> .
Are any DTCs detected?
YES >> GO TO 15. NO >> GO TO 13.
13. CHECK A/F SENSOR 1 CIRCUIT
Perform Diagnostic Procedure according to corresponding DTC.
0
>> GO TO 14.
<b>14.</b> CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"
<ol> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.</li> </ol>
Is the measurement value within the SP value?
YES >> INSPECTION END NO >> GO TO 15.

#### < DTC/CIRCUIT DIAGNOSIS >

15. DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR

- 1. Stop the engine.
- 2. Disconnect ECM harness connector. Check pin terminal and connector for damage, and then reconnect it.

>> GO TO 16.

**16.**CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

- 1. Start engine.
- Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> Detect malfunctioning part according to <u>EC-450, "Symptom Table"</u>.
- 17.CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO-1 >> More than the SP value: GO TO 18.
- NO-2 >> Less than the SP value: GO TO 25.

**18.** DETECT MALFUNCTIONING PART

- 1. Check for the cause of large engine friction. Refer to the following.
- Engine oil level is too high
- Engine oil viscosity
- Belt tension of power steering, alternator, A/C compressor, etc. is excessive
- Noise from engine
- Noise from transmission, etc.
- 2. Check for the cause of insufficient combustion. Refer to the following.
- Valve clearance malfunction
- Intake valve timing control function malfunction
- Camshaft sprocket installation malfunction, etc.

>> Repair or replace malfunctioning part, and then GO TO 30.

## **19.**CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.

- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

Is the inspection result normal?

YES >> GO TO 21.

NO >> Repair or replace malfunctioning part, and then GO TO 20.

20.CHECK "A/F ALPHA-B1", "A/F ALPHA-B2", AND "B/FUEL SCHDL"

Select "A/F ALPHA-B1", "A/F ALPHA-B2", and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> "B/FUEL SCHDL" is more, "A/F ALPHA-B1", "A/F ALPHA-B2" are less than the SP value: GO TO 21.

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.

< DTC/CIRCUIT DIAGNOSIS > [VQ35DE]	ł
2. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for damage and then reconnect it again.	k A
>> GO TO 22.	
22. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"	E
<ol> <li>Start engine.</li> <li>Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.</li> </ol>	<u>ا</u>
<u>Is the measurement value within the SP value?</u> YES >> Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to <u>EC-184</u> , "Diagno	= г
sis Procedure". Then GO TO 29. NO >> GO TO 23.	
23.CHECK "MAS A/F SE-B1"	E
Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SI value.	5
Is the measurement value within the SP value?	F
<ul> <li>YES &gt;&gt; GO TO 24.</li> <li>NO &gt;&gt; More than the SP value: Replace mass air flow sensor, refer to <u>EM-26, "Exploded View"</u>, and the GO TO 29.</li> </ul>	ו (
24.replace ECM	
<ol> <li>Replace ECM.</li> <li>Refer to <u>EC-133, "Work Procedure"</u>.</li> </ol>	ŀ
>> GO TO 29.	
25. CHECK INTAKE SYSTEM	1
Check for the cause of uneven air flow through mass air flow sensor. Refer to the following. <ul> <li>Crushed air ducts</li> </ul>	-
<ul> <li>Malfunctioning seal in air cleaner element</li> </ul>	
<ul> <li>Uneven dirt in air cleaner element</li> <li>Improper specification in intake air system</li> </ul>	
Is the inspection result normal?	ŀ
YES >> GO TO 27.	
NO >> Repair or replace malfunctioning part, and then GO TO 26. 26.CHECK "B/FUEL SCHDL"	I
	-
Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SI value.	N
Is the measurement value within the SP value?	
YES >> INSPECTION END NO >> Less than the SP value: GO TO 27.	1
27.CHECK "MAS A/F SE-B1"	1
Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SI	5
value.	(
Is the measurement value within the SP value?	
YES >> GO TO 28. NO >> Less than the SP value: Replace mass air flow sensor, refer to <u>EM-26, "Exploded View"</u> , and the	
GO TO 30.	I
28. CHECK INTAKE SYSTEM	
Check for the source of air lookage after the mass air flow sonsor. Pofer to the following	-

Check for the cause of air leakage after the mass air flow sensor. Refer to the following.
Disconnection, looseness, and cracks in air duct

Looseness of oil filler cap

• Disconnection of oil level gauge

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

- Open stuck, breakage, hose disconnection, or cracks in PCV valve
- Disconnection or cracks in EVAP purge hose, stuck open EVAP canister purge volume control solenoid valve
- Malfunctioning seal in rocker cover gasket
- Disconnection, looseness, or cracks in hoses, such as a vacuum hose, connecting to intake air system parts
- Malfunctioning seal in intake air system, etc.

#### >> GO TO 30.

 $29. {\sf CHECK ``A/F ALPHA-B1", ``A/F ALPHA-B2", AND ``B/FUEL SCHDL"}$ 

Select "A/F ALPHA-B1", "A/F ALPHA-B2", and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that each indication is within the SP value.

Is the measurement value within the SP value?

- YES >> INSPECTION END
- NO >> Detect malfunctioning part according to <u>EC-450, "Symptom Table"</u>.

**30.**CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and then check that the indication is within the SP value.

Is the measurement value within the SP value?

YES >> INSPECTION END

NO >> Detect malfunctioning part according to EC-450. "Symptom Table".

## < DTC/CIRCUIT DIAGNOSIS > POWER SUPPLY AND GROUND CIRCUIT

## **Diagnosis Procedure**

# 1.CHECK FUSE

Check that the following fuse is not fusing.

Location	Fuse	No.	Capacity			
PDM E/R	#4	4	10 A	_		
	#5	0	15 A	_		
fuse fusin	<u>g?</u>			-		
>> Rep >> GO	lace the fuse a TO 2.	fter repairing t	he applicable o	circuit.		
IECK GRC		CTION				
	n switch OFF.					
	nd connection I		GI-45, "Circuit I	Inspection".		
-	result normal?	-				
~~ ( ( )						
		round connec	tion.			
>> Rep	air or replace g		ction.			
>> Rep HECK ECM	air or replace g I GROUND CIF	RCUIT	ction.			
>> Rep HECK ECM Disconnect	air or replace g I GROUND CIF ECM harness o	CUIT		and ground.	 	
>> Rep HECK ECM Disconnect	air or replace g I GROUND CIF	CUIT		and ground.	 	
>> Rep HECK ECM Disconnect	pair or replace g 1 GROUND CIF ECM harness o continuity betwe	CUIT		and ground.		
>> Rep HECK ECM Disconnect Check the c	pair or replace g I GROUND CIF ECM harness of continuity betwe	CUIT		and ground.	 	
>> Rep HECK ECM Disconnect Check the c +	pair or replace g I GROUND CIF ECM harness of continuity betwe	CUIT	ess connector a	and ground.		
>> Rep HECK ECM Disconnect Check the c + EC onnector	air or replace g 1 GROUND CIF ECM harness of continuity betwe	CUIT	ess connector a	and ground.		
>> Rep HECK ECM Disconnect Check the c + EC	pair or replace g I GROUND CIF ECM harness of continuity betwee M Terminal	CUIT	ess connector a	and ground. 		
>> Rep HECK ECM Disconnect Check the c + EC onnector	air or replace g I GROUND CIF ECM harness of continuity between M Terminal 16	CUIT connectors. een ECM harn	Continuity	and ground. 		
>> Rep HECK ECM Disconnect Check the c + EC onnector F7	air or replace g I GROUND CIF ECM harness of continuity between M Terminal 16 12	CUIT	ess connector a	and ground. 		
>> Rep HECK ECM Disconnect Check the c + EC onnector	air or replace g I GROUND CIF ECM harness of continuity between M Terminal 16 12 123	CUIT connectors. een ECM harn	Continuity	and ground.		

>> Repair or replace error-detected parts. NO

4.CHECK ECM POWER SUPPLY (MAIN)-I

1. Reconnect ECM harness connector.

2. Turn ignition switch ON.

3. Check the voltage between ECM harness connector terminals.

	ECM		
Connector	+	_	Voltage
Connector	Terr	ninal	
E16	121	128	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 6.

5. CHECK ECM POWER SUPPLY (MAIN)-II

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#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Check the voltage between ECM harness connector terminals as per the following.

	ECM			Voltage (Approx.)	
Connector	+	-	Condition		
Connector	Terminal			(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
E16	121	128	After turning ignition switch OFF, battery voltage will ex- ist for a few seconds	Drop to 0 V	

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 7.

6.CHECK ECM POWER SUPPLY (MAIN) CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connectors.
- 3. Disconnect IPDM E/R harness connector.
- 4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

	+			
E	СМ	IPDN	Continuity	
Connector	Terminal	Connector		
E16	121	E10	10	Existed

5. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

7.CHECK ECM RELAY CONTROL SIGNAL

Check the voltage between ECM harness connector terminals as per the following.

	E	СМ				
	+ –			Condition	Voltage (Approx.)	
Connector	Terminal	Connector Terminal			( ) [ ] ] ] ]	
				Ignition switch ON	0 V	
F7	31	E16	128	Turn ignition switch OFF and wait at least 10 sec- onds.	Battery voltage	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42. "Intermittent Incident".

NO >> GO TO 8.

**8.**CHECK ECM RELAY CONTROL SIGNAL CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Disconnect IPDM E/R harness connector.
- 4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

-	+			
E	СМ	IPDI	Continuity	
Connector	Terminal	Connector Terminal		
F7	31	F12	69	Existed

		-	SUPPLY	AND GR	OUND CIRCUIT	
< DTC/CIRC						[VQ35DE]
5. Also che Is the inspec		for short to g	round and t	o power.		А
			r to PCS-36	Removal a	nd Installation".	
		place error-de			ind motandion .	
9.CHECK	GNITION S	WITCH SIGN	AL			EC
1. Turn ign	ition switch	ON.				
2. Check the	he voltage b	etween ECM	harness co	nnector term	inals.	С
	5014					
	ECM		Con	dition	Voltage	
Connector	+ Tor	 minal	Con		(Approx.)	D
	Ien		Ignition switcl	h OFF	0 V	
E16	109	128	Ignition switch		Battery voltage	E
Is the inspec	tion result n	ormal?	ignition office		Dation y Voltago	
-	GO TO 11.	<u>orman</u>				F
NO >>	GO TO 10.					Г
10.CHECK	<b>KIGNITION</b>	SWITCH SIG	SNAL CIRC	UIT		
	ition switch					G
		rness connec R harness co				
				connector ar	d IPDM E/R harness o	connector. H
	,					
-	+	-	-			
EC	CM	IPDN	1 E/R	Continuity		
Connector	Terminal	Connector	Terminal			
E16	109	E10	19	Existed		J
		for short to g	round and t	o power.		
Is the inspec					'4	
		trouble diagr place error-de			Cult.	K
	•	ER SUPPLY				
-		en ECM harr				L
	onago sorre					
	E	СМ				M
	+	-	-	Vol	age	IVI
Connector	Terminal	Connector	Terminal			
F7	26	E16	128	Battery	voltage	Ν
Is the inspec	tion result n	ormal?				
		mittent incide	nt. Refer to	<u>GI-42, "Interi</u>	nittent Incident".	0
	GO TO 12.					0
		/ER SUPPLY	(BACK-UP	) CIRCUIT		
	ition switch		tor			P
		rness connec /R harness co				
4. Check the	he continuity	v between EC	M harness	connector ar	d IPDM E/R harness o	connector.

	+			
E	CM	IPDN	M E/R	Continuity
Connector	Terminal	Connector	Terminal	
F7	26	F12	55	Existed

5. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

#### < DTC/CIRCUIT DIAGNOSIS >

# **U0101 CAN COMM CIRCUIT**

# Description

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle mul-EC tiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

# DTC Logic

INFOID:000000009651017 D

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0101	Lost communication with TCM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) with TCM for 2 seconds or more.	<ul> <li>CAN communication line between TCM and ECM</li> <li>CAN communication line open or shorted</li> </ul>
DTC CON	FIRMATION PROCI	EDURE	
1.PERFO	RM DTC CONFIRMAT	TION PROCEDURE	
<ol> <li>Turn ig</li> <li>Check</li> </ol>		wait at least 3 seconds.	
Is DTC det	ected?		
	Proceed to <u>EC-167</u> , NSPECTION END	" <u>Diagnosis Procedure"</u> .	
Diagnosi	is Procedure		INFOID:00000009651018
Perform th	e trouble diagnosis fo	or CAN communication system. Refer to	LAN-17. "Trouble Diagnosis Flow

INFOID:000000009651016

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# U1001 CAN COMM CIRCUIT

# Description

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

# DTC Logic

INFOID:000000009651020

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1001	CAN communication line	When ECM is not transmitting or receiving CAN com- munication signal other than OBD (emission related diagnosis) for 2 seconds or more.	Harness or connectors (CAN communication line is open or shorted)

## DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 3 seconds.

2. Check DTC.

#### Is DTC detected?

YES >> Proceed to <u>EC-168, "Diagnosis Procedure"</u>. NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000009651021

Perform the trouble diagnosis for CAN communication system. Refer to <u>LAN-17, "Trouble Diagnosis Flow</u> <u>Chart"</u>.

## P0011, P0021 IVT CONTROL

#### < DTC/CIRCUIT DIAGNOSIS >

# P0011, P0021 IVT CONTROL

# **DTC Logic**

## DTC DETECTION LOGIC

#### NOTE:

If DTC P0011 or P0021 is displayed with DTC P0075 or P0081, first perform the trouble diagnosis for DTC P0075, P0081. Refer to <u>EC-177, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0011	Intake valve timing control performance (bank 1)	There is a gap between angle of target and	<ul> <li>Crankshaft position sensor (POS)</li> <li>Camshaft position sensor (PHASE)</li> <li>Intake valve timing control solenoid valve</li> <li>Accumulation of debris to the signal pick-up</li> </ul>
P0021	Intake valve timing control performance (bank 2)	phase-control angle degree.	<ul> <li>Foreign matter caught in the oil groove for in- take valve timing control</li> </ul>
	VFIRMATION PR	OCEDURE	
1.PREC	ONDITIONING		
If DTC Co		ure has been previously conducted, alwa	ys perform the following before conduct-
1. Turn i	gnition switch OFF	and wait at least 10 seconds.	
	gnition switch ON.	and wait at least 10 seconds.	
TESTING	CONDITION:		
Before pe idle.	erforming the foll	owing procedure, confirm that battery	y voltage is between 10 V and 16 V at
iule.			
>	>> GO TO 2.		
2.PERFO	ORM DTC CONFIR	MATION PROCEDURE-I	
With C	ONSULT		
		and select "DATA MONITOR" mode with t up to the normal operating temperature.	
3. Maint	ain the following co		ds. Hold the accelerator pedal as steady
as po	ssible.		
ENG SPE	ED 1,200	- 2,000 rpm	
COOLAN		than 60°C (140°F)	
B/FUEL S	CHDL More	than 7.3 msec	
Selector le	ver D pos	ition	
CAU			
	ys drive at a safe vehicle with engine	speed. running and let engine idle for 10 secon	ds
	k 1st trip DTC.		
With G			
	e procedure "With ( DTC detected?	JUNSULI ADOVE.	
		70, "Diagnosis Procedure"	
	> GO TO 3.		

**3.** PERFORM DTC CONFIRMATION PROCEDURE-II

With CONSULT

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# P0011, P0021 IVT CONTROL

#### < DTC/CIRCUIT DIAGNOSIS >

#### 1. Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	1,400 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 60°C (140°F)
Selector lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions re- quired for this test.)

#### CAUTION:

Always drive at a safe speed. 2. Check 1st trip DTC. With GST Follow the procedure "With CONSULT" above. Is 1st trip DTC detected?

YES >> Proceed to <u>EC-170</u>, "Diagnosis Procedure" NO >> INSPECTION END

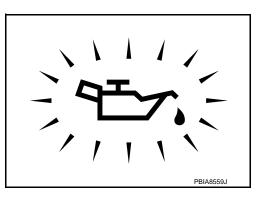
## Diagnosis Procedure

## 1.CHECK OIL PRESSURE WARNING LAMP

- 1. Start engine.
- 2. Check oil pressure warning lamp and confirm it is not illuminated.

#### Is oil pressure warming lamp illuminated?

- YES >> Check the engine oil level. Refer to <u>LU-8, "Inspection"</u>.
- NO >> GO TO 2.



## 2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Check intake valve timing control solenoid valve. Refer to <u>EC-171, "Component Inspection"</u>. <u>Is the inspection result normal?</u>

YES >> GO TO 3.

NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-66</u>, "<u>Exploded</u> <u>View</u>".

3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Check crankshaft position sensor (POS). Refer to EC-273, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace crankshaft position sensor (POS). Refer to <u>EM-38</u>, "Exploded View".

**4.**CHECK CAMSHAFT POSITION SENSOR (PHASE)

Check camshaft position sensor (PHASE). Refer to EC-276, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to EM-52, "Exploded View".

**5.**CHECK CAMSHAFT (INTAKE)

Check the following.

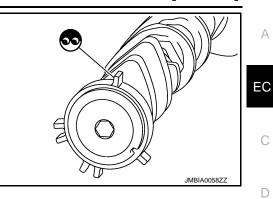
# P0011, P0021 IVT CONTROL

#### < DTC/CIRCUIT DIAGNOSIS >

- · Accumulation of debris on the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

#### Is the inspection result normal?

YES >> GO TO 6. NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to <u>EM-84.</u> <u>"Exploded View"</u>.



# 6. CHECK TIMING CHAIN INSTALLATION

<b>O.</b> CHECK TIMIN	G CHAIN INSTALLATION	
Check service rec	ords for any recent repairs that	at may cause timing chain misalignment.
<u>Are there any serv</u>	rice records that may cause til	iming chain misalignment?
YES >> Check NO >> GO TO	timing chain installation. Ref O 7.	fer to <u>EM-82, "Inspection"</u> .
7.CHECK LUBRI	CATION CIRCUIT	
Check lubrication	circuit. Refer to <u>EM-88, "Inspe</u>	ection".
Is the inspection re	esult normal?	
	intermittent incident. Refer to lubrication line.	o GI-42, "Intermittent Incident".
Component In	spection	INFOID:000000009651024
1.CHECK INTAK	E VALVE TIMING CONTROL	_ SOLENOID VALVE-I
1. Disconnect int	ake valve timing control soler	noid valve harness connector.
2. Check resista	nce between intake valve timi	ing control solenoid valve terminals as per the following.
Terminals	Resistance	-
1 and 2	7.0 - 7.5 Ω [at 20°C (68°F)]	-
T anu z		-
1 or 2 and ground	(Continuity should not exist)	
Is the inspection re	esult normal?	•
YES >> GO TO	-	he timing control colonoid volvo. Defer to EM 66. "Evolution
NO >> Repla <u>View</u> ".		lve timing control solenoid valve. Refer to EM-66, "Exploded
	E VALVE TIMING CONTROL	_ SOLENOID VALVE-II
		id valve. Refer to EM-66, "Exploded View".
2. Provide 12 V	DC between intake valve tim	ming control solenoid
	ls 1 and 2, and then interru s as shown in the figure.	ipt it. Check that the
CAUTION:	s as shown in the lighte.	
	12 V DC continuously for 5	
	y result in damage to the ol solenoid valve.	coll in intake valve
NOTE:		
Always repla	aa 🔿 uluuu uuluuu luutaka uu	
	ace O-ring when intake va ve is removed.	aive timing control
	ve is removed.	

NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-66</u>, "<u>Exploded</u> <u>View</u>".

## P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

#### < DTC/CIRCUIT DIAGNOSIS >

# P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

## **DTC Logic**

INFOID:000000009651025

#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031	Air fuel ratio (A/F) sensor 1 heater (bank 1) control circuit low	The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the A/F sensor 1 heater.)	<ul> <li>Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.)</li> <li>A/F sensor 1 heater</li> </ul>
P0032	Air fuel ratio (A/F) sensor 1 heater (bank 1) control circuit high	The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the A/F sensor 1 heater.)	<ul> <li>Harness or connectors (The A/F sensor 1 heater circuit is shorted.)</li> <li>A/F sensor 1 heater</li> </ul>
P0051	Air fuel ratio (A/F) sensor 1 heater (bank 2) control circuit low	The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the A/F sensor 1 heater.)	<ul> <li>Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.)</li> <li>A/F sensor 1 heater</li> </ul>
P0052	Air fuel ratio (A/F) sensor 1 heater (bank 2) control circuit high	The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the A/F sensor 1 heater.)	<ul> <li>Harness or connectors (The A/F sensor 1 heater circuit is shorted.)</li> <li>A/F sensor 1 heater</li> </ul>

## DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

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

#### >> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and let it idle for at least 10 seconds.
- 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to <u>EC-172</u>, "Diagnosis Procedure".
- NG >> INSPECTION END

## **Diagnosis** Procedure

**1.**CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY

1. Disconnect air fuel ratio (A/F) sensor 1 harness connector.

- 2. Turn ignition switch ON.
- 3. Check the voltage between A/F sensor 1 harness connector and ground.

DTC		A/F sensor 1		Ground	Voltage
DIC	Bank	Connector	Terminal	Giouna	voltage
P0031, P0032	1	F27	4	Ground	Battery voltage
P0051, P0052	2	F64	4	Ground	Dattery voltage

Is the inspection result normal?

INFOID:000000009651026

# P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

< DTC/CIRCUIT DIAGNOSIS >

	on switch O			OWER SUF	PLY CIRC	JIT	A
				arness coni	nector and	PDM E/R harness	s connector.
570		A/F sensor 1		IPDN	IE/R		C
DTC	Bank	Connector	Terminal	Connector	Terminal	Continuity	C
P0031, P0032	1	F27	4	E10	FZ	Eviated	
P0051, P0052	2	F64	4	F12	57	Existed	D
Is the inspection	on result no	rmal?					
		ouble diagn			ircuit.		Е
-		ace error-de	•				
3.CHECK A/F			OUTPUT S	IGNAL CIR	CUIT		
	on switch O	FF. less connec	tor				F
				or 1 harness	connector	and ECM harness	s connector.
		,					G
DTO		A/F sensor 1		EC	CM	Continuity	0
DTC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0031, P0032	1	F27	3	F7	6	Existed	Н
P0051, P0052	2	F64	3	F/	3	Existed	
4. Also check	k harness fo	or short to g	ound and s	short to powe	er.		I
Is the inspection	on result no	rmal?					I
	O TO 4.		4				_
4	• •		to ground c	or short to po	ower in nar	ness or connector	s. J
4.CHECK A/F							
Check A/F sen			<u>-173, "Cc</u>	omponent In	<u>spection"</u> .		K
Is the inspection			t Defer to		mittent Inci	do ot"	IX.
		ittent incider unctioning a				o <u>EM-33, "Explode</u>	ed View".
Component	•	-		( )			L
Component	пэреси						INFOID:000000009651027
1.CHECK AIF	R FUEL RAT	TIO (A/F) SE	INSOR 1				M
Check resistar	ice betweer	n A/F sensoi	terminals a	as per the fo	llowing.		111
				·	-		
Term	inal No.		Resi	istance			Ν
3 8	and 4		1.8 - 2.44 Ω	[at 25°C (77°F)	]		
3 ar	nd 1, 2			×Ω			0
4 ar	nd 1, 2		(Continuity s	hould not exist	)		0
Is the inspection	on result no	rmal?					
	SPECTION		a frank di				P
NO >> Re	uace malfi	uncuonina a	ii iuei ratio	LA/FLSENSO	I Refer to	<u>EM-33, "Explode</u>	AL VIEW

## < DTC/CIRCUIT DIAGNOSIS >

# P0037, P0038, P0057, P0058 HO2S2 HEATER

# **DTC** Logic

INFOID:000000009651028

[VQ35DE]

#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0037	Heated oxygen sensor 2 heater (bank 1) control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul> <li>Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)</li> <li>Heated oxygen sensor 2 heater</li> </ul>
P0038	Heated oxygen sensor 2 heater (bank 1) control circuit high	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul> <li>Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)</li> <li>Heated oxygen sensor 2 heater</li> </ul>
P0057	Heated oxygen sensor 2 heater (bank 2) control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul> <li>Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)</li> <li>Heated oxygen sensor 2 heater</li> </ul>
P0058	Heated oxygen sensor 2 heater (bank 2) control circuit high	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul> <li>Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)</li> <li>Heated oxygen sensor 2 heater</li> </ul>

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is between 10.5 V and 16 V at idle.

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Check 1st trip DTC.

#### Is 1st tip DTC detected?

- YES >> Proceed to EC-174, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000009651029

## 1.CHECK HO2S2 POWER SUPPLY

- 1. Disconnect heated oxygen sensor 2 (HO2S2) harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between HO2S2 harness connector and ground.

# P0037, P0038, P0057, P0058 HO2S2 HEATER

## < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

		HO2S2						
DTC	Bank	Connector	Terminal	- Ground	Vo	Itage		
P0037, P0038	1	F72	2	Crownd	Detter			
P0057, P0058	2	F73	2	- Ground	Ballery	/ voltage		
NO >> G 2.CHECK HO 1. Turn igniti 2. Disconne	O TO 3. O TO 2. D2S2 SEN ion switch ct IPDM E	ISOR 1 PC OFF. /R harness	connecto	r.			M E/D bornoo	
<ol> <li>Check the</li> </ol>	econtinuit	-					M E/R harnes	s connector.
DTC		HO2S2				/I E/R	Continuity	
D0027 D0029	Bank 1	Connect F72	or Termi 2	nal Co	nnector	Termina		
P0037, P0038 P0057, P0058	2	F72	2		F12	56	Existed	
s the inspecti			2					
YES >> P NO >> R	erform the epair or re	e trouble dia eplace erro	r-detected	parts.			AND SHORT	
DTC	Bank	HO2S2 Connector	Terminal	Connecto	ECM or Term	Co	ntinuity	
P0037, P0038	1	F72	3		3	7		
P0057, P0058	2	F73	3	F7	4		xisted	
NO >> R 4.CHECK HE Check heated Is the inspecti YES >> C	on result r O TO 4. epair oper EATED O oxygen s on result r heck inter	normal? n circuit, sh (YGEN SE ensor 2 he normal? mittent inci	ort to grou NSOR 2 H ater. Refer dent. Refe	Ind or sh IEATER to <u>EC-1</u> er to <u>GI-4</u>	ort to po 75, "Co 2, "Inter	ower in ha	cident".	
-	•		g heated o	oxygen s	ensor 2	. Refer to	<u>EM-33, "Explo</u>	
Componen	-							INFOID:000000009651030
<b>1</b> .CHECK HE Check resista					ne follov	ving.		
Tern	ninal No.			Resistanc	e			
	and 3		3.4 - 4.	4 Ω [at 25°	°C (77°F)]			
	id 2, 3, 4		(Contin	$\infty \Omega$ uity should	not exist	)		
4 an	id 1, 2, 3		(001111	, onoulu		/		

Is the inspection result normal?

P0037, P0038, P0057, P0058 HO2S2 HEATER

< DTC/CIRCUIT DIAGNOSIS >

YES >> INSPECTION END

NO >> Replace malfunctioning heated oxygen sensor 2. Refer to EM-33, "Exploded View".

# P0075, P0081 IVT CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

# P0075, P0081 IVT CONTROL SOLENOID VALVE

# DTC Logic

1

INFOID:000000009651031

[VQ35DE]

# DTC DETECTION LOGIC

DTC No.	I rouble	diagnosis nan	ne	DIC det	tecting condition	Possible cause
P0075		e timing contro e (bank 1) circ	uit An ir		age is sent to the ECM ve timing control solenoid	Harness or connectors     (Intake valve timing control solenoid valve
P0081		e timing contro e (bank 2) circ	ol so- valve	•		<ul><li>circuit is open or shorted.)</li><li>Intake valve timing control solenoid valve</li></ul>
DTC CO	NFIRMAT	TION PRO	CEDURE			
1.PREC	ONDITION	NING				
If DTC Co	onfirmatior	n Procedure	has beer	previously	y conducted, always	perform the following before conduct-
ing the ne				lagat 10 au		
	ignition sw	vitch OFF ar vitch ON.	id wait at	least 10 se	econas.	
		vitch OFF ar	nd wait at	least 10 se	econds.	
•	>> GO TO		_			
		CONFIRM			E	
		d let it idle f	or 5 secor	nds.		
	k 1st trip [ DTC dete					
-		d to <u>EC-177</u>	"Diagno	sis Proced	ure"	
		CTION END			<u>.</u>	
Diagno	sis Proc	edure				INFOID:00000009651032
<b>1.</b> CHEC	K INTAKE	VALVE TIM	IING CON	ITROL SO	LENOID VALVE POV	VER SUPPLY
1. Turn	ignition sw	vitch OFF.				
1. Turn 2. Disco	ignition sw	vitch OFF. ke valve tim			LENOID VALVE POV	
1. Turn 2. Disco 3. Turn	ignition swonnect inta ignition swonnect inta	vitch OFF. ke valve tim vitch ON.	ning (IVT)	control sol	enoid valve harness o	
1. Turn 2. Disco 3. Turn 4. Chec	ignition swonnect inta ignition swonnect inta	vitch OFF. ke valve tin vitch ON. age betweer	ning (IVT)	control sol	enoid valve harness o	connector.
1. Turn 2. Disco 3. Turn 4. Chec	ignition sw onnect inta ignition sw k the volta SULT or te	vitch OFF. Ike valve tim vitch ON. age betweer ester.	ning (IVT) n intake va	control sol	enoid valve harness o	connector.
1. Turn 2. Disco 3. Turn 4. Chec	ignition sw onnect inta ignition sw k the volta SULT or te	vitch OFF. ke valve tin vitch ON. age betweer	ning (IVT) n intake va	control sol	enoid valve harness o	connector.
<ol> <li>Turn</li> <li>Disco</li> <li>Turn</li> <li>Chec</li> <li>CON</li> </ol>	ignition swonnect inta ignition sw k the volta SULT or te	vitch OFF. ike valve tim vitch ON. age betweer ester.	ning (IVT) n intake va valve	control sol alve timing Ground	lenoid valve harness o control solenoid valvo Voltage	connector.
1. Turn 2. Disco 3. Turn 4. Cheo CON	ignition sw onnect inta ignition sw k the volta SULT or te IVT co Bank	vitch OFF. ike valve tim vitch ON. age betweer ester. ontrol solenoid Connector	ning (IVT) n intake va valve Terminal	control sol alve timing	enoid valve harness of control solenoid valve	connector.
1. Turn 2. Disco 3. Turn 4. Cheo CON DTC P0075 P0081	ignition sw onnect inta ignition sw k the volta SULT or te IVT c Bank 1 2	vitch OFF. ike valve tim vitch ON. age between ester. ontrol solenoid Connector F81	ning (IVT) n intake va valve Terminal 2 2	control sol alve timing Ground	lenoid valve harness o control solenoid valvo Voltage	connector.
1. Turn 2. Disco 3. Turn 4. Cheo CON DTC P0075 P0081 Is the ins YES	ignition sw onnect inta ignition sw k the volta SULT or te IVT c Bank 1 2 Dection res >> GO TO	vitch OFF. ike valve tim vitch ON. age between ester. control solenoid Connector F81 F82 sult normal? 2.	ning (IVT) n intake va valve Terminal 2 2	control sol alve timing Ground Ground	lenoid valve harness o control solenoid valvo Voltage Battery voltage	connector. e harness connector and ground with
1. Turn 2. Disco 3. Turn 4. Cheo CON DTC P0075 P0081 Is the ins YES NO	ignition sw onnect inta ignition sw k the volta SULT or te IVT co Bank 1 2 Dection res >> GO TO >> Repair	vitch OFF. ike valve tim vitch ON. age betweer ester. ontrol solenoid Connector F81 F82 sult normal? 2. open circuit	ning (IVT) n intake va valve Terminal 2 2 , short to	control sol alve timing Ground Ground	enoid valve harness of control solenoid valve Voltage Battery voltage	connector. e harness connector and ground with
1. Turn 2. Disco 3. Turn 4. Cheo CON DTC P0075 P0081 Is the ins YES NO 2.CHEC	ignition sw onnect inta ignition sw k the volta SULT or te IVT c Bank 1 2 Dection res >> GO TO >> Repair K INTAKE	vitch OFF. ike valve tim vitch ON. age betweer ester. ontrol solenoid Connector F81 F82 sult normal? 2. open circuit	ning (IVT) n intake va valve Terminal 2 2 , short to	control sol alve timing Ground Ground	enoid valve harness of control solenoid valve Voltage Battery voltage	connector. e harness connector and ground with
1. Turn 2. Disco 3. Turn 4. Cheo CON DTC P0075 P0081 Is the ins YES NO 2.CHEC AND SHO	ignition sw onnect inta ignition sw k the volta SULT or te Bank 1 2 Dection res >> GO TO >> Repair K INTAKE DRT	vitch OFF. ike valve tim vitch ON. age between ester. ontrol solenoid Connector F81 F82 Sult normal? 2. open circuit VALVE TIM	ning (IVT) n intake va valve Terminal 2 2 , short to	control sol alve timing Ground Ground	enoid valve harness of control solenoid valve Voltage Battery voltage	connector. e harness connector and ground with
1. Turn 2. Disco 3. Turn 4. Cheo CON DTC P0075 P0081 Is the ins YES NO 2.CHEC AND SHO 1. Turn	ignition sw onnect inta ignition sw k the volta SULT or te Bank 1 2 Dection res >> GO TO >> Repair K INTAKE DRT ignition sw	vitch OFF. ike valve tim vitch ON. age between ester. ontrol solenoid Connector F81 F82 Sult normal? 2. open circuit VALVE TIM	valve Terminal 2 , short to g	control sol alve timing Ground Ground ground or s	enoid valve harness of control solenoid valve Voltage Battery voltage	connector. e harness connector and ground with

3. Check the continuity between intake valve timing control solenoid valve harness connector and ECM harness connector.

А

EC

Terminal

4. Also check harness for short to ground and short to power.

IVT control solenoid valve

Connector

Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

Bank

YES >> GO TO 3.

DTC

P0075

P0081

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

3.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Check intake valve timing control solenoid valve. Refer to <u>EC-178, "Component Inspection"</u>. Is the inspection result normal?

- YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.
- NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-66</u>, "<u>Exploded</u> <u>View</u>".

P0075, P0081 IVT CONTROL SOLENOID VALVE

ECM

Connector

Terminal

Continuity

Existed

# Component Inspection

INFOID:000000009651033

# 1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-I

- 1. Disconnect intake valve timing control solenoid valve harness connector.
- 2. Check resistance between intake valve timing control solenoid valve terminals as per the following.

Terminals	Resistance
1 and 2	7.0 - 7.5 Ω [at 20°C (68°F)]
1 or 2 and ground	${}^{\infty\Omega}$ (Continuity should not exist)

Is the inspection result normal?

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-66, "Exploded</u> <u>View"</u>.

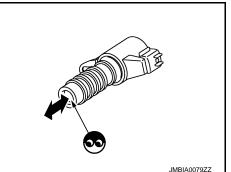
2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE-II

- 1. Remove intake valve timing control solenoid valve. Refer to EM-66. "Exploded View".
- Provide 12 V DC between intake valve timing control solenoid valve terminals 1 and 2, and then interrupt it. Check that the plunger moves as shown in the figure. CAUTION:

Never apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve. NOTE:

Always replace O-ring when intake valve timing control solenoid valve is removed.

#### YES >> INSPECTION END NO >> Replace malfunctioning intake valve timing control solenoid valve. Refer to <u>EM-66, "Exploded</u> <u>View"</u>.



# **P0101 MAF SENSOR**

# < DTC/CIRCUIT DIAGNOSIS >

# P0101 MAF SENSOR

# DTC Logic

# DTC DETECTION LOGIC **NOTE**:

If DTC P0101 is displayed with other DTC, first perform the trouble diagnosis for other DTC.

DTC No.	Trouble diagn		DTC detecting condition	Possible cause
P0101	(Trouble diagnosis MAF SEN/CIRCUIT-I [Mass air flow (MAF) cuit range/performan	B1 sensor cir-	<ul> <li>A high voltage from the sensor is sent to ECM under light load driving condition.</li> <li>A low voltage from the sensor is sent to ECM under heavy load driving condition.</li> </ul>	<ul> <li>Harness or connectors (The sensor circuit is open or short- ed.)</li> <li>Intake air leaks</li> <li>MAF sensor</li> <li>EVAP control system pressure sensor</li> <li>Intake air temperature sensor</li> </ul>
DTC COI	NFIRMATION PR	ROCEDU	RE	
1.PREC	ONDITIONING			
dure befo 1. Turn i 2. Turn i	re conducting the ignition switch OFI ignition switch ON	next test. F and wait	RE has been previously conducted, a t at least 10 seconds. t at least 10 seconds.	lways perform the following proce-
>	>> GO TO 2.			
2.perf	ORM DTC CONFI	RMATION	PROCEDURE	
1. Start 2. Drive CAU	the vehicle for at I	least 5 seo	rmal operating temperature. conds under the following conditions:	
1. Start 2. Drive CAU	the vehicle for at l	least 5 seo	conds under the following conditions:	
1. Start 2. Drive CAU	the vehicle for at <b>FION:</b> ys drive vehicle a	least 5 seo	conds under the following conditions: eed.	
1. Start 2. Drive CAU Alway	the vehicle for at FION: ys drive vehicle a	least 5 sec at safe sp Suitable po	conds under the following conditions: eed.	
1. Start 2. Drive CAU Alwa Selector le Vehicle spo	the vehicle for at I FION: ys drive vehicle a ever eed E:	least 5 sec at safe sp Suitable pc 40 km/h (2:	conds under the following conditions: eed. osition 5 MPH) or more	
1. Start 2. Drive CAU Alway Selector le Vehicle spo NOTE • The • Kee	the vehicle for at FION: ys drive vehicle a ever eed E: a gear must be fixe app the accelerator	least 5 sec at safe sp Suitable pc 40 km/h (2: ed while dr	conds under the following conditions: eed. osition 5 MPH) or more	
1. Start ( 2. Drive CAU Alway Selector le Vehicle spo NOTE • The • Kee 3. Checl	the vehicle for at FION: ys drive vehicle a ever eed E: a gear must be fixe p the accelerator k 1st trip DTC.	least 5 sec at safe sp Suitable pc 40 km/h (2: ed while dr	conds under the following conditions: eed. osition 5 MPH) or more	
1. Start ( 2. Drive CAU Alwa Selector le Vehicle spo NOTE • The • Kee 3. Check	the vehicle for at I <b>FION:</b> ys drive vehicle a ever eed E: e gear must be fixe p the accelerator k 1st trip DTC. DTC detected?	least 5 sec at safe sp Suitable pc 40 km/h (2 ed while dr pedal as s	conds under the following conditions: eed.	
1. Start ( 2. Drive CAU Alwa Selector le Vehicle spo Vehicle spo • The • Kee 3. Checl Is 1st trip YES >	the vehicle for at I <b>FION:</b> ys drive vehicle a ever eed E: e gear must be fixe p the accelerator k 1st trip DTC. DTC detected?	Suitable po 40 km/h (2 40 km/h (2	conds under the following conditions: eed. osition 5 MPH) or more	
1. Start ( 2. Drive CAU Alway Selector le Vehicle spo NOTE • The • Kee 3. Chect Is 1st trip YES > NO >	the vehicle for at I <b>FION:</b> ys drive vehicle a ver eed eed e gear must be fixe p the accelerator k 1st trip DTC. <u>DTC detected?</u> >> Proceed to <u>EC-</u>	Suitable po 40 km/h (2 40 km/h (2	conds under the following conditions: eed.	INFOID:00000009651035
1. Start ( 2. Drive CAU Alwa Selector le Vehicle spo NOTE • The • Kee 3. Check Is 1st trip YES > NO > Diagnos	the vehicle for at I <b>FION:</b> ys drive vehicle a eed eed eed e gear must be fixe p the accelerator k 1st trip DTC. <u>DTC detected?</u> >> Proceed to <u>EC-</u> >> INSPECTION E sis Procedure	Suitable po 40 km/h (2 40 km/h (2	conds under the following conditions: eed.	INFOID:00000009651035
1. Start ( 2. Drive CAU Alwa Selector le Vehicle spo • The • The • Kee 3. Chect Is 1st trip YES > NO > Diagnos 1.CHECI	the vehicle for at I <b>FION:</b> ys drive vehicle a eed eed eed e gear must be fixe p the accelerator k 1st trip DTC. <u>DTC detected?</u> >> Proceed to <u>EC-</u> >> INSPECTION E sis Procedure K INTAKE SYSTE	Suitable po 40 km/h (2 40 km/h (2	conds under the following conditions: eed.	INFOID:00000009651035
1. Start ( 2. Drive CAU Alwa Selector le Vehicle spo • The • Kee 3. Checl Is 1st trip YES NO > Diagnos 1.CHECI Check the • Air duct	the vehicle for at I <b>FION:</b> <b>ys drive vehicle a</b> <b>e</b> ed <b>E</b> : <b>e</b> gear must be fixe <b>e</b> gear must be fixe <b>e</b> gear must be fixe <b>e</b> gear must be fixe <b>b</b> the accelerator <b>k</b> 1st trip DTC. <b>DTC detected?</b> <b>&gt;&gt; Proceed to EC-</b> <b>&gt;&gt; INSPECTION E</b> <b>Sis Procedure</b> <b>K INTAKE SYSTE</b> <b>e</b> following for conrections	Suitable po 40 km/h (2 40 km/h (2	conds under the following conditions: eed.	INFOID:00000009651035
1. Start ( 2. Drive CAU Alway Selector le Vehicle spo • The • The • Kee 3. Checl Is 1st trip YES > NO > Diagnos 1.CHECI Check the • Air duct	the vehicle for at I <b>FION:</b> <b>ys drive vehicle a</b> <b>e</b> ed <b>E</b> : <b>a</b> gear must be fixe <b>b</b> the accelerator <b>k</b> 1st trip DTC. <u>DTC detected?</u> <b>&gt;&gt;</b> Proceed to <u>EC-</u> <b>&gt;&gt;</b> INSPECTION E <b>Sis Procedure</b> <b>K</b> INTAKE SYSTE <b>a</b> following for conrect	Suitable po 40 km/h (2 40 km/h (2	conds under the following conditions: eed.	INFOID:00000009651035
1. Start ( 2. Drive CAU Alway Selector le Vehicle spo NOTE • The • Kee 3. Chect Is 1st trip YES > NO > Diagnos 1.CHECI Check the • Air duct • Vacuum	the vehicle for at I <b>FION:</b> <b>ys drive vehicle a</b> <b>e</b> ed <b>E</b> : <b>a</b> gear must be fixed <b>b</b> the accelerator <b>k</b> 1st trip DTC. <u>DTC detected?</u> <b>&gt;&gt;</b> Proceed to <u>EC-</u> <b>&gt;&gt;</b> INSPECTION E <b>Sis Procedure</b> <b>K</b> INTAKE SYSTE <b>a</b> following for conr <b>a</b> hoses <b>ir</b> passage betwee	Suitable po 40 km/h (2: 40 km/	conds under the following conditions: eed.	INFOID:00000009651035
1. Start ( 2. Drive CAU Alway Selector le Vehicle spo • The • The • Kee 3. Checl Is 1st trip YES > NO > Diagnos 1.CHECI Check the • Air duct • Vacuum • Intake a Is the insp	the vehicle for at I <b>FION:</b> <b>ys drive vehicle a</b> <b>e</b> ed <b>E</b> : <b>a</b> gear must be fixe <b>b</b> the accelerator <b>k</b> 1st trip DTC. <u>DTC detected?</u> <b>&gt;&gt;</b> Proceed to <u>EC-</u> <b>&gt;&gt;</b> INSPECTION E <b>Sis Procedure</b> <b>K</b> INTAKE SYSTE <b>a</b> following for conrect	Suitable po 40 km/h (2: 40 km/	conds under the following conditions: eed.	INFOID:00000009651035
1. Start ( 2. Drive CAU Alway Selector le Vehicle spo NOTE • The • Kee 3. Check Is 1st trip YES > NO > Diagnos 1.CHECI Check the • Air duct • Air duct • Air duct • Jacheck the • Air duct	the vehicle for at I <b>FION:</b> <b>ys drive vehicle a</b> <b>e</b> ed <b>E</b> : <b>a</b> gear must be fixe <b>b</b> the accelerator <b>k</b> 1st trip DTC. <b>DTC detected?</b> <b>&gt;&gt; Proceed to EC-</b> <b>&gt;&gt; INSPECTION E</b> <b>Sis Procedure</b> <b>K INTAKE SYSTE</b> <b>a</b> following for conr <b>a</b> hoses <b>b</b> passage between <b>b</b> p	Suitable po 40 km/h (2 40 km/h (2	eed. sition 5 MPH) or more tiving the vehicle. steady as possible during cruising. gnosis Procedure". and intake manifold	INFOID:00000009651035

А

EC

# P0101 MAF SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Check ground connection E38. Refer to Ground Inspection in <u>GI-45, "Circuit Inspection"</u>.

Is the inspection result normal?

#### YES >> GO TO 3.

NO >> Repair or replace ground connection.

 ${f 3.}$  CHECK MASS AIR FLOW (MAF) SENSOR POWER SUPPLY CIRCUIT

1. Disconnect MAF sensor harness connector.

2. Turn ignition switch ON.

3. Check the voltage between MAF sensor harness connector and ground.

MAF	sensor	Ground	Voltago	
Connector	Connector Terminal		Voltage	
F4	5	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

**4.**DETECT MALFUNCTIONING PART

Check the following.

• Harness connectors E7, F121

Harness for open or short between mass air flow sensor and ECM

Harness for open or short between mass air flow sensor and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

# 5. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between MAF sensor harness connector and ECM harness connector.

MAF	MAF sensor		ECM	
Connector	Connector Terminal		Terminal	Continuity
F4	4	F8	80	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

**O**.CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between MAF sensor harness connector and ECM harness connector.

MAF	MAF sensor		ECM	
Connector	Terminal	Connector	Terminal	Continuity
F4	3	F8	82	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

**7.**CHECK INTAKE AIR TEMPERATURE SENSOR

Check intake air temperature sensor. Refer to EC-181, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.

# P0101 MAF SENSOR

< DTC/CIRCUIT I	DIAGNOSIS >	[VQ35DE]	
NO >> Repla	ce MAF sensor (with intake air temperature sensor). Refer t	o EM-26, "Exploded View".	
8.CHECK EVAP	CONTROL SYSTEM PRESSURE SENSOR		А
Check EVAP conti	rol system pressure sensor. Refer to EC-305, "Component I	nspection".	
Is the inspection re	esult normal?		EC
YES >> GO TO			
· ·	ce EVAP control system pressure sensor.		
9.CHECK MAF S	ENSOR		С
Check MAF sense	r. Refer to EC-181, "Component Inspection".		
Is the inspection re	esult normal?		D
YES >> GO TO			D
	ce MAF sensor. Refer to <u>EM-26, "Exploded View"</u> .		
<b>10.</b> CHECK INTE	ERMITTENT INCIDENT		Е
Check intermittent	incident. Refer to GI-42, "Intermittent Incident".		
>> INSPE	ECTION END		F
Component In	spection	INFOID:000000009651036	
1			G
I.CHECK MASS	AIR FLOW (MAF) SENSOR-I		
With CONSULT			
<ol> <li>Turn ignition s</li> <li>Reconnect all</li> </ol>	witch OFF. harness connectors disconnected.		Н
	nd warm it up to normal operating temperature.		
	SULT and select "DATA MONITOR" mode.		
5. Select "MAS A	VF SE-B1" and check the indication.		1
Monitor item	Condition	Indication (V)	J
	Ignition switch ON (Engine stopped.)	Approx. 0.4	-
MAS A/F SE-B1	Idle (Engine is warmed-up to normal operating temperature.)	0.8 – 1.2	
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 – 1.9	Κ

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

#### Without CONSULT

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.

Idle to about 4,000 rpm

- 3. Start engine and warm it up to normal operating temperature.
- 4. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM				
Connector	+	-	Condition	Voltage (V)	
Connector	Terr	ninal			
			Ignition switch ON (Engine stopped.)	Approx. 0.4	
F8	82	80	Idle (Engine is warmed-up to normal operating temperature.)	0.8 – 1.2	
го	02	80	2,500 rpm (Engine is warmed-up to normal op- erating temperature.)	1.6 – 1.9	
			Idle to about 4,000 rpm	0.8 – 1.2 to Approx. 2.4*	

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

Is the inspection result normal?

YES >> GO TO 4.

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0.8 – 1.2 to Approx. 2.4\*

### < DTC/CIRCUIT DIAGNOSIS >

# NO >> GO TO 2.

# $2. {\sf CHECK} \ {\sf FOR} \ {\sf THE} \ {\sf CAUSE} \ {\sf OF} \ {\sf UNEVEN} \ {\sf AIR} \ {\sf FLOW} \ {\sf THROUGH} \ {\sf MAF} \ {\sf SENSOR}$

- 1. Turn ignition switch OFF.
- 2. Check for the cause of uneven air flow through MAF sensor. Refer to the following.
- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system parts

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

**3.**CHECK MAF SENSOR-II

### (I) With CONSULT

- 1. Repair or replace malfunctioning part.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Connect CONSULT and select "DATA MONITOR" mode.
- 4. Select "MAS A/F SE-B1" and check the indication.

Monitor item	Condition	Indication (V)
	Ignition switch ON (Engine stopped.)	Approx. 0.4
MAS A/F SE-B1	Idle (Engine is warmed-up to normal operating temperature.)	0.8 – 1.2
MAS AN SE-DI	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 – 1.9
	Idle to about 4,000 rpm	0.8 – 1.2 to Approx. 2.4*

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

#### Without CONSULT

- 1. Repair or replace malfunctioning part.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM			
Connector	+	_	Condition	Voltage (V)
Connector	Terr	ninal		
			Ignition switch ON (Engine stopped.)	Approx. 0.4
F8	82 8	80	Idle (Engine is warmed-up to normal operating temperature.)	0.8 – 1.2
ГO	02	80	2,500 rpm (Engine is warmed-up to normal op- erating temperature.)	1.6 – 1.9
			Idle to about 4,000 rpm	0.8 – 1.2 to Approx. 2.4*

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

#### Is the inspection result normal?

YES >> INSPECTION END

### 4.CHECK MAF SENSOR-III

#### With CONSULT

- 1. Turn ignition switch OFF.
- 2. Disconnect MAF sensor harness connector and reconnect it again.
- 3. Start engine and warm it up to normal operating temperature.
- 4. Connect CONSULT and select "DATA MONITOR" mode.
- 5. Select "MAS A/F SE-B1" and check the indication.

# **P0101 MAF SENSOR**

### < DTC/CIRCUIT DIAGNOSIS >

Monitor item	Condition	Indication (V)
	Ignition switch ON (Engine stopped.)	Approx. 0.4
MAS A/F SE-B1	Idle (Engine is warmed-up to normal operating temperature.)	0.8 – 1.2
INIAS A/F SE-DI	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 – 1.9
	Idle to about 4,000 rpm	0.8 – 1.2 to Approx. 2.4*

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

#### Without CONSULT

- 1. Turn ignition switch OFF.
- 2. Disconnect MAF sensor harness connector and reconnect it again.
- 3. Start engine and warm it up to normal operating temperature.
- 4. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM			
Connector	+	-	Condition	Voltage (V)
Connector	Terr	minal		
			Ignition switch ON (Engine stopped.)	Approx. 0.4
F8	80	80	Idle (Engine is warmed-up to normal operating temperature.)	0.8 – 1.2
Γŏ	82	80	2,500 rpm (Engine is warmed-up to normal op- erating temperature.)	1.6 – 1.9
			Idle to about 4,000 rpm	0.8 – 1.2 to Approx. 2.4*

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

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Clean or replace MAF sensor.

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### < DTC/CIRCUIT DIAGNOSIS >

# P0102, P0103 MAF SENSOR

# DTC Logic

INFOID:000000009651037

[VQ35DE]

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Intake air leakage</li> <li>Mass air flow sensor</li> </ul>
P0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul><li>Harness or connectors (The sensor circuit is open or shorted.)</li><li>Mass air flow sensor</li></ul>

### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### Which DTC is detected?

P0102 >> GO TO 2.

P0103 >> GO TO 3.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0102

- 1. Start engine and wait at least 5 seconds.
- 2. Check DTC.

### Is DTC detected?

- YES >> Proceed to EC-184, "Diagnosis Procedure".
- NO >> INSPECTION END

# **3.** PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-I

- 1. Turn ignition switch ON and wait at least 5 seconds.
- 2. Check DTC.

### Is DTC detected?

- YES >> Proceed to EC-184, "Diagnosis Procedure".
- NO >> GO TO 4.

**4.**PERFORM DTC CONFIRMATION PROCEDURE FOR DTC P0103-II

1. Start engine and wait at least 5 seconds.

- 2. Check DTC.
- Is DTC detected?
- YES >> Proceed to EC-184, "Diagnosis Procedure".
- NO >> INSPECTION END

# **Diagnosis Procedure**

**1.**INSPECTION START

Confirm the detected DTC. <u>Which DTC is detected?</u> P0102 >> GO TO 2. P0103 >> GO TO 3.

2. CHECK INTAKE SYSTEM

Revision: 2014 May

		P0102	2, P0103	MAF SENSOF	2	
< DTC/CIRC	UIT DIAGNOS				[VQ35DE]	
	owing for con	nection.				
<ul><li>Air duct</li><li>Vacuum hos</li></ul>	ses					
		en air duct to int	ake manifol	d		
	ion result norm	<u>nal?</u>				Е
	O TO 3. econnect the	narts				
-		POWER SUPPL	Y			
		w (MAF) senso		nnector		
<ol><li>Turn ignit</li></ol>	ion switch ON			onnector and grou	ind.	
MA	F sensor					
Connector	Terminal	Ground	Vo	ltage		
F4	5	Ground	Batter	/ voltage		
s the inspecti	ion result norm	nal?	I			
	60 TO 5.					
	60 TO 4.	_				
+.CHECK M	AF SENSOR I	POWER SUPPI				
<ol> <li>Check the</li> </ol>		arness connect tween MAF ser	isor harness	s connector and IP	PDM E/R harness connector.	
Connector	Terminal	Connector	Terminal	Continuity		
F4	5	E10	10	Existed	-	
s the inspecti	ion result norm	nal?			-	
		uble diagnosis f ce error-detecte		pply circuit.		
-			•	PEN AND SHORT	r.	
				FEIN AND SHOKI		
2. Disconne	ion switch OF ct ECM harne e continuity be	ss connector.	sor harness	s connector and E	CM harness connector.	
MAF	sensor	ECN	Λ		-	
Connector	Terminal	Connector	Terminal	Continuity		
F4	4	F8	80	Existed	-	
. Also cheo	k harness for	short to ground	and short to	o power.	-	
	ion result norm	nal?				
	GO TO 6.	ouit chartta ar	und or ob-	rt to power in here	and or connectors	
•	• •	•		•	ess or connectors.	
				OR OPEN AND S		
. Check the	e continuity be	tween MAF ser	isor harness	s connector and E	CM harness connector.	
MAE	sensor	ECN	Λ		-	
171/1	001001			1		

MAF	sensor	E	Continuity		
Connector	Terminal	Connector	Terminal	Continuity	
F4	3	F8	82	Existed	

2. Also check harness for short to ground and short to power. Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 7.
- NO >> Repair open circuit, short to ground or short to power in harness or connectors.

# 7.CHECK MASS AIR FLOW SENSOR

Check mass air flow sensor. Refer to EC-186, "Component Inspection".

### Is the inspection result normal?

- YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".
- NO >> Replace mass air flow sensor. Refer to EM-26, "Exploded View".

### Component Inspection

1.CHECK MASS AIR FLOW SENSOR-I

### With CONSULT

- 1. Reconnect all harness connectors disconnected.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Connect CONSULT and select "DATA MONITOR" mode.
- 4. Select "MAS A/F SE-B1" and check indication under the following conditions.

Monitor item	Condition	MAS A/F SE-B1 (V)
	Ignition switch ON (Engine stopped.)	Approx. 0.4
MAS A/F SE-B1	Idle (Engine is warmed-up to normal operating temperature.)	0.8 - 1.2
MAS AF SE-BI	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9
	Idle to approximately 4,000 rpm	0.8 - 1.2 to Approx. 2.4*

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

### Without CONSULT

- 1. Reconnect all harness connectors disconnected.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM			
Connector	+	_	Condition	Voltage (V)
Connector	Terminal	Terminal		
			Ignition switch ON (Engine stopped.)	Approx. 0.4
F8	82 (MAF sen-	80 (Sensor	Idle (Engine is warmed-up to normal operating temperature.)	0.8 - 1.2
10	sor signal)	ground)	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9
			Idle to approximately 4,000 rpm	0.8 - 1.2 to Approx. 2.4*

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

### 2.CHECK FOR THE CAUSE OF UNEVEN AIR FLOW THROUGH MASS AIR FLOW SENSOR

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.

- Crushed air ducts
- · Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system parts

Is the inspection result normal?

YES >> GO TO 4.

3.CHECK MASS AIR FLOW SENSOR-II

# P0102, P0103 MAF SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

### With CONSULT

- 1. Repair or replace malfunctioning part.
- 2. Start engine and warm it up to normal operating temperature.
- 3. Connect CONSULT and select "DATA MONITOR" mode.
- 4. Select "MAS A/F SE-B1" and check indication under the following conditions.

Monitor item	Condition	MAS A/F SE-B1 (V)
	Ignition switch ON (Engine stopped.)	Approx. 0.4
MAS A/F SE-B1	Idle (Engine is warmed-up to normal operating temperature.)	0.8 - 1.2
	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9
	Idle to approximately 4,000 rpm	0.8 - 1.2 to Approx. 2.4*

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

#### Without CONSULT

- 1. Repair or replace malfunctioning part.
- 2. Start engine and warm it up to normal operating temperature.
- Check the voltage between ECM harness connector terminals under the following conditions.

	ECM						
Connector	+	-	Condition	Voltage (V)			
Connector	Terminal	Terminal					
					Ignition switch ON (Engine stopped.)	Approx. 0.4	
F8	82 80 (MAF sen- (Sensor sor signal) ground)		Idle (Engine is warmed-up to normal operating temperature.)	0.8 - 1.2			
-		`	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9			
			Idle to approximately 4,000 rpm	0.8 - 1.2 to Approx. 2.4*			

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

### **4.**CHECK MASS AIR FLOW SENSOR-III

### With CONSULT

- 1. Turn ignition switch OFF.
- 2. Disconnect mass air flow sensor harness connector and reconnect it again.
- 3. Start engine and warm it up to normal operating temperature.
- 4. Connect CONSULT and select "DATA MONITOR" mode.
- 5. Select "MAS A/F SE-B1" and check indication under the following conditions.

Monitor item	Condition	MAS A/F SE-B1 (V)	
	Ignition switch ON (Engine stopped.)	Approx. 0.4	Ν
MAS A/F SE-B1	Idle (Engine is warmed-up to normal operating temperature.)	0.8 - 1.2	
MAS AT SE-DI	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9	$\cap$
	Idle to approximately 4,000 rpm	0.8 - 1.2 to Approx. 2.4*	0

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

#### Without CONSULT

- 1. Turn ignition switch OFF.
- 2. Disconnect mass air flow sensor harness connector and reconnect it again.
- 3. Start engine and warm it up to normal operating temperature.
- 4. Check the voltage between ECM harness connector terminals under the following conditions.

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# P0102, P0103 MAF SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

ECM					
Connector	nnector + – Condition		Condition	Voltage (V)	
Connector					
			Ignition switch ON (Engine stopped.)	Approx. 0.4	
F8	82 (MAF sen-		Idle (Engine is warmed-up to normal operating temperature.)	0.8 - 1.2	
FO	sor signal)	(Sensor ground)	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9	
			Idle to approximately 4,000 rpm	0.8 - 1.2 to Approx. 2.4*	

\*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Clean or replace mass air flow sensor. Refer to <u>EM-26, "Exploded View"</u>.

# **P0111 IAT SENSOR**

# < DTC/CIRCUIT DIAGNOSIS >

# P0111 IAT SENSOR

# DTC Logic

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0111	IAT SENSOR 1 B1 [Intake air temperature (IAT) sensor circuit range/perfor- mance]	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, FTT sensor, and EOT sensor) shows that the voltage signal of the IAT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	<ul> <li>Harness or connectors (High or low resistance in the IAT sensor circuit)</li> <li>IAT sensor</li> </ul>
	NFIRMATION PROCEDU	JRE	
I.INSPE	CTION START		
YES >	<u>ssary to erase permanent D</u> >> GO TO 3. >> GO TO 2. ORM COMPONENT FUNC		
		Refer to EC-190, "Component Function	<u>Check"</u> .
	omponent function check to IC might not be confirmed.	o check the overall function of the IAT	sensor circuit. During this check, a
YES >	<u>pection result normal?</u> >> INSPECTION END >> Proceed to <u>EC-190, "Dia</u>	ignosis Procedure".	
		DE has been providually conducted a	wave perform the following proce
lure befo . Turn 2. Turn 3. Turn	re conducting the next test. ignition switch OFF and wa ignition switch ON. ignition switch OFF and wa	it at least 10 seconds.	ways perform the following proce-
Before Before	performing the following	procedure, do not add fuel. procedure, check that fuel level is b procedure, confirm that battery volt	
	>> GO TO 4.		
1.PERF	ORM DTC CONFIRMATION	N PROCEDURE	
	engine and let it idle for 60 the vehicle to a cool place		
Cool 3. Turn		ent of ambient air temperature between ak the vehicle for 12 hours.	–10°C (14°F) and 35°C (95°F).
	r turn ignition switch ON	during soaking.	
The v 4. Start	vehicle must be cooled with engine and let it idle for 5 n TION:		

INFOID:000000009651040

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# P0111 IAT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

5. Check 1st trip DTC.

### Is 1st trip DTC detected?

YES >> Proceed to EC-190, "Diagnosis Procedure".

NO >> INSPECTION END

Component Function Check

1.CHECK INTAKE AIR TEMPERATURE (IAT) SENSOR

### 1. Turn ignition switch OFF.

### 2. Disconnect mass air flow sensor harness connector.

3. Check resistance between mass air flow sensor terminals as follows.

Terminals	Condition		Resistance (k $\Omega$ )
1 and 2	Temperature [°C (°F)]	25 (77)	1,800 – 2,200

### Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

NO >> Proceed to EC-190, "Diagnosis Procedure".

### **Diagnosis Procedure**

**1.**CHECK INTAKE AIR TEMPERATURE (IAT) SENSOR

Check intake air temperature sensor. Refer to EC-190, "Component Inspection".

### Is the inspection result normal?

- YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.
- NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to <u>EM-26</u>, "<u>Exploded</u> <u>View</u>".

# Component Inspection

INFOID:000000009651043

INFOID:000000009651042

# **1.**CHECK INTAKE AIR TEMPERATURE (IAT) SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect mass air flow sensor harness connector.
- 3. Check resistance between mass air flow sensor terminals as follows.

Terminals	Condition		Resistance (k $\Omega$ )
1 and 2	Temperature [°C (°F)]	25 (77)	1,800 – 2,200

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to <u>EM-26, "Exploded</u> <u>View"</u>.

# P0112, P0113 IAT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

# P0112, P0113 IAT SENSOR

# DTC Logic

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#### INFOID:000000009651044

[VQ35DE]

# DTC DETECTION LOGIC

	Trouble diagnosis name	DTC detectin	g condition	Possible cause
P0112	Intake air tempera- ture sensor circuit low input	An excessively low voltage sent to ECM.	ge from the sensor is	Harness or connectors     (The senser circuit is open or shorted.)
P0113	Intake air tempera- ture sensor circuit high input	An excessively high volta sent to ECM.	ge from the sensor is	<ul><li>(The sensor circuit is open or shorted.)</li><li>Intake air temperature sensor</li></ul>
	IFIRMATION PR	OCEDURE		
1.PRECC	NDITIONING			
ing the nex	kt test.		•	ays perform the following before conduct
2. Turn iç	gnition switch ON.	and wait at least 10 s		
~	> GO TO 2. PRM DTC CONFIF		RE	
2. Check	gnition switch ON 1st trip DTC. DTC detected?	and wait at least 5 se	conds.	
	> Proceed to <u>EC-</u> > INSPECTION E	<u>191, "Diagnosis Proce</u> ND	edure".	
Diagnos	is Procedure			INFOID:0000000965104
<b>1.</b> CHECK	INTAKE AIR TE	MPERATURE SENSC	R POWER SUPP	LY
	gnition switch ON.	w sensor (with intake a een mass air flow sen		ensor) harness connector.
2. Turn ig	the voltage betwo			
2. Turn iç 3. Check	MAF sensor	Ground		
2. Turn ig 3. Check Connec	MAF sensor tor Termina	1	Voltage	
2. Turn iç 3. Check Connec F4	MAF sensor	l Ground		

2. Disconnect ECM harness connector.

3. Check harness continuity between mass air flow sensor harness connector and ECM harness connector.

MAF	MAF sensor		ECM		
Connector	Terminal	Connector Terminal		Continuity	
F4	1	F8	80	Existed	

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# P0112, P0113 IAT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**3.**CHECK INTAKE AIR TEMPERATURE SENSOR

Check intake air temperature sensor. Refer to EC-192, "Component Inspection".

#### Is the inspection result normal?

- YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".
- NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to <u>EM-26, "Exploded</u> <u>View"</u>.

# Component Inspection

INFOID:000000009651046

# **1.**CHECK INTAKE AIR TEMPERATURE SENSOR

1. Turn ignition switch OFF.

2. Disconnect mass air flow sensor harness connector.

3. Check resistance between mass air flow sensor terminals as per the following.

Terminal	Condition	Resistance (k $\Omega$ )	
1 and 2	Temperature [°C (°F)]	25 (77)	1.800 - 2.200

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to <u>EM-26</u>, "<u>Exploded</u> <u>View</u>".

# P0116 ECT SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# P0116 ECT SENSOR

# DTC Logic

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0116	ECT SEN/CIRC [Engine coolant temperature (ECT) sensor circuit range/per- formance]	The comparison result of signals transmitted to ECM from each temperature sensor (IAT sensor, ECT sensor, FTT sensor, and EOT sensor) shows that the voltage signal of the ECT sensor is higher/lower than that of other temperature sensors when the engine is started with its cold state.	<ul> <li>Harness or connectors (High or low resistance in the ECT sensor circuit)</li> <li>ECT sensor</li> </ul>
	NFIRMATION PROCEDU	IRE	
1.INSPE	ECTION START		
YES NO	ssary to erase permanent D >> GO TO 3. >> GO TO 2. ORM COMPONENT FUNC <sup>-</sup>		
Perform		Refer to EC-194, "Component Function	<u>n Check"</u> .
	component function check to TC might not be confirmed.	check the overall function of the ECT	sensor circuit. During this check, a
	pection result normal? >> INSPECTION END		
	> Proceed to <u>EC-194, "Dia</u>	gnosis Procedure".	
<b>3.</b> PREC	ONDITIONING		
dure befo I. Turn	re conducting the next test. ignition switch OFF and wai	RE has been previously conducted, al t at least 10 seconds.	ways perform the following proce-
3. Turn <b>FESTING</b>	ignition switch ON. ignition switch OFF and wai CONDITION:		
<ul> <li>Before</li> </ul>	performing the following	procedure, do not add fuel. procedure, check that fuel level is b procedure, confirm that battery volt	
	>> GO TO 4.		
<b>1.</b> perf	ORM DTC CONFIRMATION	I PROCEDURE	
	engine and let it idle for 60 the vehicle to a cool place.		
Cool 3. Turn		nt of ambient air temperature between k the vehicle for 12 hours.	–10°C (14°F) and 35°C (95°F).
	er turn ignition switch ON	during soaking.	
The 4. Start	E: /ehicle must be cooled with engine and let it idle for 5 m TION:		

Never turn ignition switch OFF during idling.

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### < DTC/CIRCUIT DIAGNOSIS >

5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to <u>EC-194</u>, "Diagnosis Procedure".

NO >> INSPECTION END

Component Function Check

# 1.CHECK ENGINE COOLANT TEMPERATURE (ECT) SENSOR

### 1. Turn ignition switch OFF.

- 2. Disconnect ECT sensor harness connector.
- 3. Remove ECT sensor. Refer to CO-26, "Exploded View".
- Check resistance between ECT sensor terminals by heating with hot water as shown in the figure.

Terminals	Condition		Resistance (k $\Omega$ )
		20 (68)	2.1 – 2.9
1 and 2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00
		90 (194)	0.236 - 0.260

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent</u> <u>Incident"</u>.

NO >> Proceed to EC-194, "Diagnosis Procedure".

# Diagnosis Procedure

# **1.**CHECK ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Check ECT sensor. Refer to EC-194, "Component Inspection".

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".
- NO >> Replace ECT sensor. Refer to CO-26, "Exploded View".

# Component Inspection

# 1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect engine coolant temperature sensor harness connector.
- 3. Remove engine coolant temperature sensor. Refer to <u>CO-26, "Exploded View"</u>.
- 4. Check resistance between engine coolant temperature sensor terminals as per the following.

Terminals	Condition	Resistance (k $\Omega$ )	
		20 (68)	2.1 - 2.9
1 and 2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00
		90 (194)	0.236 - 0.260

Is the inspection result normal?

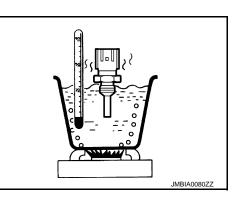
YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-26. "Exploded View"</u>.



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INFOID:000000009651049

# P0117, P0118 ECT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

# P0117, P0118 ECT SENSOR

# DTC Logic

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INFOID:000000009651051

[VQ35DE]

### DTC DETECTION LOGIC

DTC No.	Trouble Diagnosis Name	DTC detection	g condition	Possible Cause
P0117	Engine coolant tem- perature sensor cir- cuit low input	An excessively low volta sent to ECM.	ge from the sensor is	<ul> <li>Harness or connectors</li> <li>(The sensor circuit is open or shorted.)</li> </ul>
P0118	Engine coolant tem- perature sensor cir- cuit high input	An excessively high volta sent to ECM.	age from the sensor is	
	NFIRMATION PRO	DCEDURE		
1.PRECO	ONDITIONING			
		re has been previous	ly conducted, alw	ays perform the following before conduct-
ing the ne 1. Turn i		and wait at least 10 s	econds.	
2. Turn i	gnition switch ON.			
3. Turn i	gnition switch OFF	and wait at least 10 s	econds.	
	> GO TO 2.			
~		MATION PROCEDUR	۶F	
		nd wait at least 5 sec		
	DTC.	nu wait at least 5 sec	0103.	
<u>Is DTC de</u>	tected?			
	> Proceed to <u>EC-1</u> > INSPECTION EN	95, "Diagnosis Proced	<u>dure"</u> .	
		U		
Diagnos	is Procedure			INFOID:000000009651052
<b>1.</b> CHECK	CECT SENSOR PO	OWER SUPPLY		
1. Disco	nnect engine coola	nt temperature (ECT)	sensor harness of	connector.
2. Turn i	gnition switch ON.			
3. Checl	the voltage betwee	en ECT sensor harne	ss connector and	grouna.
	ECT sensor			
Conne	ctor Terminal	Ground	Voltage	
F80	1	Ground	Approx. 5 V	
Is the insp	ection result norma	<u> ?</u>		
	> GO TO 2.			
~		-	-	harness or connectors.
∠.CHEC	CECT SENSOR G	ROUND CIRCUIT FO	R OPEN AND SH	IORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between ECT sensor harness connector and ECM harness connector.

ECT	sensor	E	CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F80	2	F8	76	Existed

4. Also check harness for short to ground and short to power.

### EC-195

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# P0117, P0118 ECT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**3.**CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor. Refer to EC-196. "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-26, "Exploded View"</u>.

### Component Inspection

INFOID:000000009651053

# 1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

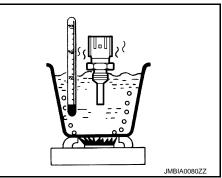
- 1. Turn ignition switch OFF.
- 2. Disconnect engine coolant temperature sensor harness connector.
- 3. Remove engine coolant temperature sensor. Refer to CO-26, "Exploded View".
- 4. Check resistance between engine coolant temperature sensor terminals as per the following.

Terminals	Condition		Resistance (k $\Omega$ )
		20 (68)	2.1 - 2.9
1 and 2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00
		90 (194)	0.236 - 0.260

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to CO-26, "Exploded View".



# P0122, P0123 TP SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

# P0122, P0123 TP SENSOR

# **DTC** Logic

# DTC DETECTION LOGIC

### NOTE:

If DTC P0122 or P0123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-337, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC de	tecting condition	Possible cause
P0122	Throttle position sensor 2 circuit low input	An excessively low 2 is sent to ECM.	voltage from the TP sensor	Harness or connectors     (TP sensor 2 circuit is open or shorted.)
P0123	Throttle position sensor 2 circuit high input	An excessively high 2 is sent to ECM.	voltage from the TP sensor	Electric throttle control actuator (TP sensor 2)
DTC CON	FIRMATION PROCE	EDURE		
1.PRECO	NDITIONING			
ing the nex 1. Turn ig 2. Turn ig 3. Turn ig <b>TESTING (</b>	t test. Inition switch OFF and Inition switch ON. Inition switch OFF and <b>CONDITION:</b>	wait at least 10 wait at least 10	seconds.	perform the following before conduct-
setore per	forming the followin	g procedure, co	onfirm that battery vor	tage is more than 8 V at idle.
>>	• GO TO 2.			
2.PERFO	RM DTC CONFIRMAT	ION PROCEDU	RE	
2. Check Is DTC dete	ected?			
	Proceed to <u>EC-197, '</u> INSPECTION END	<u>'Diagnosis Proce</u>	<u>edure"</u> .	
	s Procedure			
				INFOID:000000009651055
1.CHECK	THROTTLE POSITIO	N SENSOR 2 P	OWER SUPPLY	
2. Turn ig	nect electric throttle co nition switch ON. the voltage between e		arness connector. Introl actuator harness	connector and ground.
Electric t	throttle control actuator	Ground	Voltage	
Connect	tor Terminal	Ground	voltage	
F29	1	Ground	Approx. 5 V	
	ection result normal?			
NO >>		-	r short to power in harn ROUND CIRCUIT FOR	

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

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# P0122, P0123 TP SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Electric throttle	control actuator	E	CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F29	4	F7	19	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle	control actuator	E	CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F29	3	F7	23	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

### **4.**CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to EC-198, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

NO >> Replace electric throttle control actuator. Refer to <u>EM-28, "Exploded View"</u>.

# **Component Inspection**

INFOID:000000009651056

# 1.CHECK THROTTLE POSITION SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Perform EC-136, "Work Procedure".
- 4. Turn ignition switch ON.
- 5. Set selector lever to D position.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM				
Connector	+	_	Condit	ion	Voltage
Connector	Terminal	Terminal			
	22 (TD as a set a size			Fully released	More than 0.36 V
F7	(TP sensor 1 sig- nal)	19	Accelerator pedal	Fully depressed	Less than 4.75 V
Γ1	23	(Sensor ground)	Accelerator pedal	Fully released	Less than 4.75 V
	(TP sensor 2 sig- nal)			Fully depressed	More than 0.36 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electric throttle control actuator. Refer to EM-28, "Exploded View".

# P0125 ECT SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# P0125 ECT SENSOR

# DTC Logic

# DTC DETECTION LOGIC

# NOTE:

- If DTC P0125 is displayed with P0116, first perform the trouble diagnosis for DTC P0116. Refer to <u>EC-193, "DTC Logic"</u>.
- If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117, P0118. Refer to <u>EC-195, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0125	Insufficient engine cool- ant temperature for closed loop fuel control	<ul> <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> <li>Harness or connectors (High resistance in the circuit)</li> <li>Engine coolant temperature sensor</li> <li>Thermostat</li> </ul>
	FIRMATION PROC	EDURE	
.PRECO	NDITIONING		
f DTC Cor ng the nex		has been previously conducted, always p	perform the following before conduct-
. Turn ig	nition switch OFF and	l wait at least 10 seconds.	
	nition switch ON.	l wait at least 10 seconds.	
•	• GO TO 2.		
CHECK	ENGINE COOLANT	TEMPERATURE SENSOR FUNCTION	
With CO	<b>NSULT</b> Inition switch ON.		
2. Select	"DATA MONITOR" mo		
3. Check Check		/S" is above 10°C (50°F).	
	procedure "With CON	SULT" above.	
•	erature above 10°C (	50°F)?	
	<ul> <li>INSPECTION END</li> <li>GO TO 3.</li> </ul>		
<b>3.</b> PERFO	RM DTC CONFIRMA	TION PROCEDURE	
With CO	NSULT		
		minutes at idle speed. eases to more than 10°C (50°F) withir	65 minutas, ston angina bacausa
the tes	st result will be OK.		i os minutes, stop engine because
CAUTI Never	ON: overheat engine.		
2. Check	1st trip DTC.		
With GS Ollow the	<b>T</b> procedure "With CON	SULT" above.	
	DTC detected?		
	EC-199, "Diagnosis INSPECTION END	Procedure"	
Diagnosi	s Procedure		INFOID:00000009651058
.CHECK	ENGINE COOLANT	TEMPERATURE SENSOR	
heck end	ine coolant temperatu	re sensor Refer to EC-200 "Componen	t Inspection"

Check engine coolant temperature sensor. Refer to <u>EC-200, "Component Inspection"</u>.

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< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace engine coolant temperature sensor.

2. CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm that the engine coolant does not flow.

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.
- NO >> Repair or replace thermostat. Refer to <u>CO-24, "Exploded View"</u>.

# Component Inspection

INFOID:000000009651059

# 1.CHECK ENGINE COOLANT TEMPERATURE SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect engine coolant temperature sensor harness connector.
- 3. Remove engine coolant temperature sensor. Refer to CO-26, "Exploded View".
- 4. Check resistance between engine coolant temperature sensor terminals as per the following.

Terminals	Condition		Resistance (kΩ)
		20 (68)	2.1 - 2.9
1 and 2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00
		90 (194)	0.236 - 0.260

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Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to CO-26, "Exploded View".

# < DTC/CIRCUIT DIAGNOSIS >

# P0127 IAT SENSOR

# DTC Logic

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INFOID:000000009651060

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0127	Intake air temperature too high	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Intake air temperature sensor</li> </ul>
DTC CON	FIRMATION PROCI	EDURE	
1.PRECO	NDITIONING		
ng the nex 1. Turn ig 2. Turn ig 3. Turn ig	t test. Inition switch OFF and Inition switch ON.	as been previously conducted, always p wait at least 10 seconds. wait at least 10 seconds.	perform the following before conduct-
This test r	nay be conducted wi	th the drive wheels lifted in the shop is unnecessary to lift the vehicle.	or by driving the vehicle. If a road
>:	> GO TO 2.		
2.perfo	RM DTC CONFIRMAT	ION PROCEDURE	
Turn ig	ntil engine coolant tem Inition switch ON.	perature is less than 96°C (205°F)	
Check			n ignition switch OFF and cool down
NOTE:		ore engine coolant temperature is above	96°C (205°E)
2. Turn ig	nition switch ON.	2	
	"DATA MONITOR" mo ngine. abiele speed at more t	han 70 km/h (43 MPH) for 100 consecut	
5. Hold v			live seconds.
5. Hold v CAUT Alway	I <mark>ON:</mark> s drive vehicle at a s		live seconds.
5. Hold v CAUT Alway 6. Check	ION: s drive vehicle at a s 1st trip DTC.		live seconds.
5. Hold v CAUT Alway 6. Check With GS Follow the	ION: s drive vehicle at a s 1st trip DTC. T procedure "With CON	afe speed.	live seconds.
5. Hold v CAUT Alway 6. Check With GS Follow the s 1st trip E YES >>	ON: s drive vehicle at a s 1st trip DTC. T procedure "With CON DTC detected? > Proceed to <u>EC-201.</u>	afe speed.	live seconds.
5. Hold v CAUT Alway 6. Check With GS Follow the s 1st trip E YES >: NO >:	ON: s drive vehicle at a s 1st trip DTC. T procedure "With CON <u>DTC detected?</u> > Proceed to <u>EC-201</u> , > INSPECTION END	<b>afe speed.</b> SULT" above.	IVE SECONDS.
5. Hold v CAUT Alway 6. Check With GS Follow the s 1st trip E YES >: NO >: Diagnosi	ON: s drive vehicle at a s 1st trip DTC. T procedure "With CON DTC detected? > Proceed to <u>EC-201.</u>	<b>afe speed.</b> SULT" above. " <u>Diagnosis Procedure"</u> .	

Is the inspection result normal?

>> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>. >> Replace mass air flow sensor (with intake air temperature sensor). YES

NO

# P0127 IAT SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# Component Inspection

[VQ35DE]

# **1.**CHECK INTAKE AIR TEMPERATURE SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect mass air flow sensor harness connector.
- 3. Check resistance between mass air flow sensor terminals as follows.

Terminals	Condition		Resistance (k $\Omega$ )
1 and 2	Temperature [°C (°F)]	25 (77)	1.800 - 2.200

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace mass air flow sensor (with intake air temperature sensor). Refer to <u>EM-26</u>, "<u>Exploded</u> <u>View</u>".

### **P0128 THERMOSTAT FUNCTION**

< DTC/CIRCUIT DIAGNOSIS >

# P0128 THERMOSTAT FUNCTION

# **DTC Logic**

### DTC DETECTION LOGIC

#### NOTE:

If DTC P0128 is displayed with DTC P0300, P0301, P0302, P0303, P0304, P0305 or P0306, first perform the trouble diagnosis for P0300, P0301, P0302, P0303, P0304, P0305, P0306. Refer to <u>EC-263, "DTC Logic"</u>.

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 being stuck open.

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0128	THERMSTAT FNCTN [Coolant thermostat (coolant temperature below thermostat regulating temperature)]	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	<ul> <li>Thermostat</li> <li>Leakage from sealing portion of thermostat</li> <li>Engine coolant temperature sensor</li> </ul>
NOTE:	NFIRMATION PROCEDU		
1.PREC	ONDITIONING-I		
		s been previously conducted, always	perform the following procedure
<ol> <li>Turn</li> <li>Turn</li> </ol>	nducting the next test. ignition switch OFF and wa ignition switch ON. ignition switch OFF and wa		
•	>> GO TO 2.		
<b>Z.</b> PREC	ONDITIONING-II		
	ONSULT ignition switch ON. k the following conditions:		
Ambient te	emperature –	10°C (14°F) or more	
Ambient te A/C switch	•	10°C (14°F) or more	
	C	· · ·	
A/C switch Blower far 3. Selec	switch C	)FF	
A/C switch Blower far 3. Selec	switch c t "DATA MONITOR" mode k the following conditions:	OFF	
A/C switch Blower far 3. Selec 4. Chec	switch c t "DATA MONITOR" mode k the following conditions:	OFF OFF of "ENGINE" using CONSULT.	
A/C switch Blower far 3. Selec 4. Chec COOLAN Is the con YES	switch       C         switch       C         st "DATA MONITOR" mode         k the following conditions:         TEMP/S       -         dition satisfied?         >> GO TO 3.         >> 1.       Satisfy the condition	oFF oFF of "ENGINE" using CONSULT. 10°C – 46°C (14 – 115°F)	
A/C switch Blower far 3. Selec 4. Chec COOLAN Is the con YES NO	switch       C         switch       C         it "DATA MONITOR" mode         k the following conditions:         TEMP/S         dition satisfied?         >> GO TO 3.	DFF OFF of "ENGINE" using CONSULT. 10°C – 46°C (14 – 115°F)	

Always drive vehicle at safe speed.

- STEP 1

INFOID:000000009651063

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# **P0128 THERMOSTAT FUNCTION**

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Drive the vehicle under the conditions instructed below until the difference between "COOLAN TEMP/S" and "FUEL T/TMP SE" becomes at least 24°C (43°F).

COOLAN TEMP/S	65°C (149°F) or less
FUEL T/TMP SE	Less than the value calculated by sub- tracting 24°C (43°F) from "COOLAN TEMP/S".*

*.	Example
	Lvample

COOLAN TEMP/S	FUEL T/TMP SE
70°C (158°F)	45°C (113°F) or less
65°C (149°F)	40°C (104°F) or less
60°C (140°F)	35°C (95°F) or less

### STEP 2

Drive the vehicle at 50 km/h (32 MPH) or more with the difference between "COOLAN TEMP/S" and "FUEL T/TMP SE" maintained at 24°C (43°F) or more.

### NOTE:

Keep the accelerator pedal as steady as possible during cruising.

### STEP 3

Drive the vehicle at 50 km/h (32 MPH) or more until "COOLAN TEMP/S" increases by 6°C (11°F). **NOTE:** 

Keep the accelerator pedal as steady as possible during cruising.

### Is the condition satisfied?

YES >> GO TO 4.

NO >> GO TO 1.

**4.**PERFORM DTC CONFIRMATION PROCEDURE-II

### (B) With CONSULT

T. Drive the vehicle until the following condition is satisfied.

COOLAN TEMP/S

65°C (149°F) or more

### **CAUTION:**

### Always drive vehicle at safe speed.

2. Check 1st trip DTC.

### Is 1st trip DTC detected?

YES >> Proceed to EC-204, "Diagnosis Procedure".

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000009651064

**1.**CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor. Refer to EC-204, "Component Inspection".

### Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace engine coolant temperature sensor.

### 2. CHECK THERMOSTAT

Check thermostat. Refer to CO-24, "Exploded View".

Is the inspection result normal?

### YES >> INSPECTION END

NO >> Replace thermostat. Refer to <u>CO-24. "Exploded View"</u>.

# Component Inspection

**1.**CHECK ENGINE COOLANT TEMPERATURE SENSOR

# **P0128 THERMOSTAT FUNCTION**

### < DTC/CIRCUIT DIAGNOSIS >

### [VQ35DE]

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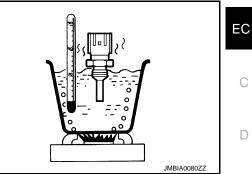
- 1. Turn ignition switch OFF.
- 2. Disconnect engine coolant temperature sensor harness connector.
- 3. Remove engine coolant temperature sensor. Refer to <u>CO-26, "Exploded View"</u>.
- 4. Check resistance between engine coolant temperature sensor terminals as per the following.

Terminals	Condition	Resistance (k $\Omega$ )	
		20 (68)	2.1 - 2.9
1 and 2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00
		90 (194)	0.236 - 0.260

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-26, "Exploded View"</u>.



### < DTC/CIRCUIT DIAGNOSIS >

# P0130, P0150 A/F SENSOR 1

# DTC Logic

INFOID:000000009651066

[VQ35DE]

### DTC DETECTION LOGIC

To judge malfunctions, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal fluctuates according to fuel feedback control.

DTC No.	Trouble diagnosis name		DTC detecting condition	Possible cause
P0130	Air fuel ratio (A/F) sensor 1 (bank 1) circuit			<ul> <li>Harness or connectors (The A/F sensor 1 circuit is open or shorted.)</li> </ul>
		B)	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.	A/F sensor 1
P0150	Air fuel ratio (A/F) sensor 1	A)	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in a range other than approx. 2.2 V.	<ul> <li>Harness or connectors (The A/F sensor 1 circuit is open or shorted.)</li> </ul>
	(bank 2) circuit		The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.	A/F sensor 1

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### **TESTING CONDITION:**

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A

- 1. Start engine and warm it up to normal operating temperature.
- 2. Let engine idle for 2 minutes.
- 3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-208, "Diagnosis Procedure".

- NO-1 >> With CONSULT: GO TO 3.
- NO-2 >> With GST: GO TO 7.

**3.**CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION

- 1. Start engine and warm it up to normal operating temperature.
- 2. Select "A/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT.
- 3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.

Does the indication fluctuate around 2.2 V?

YES >> GO TO 4.

NO >> Proceed to <u>EC-208</u>, "Diagnosis Procedure".

**4.**PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B-I

1. Select "A/F SEN1 (B1) P1276" (for DTC P0130) or "A/F SEN1 (B2) P1286" (for DTC P0150) of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT.

2. Touch "START".

3. When the following conditions are met, "TESTING" will be displayed on the CONSULT screen.

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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ENG SPEED	1,000 - 3,200 rpm	
VHCL SPEED SE	More than 64 km/h (40 mph)	
B/FUEL SCHDL	1.0 - 10.0 msec	EC
Selector lever	D position	
CAUTION:	ot displayed after 20 seconds, retry from step 2.	С
•	icle at a safe speed.	
YES >> GO TO 5.	d on CONSULT screen?	D
	sensor 1 function again. GO TO 3.	D
5.PERFORM DTC CO	ONFIRMATION PROCEDURE FOR MALFUNCTION B-II	
Release accelerator peo	dal fully.	E
	n releasing the accelerator pedal.	
Which does "TESTING"	<u>" change to?</u>	F
COMPLETED>>GO T		
•	>>Retry DTC CONFIRMATION PROCEDURE. GO TO 4.	G
	ONFIRMATION PROCEDURE FOR MALFUNCTION B-III	0
Touch "SELF-DIAG RES		
Which is displayed on C		Н
OK >> INSPECTION NG >> Proceed to	ON END <u>EC-208, "Diagnosis Procedure"</u> .	
-	DNENT FUNCTION CHECK FOR MALFUNCTION B	1
	nction check. Refer to <u>EC-207, "Component Function Check"</u> .	
NOTE:	icition check. Refer to <u>LO-207, Component runction Oneck</u> .	
	on check to check the overall function of the A/F sensor 1 circuit. During this che	eck, a     J
1st trip DTC might not b Is the inspection result r		
YES >> INSPECTIO		K
	EC-208, "Diagnosis Procedure".	
Component Functi	ion Check	0009651067
		L
	DNENT FUNCTION CHECK	
With GST	arm it up to normal an arcting tamp areture	M
	arm it up to normal operating temperature. t a speed of 80 km/h (50 MPH) for a few minutes in the suitable gear position.	
3. Shift the selector le	ever to the D position, then release the accelerator pedal fully until the vehicle s	speed
decreases to 50 km CAUTION:	n/h (31 MPH).	N
	icle at a safe speed.	
NOTÉ:	•	0
	when releasing the accelerator pedal.	
	id turn ignition switch OFF.	_
6. Wait at least 10 sec	conds and restart engine.	Р
<ol> <li>Repeat steps 2 and</li> <li>Stop the vehicle.</li> </ol>	d 3 for 5 times.	
9. Check 1st trip DTC.	· · · · · · · · · · · · · · · · · · ·	
Is 1st trip DTC detected		
	EC-208, "Diagnosis Procedure".	
NO >> INSPECTIO	UN END	

### < DTC/CIRCUIT DIAGNOSIS >

### Diagnosis Procedure

[VQ35DE]

INFOID:000000009651068

# **1.**CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY

- 1. Disconnect A/F sensor 1 harness connector.
- 2. Turn ignition switch ON.

3. Check the voltage between A/F sensor 1 harness connector and ground.

DTC		A/F sensor 1 Ground Voltac		Voltage	
DIC	Bank	Connector	Terminal	Ground	voltage
P0130	1	F27	4	Ground	Battery voltage
P0150	2	F64	4	Ground	Dattery Voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

# 2.CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect IPDM E/R harness connector.

3. Check the continuity between A/F sensor 1 harness connector and IPDM E/R harness connector.

DTC	A/F sensor 1			IPDN	Continuity	
ыс	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0130	1	F27	4	F12	57	Existed
P0150	2	F64	4	112	57	LAISIEU

#### Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

# 3. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC		A/F sensor 1		E	CM	Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0130	1	F27	1		69	
F0130	I	2	F8	73	Existed	
P0150	2	150 2 F64	1	10	77	LAISIEU
F0150	2	F64	2 F64 2		81	

4. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

DTC		A/F sensor 1	Ground	Continuity		
DIC	Bank	Connector	Terminal	Ground Continuity		
P0130	1	E27	1			
F0130	I	F27 2		Ground	Not existed	
D0150	C	EC4	1	Giouna	NUL EXISTED	
P0150	2	F64	2			

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

DTC		CM	Ground	Continuity	
DIC	Connector	Terminal	Gibunu	Continuity	
P0130		69			E
1 0100	- F8	73	Ground	Not existed	
P0150		77	Croana		
		81			
	heck harness		power.		
	<u>ection result</u> > GO TO 4.	normal?			
		n circuit, sho	ort to ground	d or short to power in harness or connectors.	
				ermittent Incident".	
	ection result		<u></u>		
YES >:	> Replace m	alfunctioning	air fuel rati	o (A/F) sensor 1. Refer to <u>EM-33, "Exploded View"</u> .	
NO >:	> Repair or r	eplace error-	-detected pa	arts.	

### < DTC/CIRCUIT DIAGNOSIS >

# P0131, P0151 A/F SENSOR 1

# DTC Logic

INFOID:000000009651069

[VQ35DE]

### DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately low.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0131	Air fuel ratio (A/F) sensor 1 (bank 1) circuit low voltage	• The A/F signal computed by ECM from the A/	Harness or connectors     (The A/F sensor 1 circuit is open or
P0151	Air fuel ratio (A/F) sensor 1 (bank 2) circuit low voltage	F sensor 1 signal is constantly approx. 0 V.	shorted.) • A/F sensor 1

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

**TESTING CONDITION:** 

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

>> GO TO 2.

2. CHECK A/F SENSOR 1 FUNCTION

### With CONSULT

- 1. Start engine and warm it up to normal operating temperature.
- 2. Select "A/F SEN1 (B1)" or "A/F SEN1 (B2)" in "DATA MONITOR" mode with CONSULT.
- 3. Check "A/F SEN1 (B1)" or "A/F SEN1 (B2)" indication.

### With GST

Follow the procedure "With CONSULT" above.

Is the indication constantly approx. 0 V?

YES >> Proceed to EC-211, "Diagnosis Procedure".

NO >> GO TO 3.

**3.** PERFORM DTC CONFIRMATION PROCEDURE

### With CONSULT

- 1. Turn ignition switch OFF, wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
- Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine. CAUTION:

#### Always drive vehicle at a safe speed.

5. Maintain the following conditions for approximately 20 consecutive seconds.

ENG SPEED	1,000 - 3,200 rpm
VHCL SPEED SE	More than 40 km/h (25 mph)
B/FUEL SCHDL	1.5 - 9.0 msec
Selector lever	Suitable position

### NOTE:

- Keep the accelerator pedal as steady as possible during cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 1, return to step
- Check 1st trip DTC.

DTC/CIF		AGNOSIS >		01, PU1	•••••	SENSOF	<b>、</b> I	[VQ35DE]	
<b>With GS</b> ollow the	<b>T</b> procedure	e "With CON		bove.					ļ
	> Proceed	to <u>EC-211.</u> TION END	"Diagnos	sis Proce	edure".				E
Diagnosi	s Proce	dure						INFOID:00000000965107	0
CHECK		L RATIO (A/	F) SENS			PPLY			C
. Discon 2. Turn ig	nect A/F s	sensor 1 har	ness cor	nnector.			round.		[
DTC		A/F sensor 1		Crowne					
DTC	Bank	Connector	Terminal	Ground	I Volta	ige			
P0131	1	F27	4	Ground	Battery v	voltage			
P0151	2	F64 ult normal?	4			g-			
•	> GO TO 2 AIR FUE		F) SENS				CUIT		
CHECK . Turn ig . Discon	AIR FUE	L RATIO (A/ tch OFF. M E/R harne huity betwee	ss conne n A/F se	ector.	arness con	nector and		harness connector.	_
CHECK . Turn ig . Discon	AIR FUE Inition swi Inect IPDM the contir	L RATIO (A/ tch OFF. I E/R harne nuity betwee A/F ser	ss conne n A/F se	ector. nsor 1 ha	arness coni IPDN	nector and		_	-
CHECK Turn ig Discon Check	AIR FUE Inition swi Inect IPDN the contin	L RATIO (A/ tch OFF. M E/R harne nuity betwee A/F ser nk Conne	ss conne n A/F se nsor 1 ector T	ector. nsor 1 ha	arness con	nector and	IPDM E/R	_	_
CHECK . Turn ig . Discon . Check	AIR FUE Inition swi Inect IPDM the contir	L RATIO (A/ tch OFF. M E/R harne nuity betwee A/F ser nk Conne F2	ss conne n A/F se nsor 1 ector Tr 7	ector. nsor 1 ha	arness coni IPDN	nector and	IPDM E/R	_	_
CHECK Turn ig Discon Check DTC P0131 P0151 Sthe inspective YES NO State	AIR FUE Inition swi Inect IPDM the contin Ba Ba Ba Contine Ba Contine Ba Contine Ba Contine Ba Contine Ba Contine Ba Contine Ba Contine Contine Ba Contine Con	L RATIO (A/ tch OFF. M E/R harne nuity betwee A/F ser nk Conne F2	ss conne n A/F sei nsor 1 ector Tr 7 4 diagnosis	ector. nsor 1 ha erminal 4 4 5 for pow ted parts	arness con IPDN Connector F12 /er supply c	nector and M E/R Terminal 57 Sircuit.	IPDM E/R Continuity Existed	_	-
CHECK Turn ig Discon Check DTC P0131 P0151 the inspe YES NO CHECK CHECK Turn ig Discon	AIR FUE inition swi inect IPDN the contin Ba Ba 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	L RATIO (A/ tch OFF. M E/R harne huity betwee A/F ser nk Conne A/F ser nk Conne 2 F6 JIt normal? the trouble of r replace err SOR 1 INPL tch OFF. I harness con huity betwee	ss conne n A/F ser nsor 1 ector Tr 7 4 diagnosis ror-detec JT SIGN/ nnector. n A/F ser	ector. nsor 1 ha erminal 4 4 4 5 for pow ted parts	arness con IPDM Connector F12 /er supply c s. :UIT FOR C arness con	nector and M E/R Terminal 57 Sircuit.	IPDM E/R Continuity Existed	_	-
CHECK Turn ig Discon Check DTC P0131 P0151 the inspe YES NO CHECK Turn ig Discon	AIR FUE Inition swi Inect IPDM the contin Ba Ba Ba Contine Perform Perform Perform Repair o A/F SEN Inition swi Inect ECM the contin	L RATIO (A/ tch OFF. M E/R harne huity betwee A/F ser nk Conne Conne 2 F6 ult normal? the trouble of r replace err SOR 1 INPL tch OFF. I harness co nuity betwee A/F sensor 1	ss conne n A/F ser nsor 1 ector Tr 7 4 diagnosis ror-detec JT SIGN/ nnector. n A/F ser	ector. nsor 1 ha erminal 4 4 4 5 for pow ted parts AL CIRC nsor 1 ha	arness coni IPDM Connector F12 Ver supply c S. UIT FOR C arness coni ECM	nector and ME/R Terminal 57 Sircuit. OPEN AND nector and	IPDM E/R Continuity Existed		_
CHECK Turn ig Discon Check DTC P0131 P0151 the inspe YES >> NO >> CHECK Turn ig Discon Check	AIR FUE inition swi inect IPDN the contin Ba Ba 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	L RATIO (A/ tch OFF. M E/R harne huity betwee A/F ser nk Conne A/F ser nk Conne 2 F6 JIt normal? the trouble of r replace err SOR 1 INPL tch OFF. I harness con huity betwee	ss conne n A/F ser nsor 1 ector Tr 7 4 diagnosis ror-detec JT SIGN/ nnector. n A/F ser Termina 1	ector. nsor 1 ha erminal 4 4 4 5 for pow ted parts AL CIRC nsor 1 ha	arness coni IPDM Connector F12 Ver supply c S. UIT FOR C arness coni ECM	nector and ME/R Terminal 57 Sircuit. OPEN AND nector and erminal 69	IPDM E/R Continuity Existed		-
CHECK Turn ig Discon Check DTC P0131 P0151 the inspe YES NO CHECK Turn ig Discon Check DTC DTC	AIR FUE mition swi inect IPDM the contir Ba Ba > Perform > Repair o A/F SEN mect ECM the contir	L RATIO (A/ tch OFF. M E/R harne nuity betwee A/F ser nk Conne 2 F6 Jlt normal? the trouble of r replace err SOR 1 INPL tch OFF. 1 harness co nuity betwee A/F sensor 1 Connector	ss conne n A/F ser nsor 1 ector Tr 7 4 diagnosis ror-detec JT SIGN/ nnector. n A/F ser Termina 1 2	ector. nsor 1 ha erminal 4 4 4 5 for pow ted parts AL CIRC nsor 1 ha al Con	arness coni IPDM Connector F12 Ver supply c S. UIT FOR C arness coni ECM	nector and ME/R Terminal 57 Sircuit. OPEN AND nector and erminal 69 73	IPDM E/R Continuity Existed		-
2.CHECK Turn ig Discon Check DTC P0131 P0151 s the inspect YES >> NO >> 3.CHECK Turn ig 2.Discon 3.Check DTC	AIR FUE mition swi inect IPDM the contir Ba Ba > Perform > Repair o A/F SEN mect ECM the contir	L RATIO (A/ tch OFF. M E/R harne nuity betwee A/F ser nk Conne 2 F6 Jlt normal? the trouble of r replace err SOR 1 INPL tch OFF. 1 harness co nuity betwee A/F sensor 1 Connector	ss conne n A/F ser nsor 1 ector Tr 7 4 diagnosis ror-detec JT SIGN/ nnector. n A/F ser Termina 1	ector. nsor 1 ha erminal 4 4 4 5 for pow ted parts AL CIRC nsor 1 ha al Con	arness coni IPDM Connector F12 ver supply c S. UIT FOR C arness coni ECM nector Te	nector and ME/R Terminal 57 Sircuit. OPEN AND nector and erminal 69	IPDM E/R Continuity Existed SHORT ECM harne		_

and ground.

### < DTC/CIRCUIT DIAGNOSIS >

DTC		A/F sensor 1			Continuity
DIC	Bank	k Connector Terminal		Ground	Continuity
P0131	1	F27	1		
FUIST	I	2		Ground	Not existed
P0151	2	E64	1	Giouna	NUL EXISIEU
FUIJI	2	2 F64			

DTC	EC	CM	Ground	Continuity
DIC	Connector	Terminal	Ground	
P0131		69		Not existed
FUISI	EQ	73	Ground	
P0151	F8	77		
F0151		81		

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**4.**CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to EM-33, "Exploded View".

NO >> Repair or replace error-detected parts.

### < DTC/CIRCUIT DIAGNOSIS >

# P0132, P0152 A/F SENSOR 1

# **DTC Logic**

DTC DETECTION LOGIC

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the A/F sensor 1 signal is not inordinately high.

DTC No.	Trouble diagnosis n	ame	DTC detecting condition	Possible cause
P0132	Air fuel ratio (A/F) sen (bank 1) circuit high vo		<ul> <li>The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 5 V.</li> </ul>	Harness or connectors     (The A/F sensor 1 circuit is open or
P0152	Air fuel ratio (A/F) sen (bank 2) circuit high vo	shorted.) • A/F sensor 1		
DTC CON	FIRMATION PRO	DCED	URE	
1.PRECC	ONDITIONING			
ing the nex 1. Turn ig 2. Turn ig 3. Turn ig <b>TESTING</b>	xt test. gnition switch OFF a gnition switch ON. gnition switch OFF a <b>CONDITION:</b>	and wa and wa	been previously conducted, always prefo ait at least 10 seconds. ait at least 10 seconds. rocedure, confirm that battery voltage	
~	> GO TO 2.			
2.CHECK	A/F SENSOR 1 FU	UNCTI	ON	
2. Select 3. Check With GS Follow the Is the indic YES > NO >	engine and warm it of "A/F SEN1 (B1)" of "A/F SEN1 (B1)" of <b>ST</b> procedure "With Constantly approceed to <u>EC-21</u> > GO TO 3.	or "A/F : or "A/F : ONSUI oprox. <u>5</u> 14, "Dia	<u>5 V?</u> agnosis Procedure".	vith CONSULT.
	ORM DTC CONFIRM	MATIO	NPROCEDURE	
2. Turn i	gnition switch OFF a gnition switch ON.		ait at least 10 seconds.	e.
4. Drive CAUT	and accelerate vehi	icle to i	more than 40 km/h (25 MPH) within 20 s	
			s for approximately 20 consecutive secon	nds.
ENG SPEE	D 1	1,000 - 3	,200 rpm	
VHCL SPE			n 40 km/h (25 mph)	

# ENG SPEED1,000 - 3,200 rpmVHCL SPEED SEMore than 40 km/h (25 mph)B/FUEL SCHDL1.5 - 9.0 msecSelector leverSuitable position

### NOTE:

- Keep the accelerator pedal as steady as possible during cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 1, return to step 1.
- 6. Check 1st trip DTC.

INFOID:00000000965107

А

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### < DTC/CIRCUIT DIAGNOSIS >

#### With GST

Follow the procedure "With CONSULT" above.

Is 1st trip DTC detected?

YES >> Proceed to <u>EC-214. "Diagnosis Procedure"</u>.

NO >> INSPECTION END

### Diagnosis Procedure

# **1.**CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY

1. Disconnect A/F sensor 1 harness connector.

2. Turn ignition switch ON.

3. Check the voltage between A/F sensor 1 harness connector and ground.

DTC		A/F sensor 1		Ground	Voltage	
DIC	Bank	Connector	Terminal	Ground	voltage	
P0132	1	F27	4	Ground	Battory voltago	
P0152	2	F64	4	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

# 2. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect IPDM E/R harness connector.
- 3. Check the continuity between A/F sensor 1 harness connector and IPDM E/R harness connector.

DTC	A/F sensor 1			IPDM E/R		Continuity
ыс	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0132	1	F27	4	F12	57	Existed
P0152	2	F64	4	FIZ	57	Existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

# ${f 3.}$ CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC		A/F sensor 1		E	Continuity		
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0132	4	1 F27 1	1		69		
F0132	I	F27 —	2	2	F8	73	Existed
P0152	2	F64	1	ГО	77	EXISTED	
F0152		F04	2		81		

4. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

[VQ35DE]

### < DTC/CIRCUIT DIAGNOSIS >

DTC		A/F sensor 1	Ground	Continuity	
DIC	Bank	Connector Termina		Giouna	Continuity
P0132	1	F27	1		
F0132	I	2		Ground	Not existed
P0152	2	F64	1	Giouna	
F0152	Z	F04	2	1	

DTC	E	CM	Ground	Continuity
DIC	Connector	Terminal	Giouna	
P0132		69	O second d	
F0132	F8	73		
D0150	Fð	77	Ground	Not existed
P0152		81		

5. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**4.**CHECK INTERMITTENT INCIDENT

Check i	Check intermittent incident. Refer to GI-42, "Intermittent Incident".					
<u>Is the ir</u>	Is the inspection result normal?					
YES	>> Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to EM-33, "Exploded View".					
NO	>> Repair or replace error-detected parts					

>> Repair or replace error-detected parts. NO

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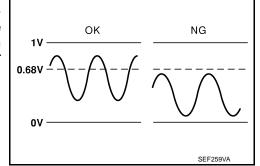
Ρ

# P0137, P0157 HO2S2

DTC Logic

### DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during various driving conditions such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0137	Heated oxygen sensor 2 (bank 1) circuit low volt- age	The maximum voltage from the sensor does not	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul>
P0157	Heated oxygen sensor 2 (bank 2) circuit low volt- age	reach the specified voltage.	<ul><li>Fuel pressure</li><li>Fuel injector</li><li>Intake air leakage</li></ul>

# DTC CONFIRMATION PROCEDURE

# **1.**INSPECTION START

### Will CONSULT be used?

Will CONSULT be used?

YES	>> GO TO 2.
NO	>> GO TO 5.

### **n**o *>>* 00103.

# 2.PRECONDITIONING

If DTC confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### TESTING CONDITION:

For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

### >> GO TO 3.

# $\mathbf{3}.$ Perform dtc confirmation procedure

### With CONSULT

- 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- 6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 7. Let engine idle for 1 minute.
- 8. Check that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F).
- 9. Open engine hood.

# EC-216

CDTC/CI	RCUIT DI	AGNOSIS >	101		[VQ35DE]
"DTC	WORK SI	JPPORT" mode	with CON	ISULT.	(for DTC P0157) of "HO2S2" ir
		uction of CONSU	LT displa	у.	
NOTE		st 10 minutes ur	ntil "COMF	PLETED" is displayed.	
2. Touch	"SELF-DI	AG RESULTS".			
		on CONSULT scr	<u>een?</u>		
		CTION END I to <u>EC-218, "Dia</u>	ianosis Pi	rocedure"	
		GNOSED>>GO			
PERFC	ORM DTC	CONFIRMATION	N PROCE	DURE AGAIN	
				hicle in a cool place (soak the v	/ehicle).
. Perfor	rm DTC co	onfirmation proce	dure agai	in.	
>	-> GO TO	3			
_		PONENT FUNC	TION CH	ECK	
				C-217, "Component Function (	Check"
IOTE:					
		ction check to ch C might not be co		verall function of the heated oxy	ygen sensor 2 circuit. During this
-	•	ult normal?	Jiiiiiieu.		
		TION END			
NO >	> Proceed	to <u>EC-218, "Dia</u>	ignosis Pi	rocedure".	
Compor	nent Fur	ction Check			INFOID:0000000965107
		PONENT FUNC		ECK-I	
	t CONSUI engine and		e normal	operating temperature.	
		itch OFF and wa	it at least	10 seconds.	
	gnition sw gnition sw	itch OFF and wa	it at least	10 seconds.	
5. Start e	engine and	d keep the engine			r at least 1 minute under no load
		or 1 minute. ae between ECN	1 harness	connector terminals under the	following conditions.
	·	5			0
		ECM			
DTC	Connec-	+	-	Condition	Voltage
	tor	Terminal	Terminal		
P0137		57 [HO2S2 (bank 1)			
	F8	signal]	59 (Sensor	Revving up to 4,000 rpm under no	The voltage should be above 0.68 V
D0/57	ΓŎ	58	(Sensor ground)	load at least 10 times	at least once during this procedure.
P0157		[HO2S2 (bank 2) signal]			
<u>s the insp</u>	ection res	ult normal?			
YES >	> INSPEC	TION END			
NO >	-> GO TO	2. PONENT FUNC			
ר					

Check the voltage between ECM harness connector terminals under the following conditions.

#### < DTC/CIRCUIT DIAGNOSIS >

FN /	005	
ĮV	Q35	5DE]

		ECM					
DTC	Connec-	+	_		Conditi	on	Voltage
	tor	Terminal	Termin	al			
P0137	- F8	57 [HO2S2 (bank signal]	1) 59 (Senso	or i i	ing engine at id	le for 10 min-	The voltage should be above 0.68 \
P0157		58 [HO2S2 (bank signal]	around	LITES			at least once during this procedure
s the insp	pection res	ult normal?					
	>> INSPEC >> GO TO	TION END 3.					
<b>3.</b> PERF	ORM COM	PONENT FUR	ICTION C	HECK-II	I		
Check the	e voltage b	etween ECM h	arness co	nnector	terminals ur	der the follow	wing conditions.
570		ECM					
DTC	Connec- tor	+ Torminal			Conditio	n	Voltage
	101	Terminal 57	Termina	1			
P0137	- F8	57 [HO2S2 (bank <sup>-</sup> signal]	l) 59 (Senso		Coasting from 80 km/h (50 MPF		The voltage should be above 0.68 V
P0157	10	58 [HO2S2 (bank 2 signal]	around		elector lever in	the D position	at least once during this procedure.
s the insp	pection res	ult normal?					
		TION END I to <u>EC-218, "[</u>	Diagnosis I	Procedu	<u>re"</u> .		
Diagnos	sis Proce	edure					INFOID:000000009651
	R MIXTUR	E RATIO SELI	-LEARNII		UE		
		e ratio self-lea				Work Procee	dure".
	-	at least 10 min		-			
		0171 or P0174					
	>> Perform >> GO TO :	0	DSIS for DI	C PUT	1 of P0174.	Refer to <u>EC-</u>	241, "DTC Logic".
2.снес	K HO2S2 (	GROUND CIR			AND SHOR	т	
	ignition swi						
2. Disco	onnect heat	ed oxygen sei		ness cor	nector.		
		I harness con		vvaen s	ansor 2 (HC	)292) harned	ss connector and ECM harnes
conne		nulty between	neated 0	xygen 3			
DTC		HO2S2			CM	Continuity	
DIC	Bank	Connector	Ferminal C	connector	Terminal		
		<b>-</b>					
P0137 P0157	1 2	F72 F73	1	F8	59	Existed	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

#### < DTC/CIRCUIT DIAGNOSIS >

# ${f 3.}$ CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

#### 1. Check the continuity between HO2S2 harness connector and ECM harness connector.

DTC		HO2S2		E	СМ	Continuity
DIO	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0137	1	F72	4	F8	57	Existed
P0157	2	F73	4	10	58	LVISIGO

#### Check the continuity between HO2S2 harness connector and ground, or ECM harness connector and ground.

DTC		HO2S2		Ground	Continuity
DIC	Bank	Connector	Terminal	Ciouna	Continuity
P0137	1	F72	4	Ground	Not existed
P0157	2	F73	4	Ground	NUL EXISTED

DTC	E	СМ	Ground	Continuity
DIC	Connector	Terminal	Ground	Continuity
P0137	F8	57	Ground	Not existed
P0157	10	58	Giouna	NUL EXISIEU

#### 3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**4.**CHECK HEATED OXYGEN SENSOR 2

Check heated oxygen sensor 2. Refer to EC-219, "Component Inspection".
--

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO	>> Replace malfunctioning heated oxygen sensor 2. Refer to EM-33, "Exploded View"

#### Component Inspection

1	<b>.</b> INSPECTION START
---	---------------------------

Will CONSULT be used?

Will CONSULT be used?

- YES >> GO TO 2.
- NO >> GO TO 3.

2. CHECK HEATED OXYGEN SENSOR 2

#### With CONSULT

- 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 5. Let engine idle for 1 minute.
- 6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT.

А

EC

D

Е

F

Н

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L

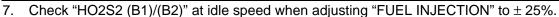
Μ

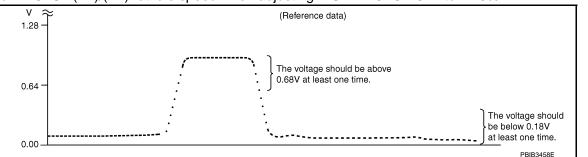
Ν

Ρ

INFOID:000000009651076

#### < DTC/CIRCUIT DIAGNOSIS >





"HO2S2 (B1)/(B2)" should be above 0.68 V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)/(B2)" should be below 0.18 V at least once when the "FUEL INJECTION" is -25%.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning heated oxygen sensor 2. Refer to EM-33, "Exploded View".

**3.**CHECK HEATED OXYGEN SENSOR 2-I

#### **Without CONSULT**

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 4. Let engine idle for 1 minute.
- 5. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM			
Connector	+	_	Condition	Voltage
Connector	Terminal	Terminal		
F8	57 [HO2S2 (bank 1) signal]	59 (Sensor	Revving up to 4,000 rpm under no load at	The voltage should be above 0.68 V at least once during this procedure.
10	58 [HO2S2 (bank 2) signal]	ground)	least 10 times	The voltage should be below 0.18 V at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

**4.**CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector terminals under the following conditions.

	ECM			
Connector	+	-	Condition	Voltage
Connector	Terminal	Terminal		
F8 –	57 [HO2S2 (bank 1) signal]	59 (Sensor	9 least once	The voltage should be above 0.68 V at least once during this procedure.
10 -	58 [HO2S2 (bank 2) signal]	ground)	Keeping engine at idle for 10 minutes	The voltage should be below 0.18 V at least once during this procedure.

#### is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

**5.**CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector terminals under the following conditions.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	ECM			
onnector	+	_	Condition	Voltage
Term	Terminal	Terminal		
F8	57 [HO2S2 (bank 1) signal] 58 [HO2S2 (bank 2) signal]	59 (Sensor ground)	Coasting from 80 km/h (50 MPH) with se- lector lever in the D position	The voltage should be above 0.68 V at least once during this procedure. The voltage should be below 0.18 V at least once during this procedure.
the inspe	ection result norr	nal?		
	INSPECTION I			
0 >>	<ul> <li>Replace malful</li> </ul>	nctioning	heated oxygen sensor 2. Refer to EN	M-33, "Exploded View".

#### < DTC/CIRCUIT DIAGNOSIS >

### P0138, P0158 HO2S2

### **DTC** Logic

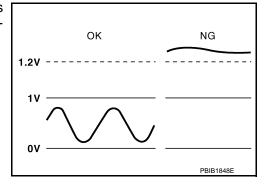
INFOID:000000009651077

#### DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/ F) sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time.

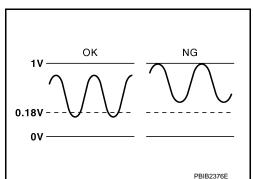
#### MALFUNCTION A

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during various driving conditions such as fuel cut.



#### **MALFUNCTION B**

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during various driving conditions such as fuel-cut.



DTC No.	DTC No. Trouble diagnosis name		DTC detecting condition	Possible cause	
Heated ovugen sensor 2		A)	An excessively high voltage from the sen- sor is sent to ECM.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul>	
P0138 Heated oxygen sensor 2 (bank 1) circuit high voltage	B)	The minimum voltage from the sensor is not reached to the specified voltage.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> <li>Fuel pressure</li> <li>Fuel injector</li> </ul>		
		A)	An excessively high voltage from the sen- sor is sent to ECM.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul>	
, ,	Heated oxygen sensor 2 (bank 2) circuit high volt- age	B)	The minimum voltage from the sensor is not reached to the specified voltage.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> <li>Fuel pressure</li> <li>Fuel injector</li> </ul>	

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### < DTC/CIRCUIT DIAGNOSIS >

>> GO TO 2.	А
2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A	
<ol> <li>Start engine and warm it up to the normal operating temperature.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON.</li> </ol>	EC
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.</li> <li>Let engine idle for 2 minutes.</li> <li>Check 1st trip DTC.</li> </ol>	С
Is 1st trip DTC detected?	D
YES >> Proceed to <u>EC-225, "Diagnosis Procedure"</u> . NO-1 >> With CONSULT: GO TO 3. NO-2 >> Without CONSULT: GO TO 5.	E
3.PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B	
<ul> <li>NOTE:</li> <li>For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).</li> <li>1. Select "DATA MONITOR" mode with CONSULT.</li> <li>2. Start engine and warm it up to the normal operating temperature.</li> </ul>	F
3. Turn ignition switch OFF and wait at least 10 seconds.	G
<ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.</li> <li>Let engine idle for 1 minute.</li> </ol>	Н
<ol> <li>Check that "COOLAN TEMP/S" indicates more than 70°C (158°F). If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F).</li> <li>Open engine hood.</li> <li>Select "HO2S2 (B1) P1146" (for DTC P0138) or "HO2S2 (B2) P1166" (for DTC P0158) of "HO2S2" in</li> </ol>	I
"DTC WORK SUPPORT" mode with CONSULT. 11. Follow the instruction of CONSULT display. NOTE:	J
It will take at most 10 minutes until "COMPLETED" is displayed. 12. Touch "SELF-DIAG RESULTS".	
Which is displayed on CONSULT screen?         OK       >> INSPECTION END         NG       >> Proceed to EC-225, "Diagnosis Procedure".         ONNOT DE DIA CNOCED ::       CONTO 1	K
CON NOT BE DIAGNOSED>>GO TO 4. 4. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B AGAIN	
<ol> <li>Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).</li> <li>Perform DTC confirmation procedure again.</li> </ol>	M
>> GO TO 3.	Ν
5. PERFORM COMPONENT FUNCTION CHECK FOR MALFUNCTION B	IN
Perform component function check. Refer to EC-223, "Component Function Check".	0
<b>NOTE:</b> Use component function check to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.	
<u>Is the inspection result normal?</u> YES >> INSPECTION END	Ρ
NO >> Proceed to <u>EC-225, "Diagnosis Procedure"</u> .	
Component Function Check	
1.PERFORM COMPONENT FUNCTION CHECK-I	

#### < DTC/CIRCUIT DIAGNOSIS >

#### **Without CONSULT**

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Check the voltage between ECM harness connector terminals under the following conditions.

		ECM			Voltage
DTC	Connec-	+	_	Condition	
	tor	Terminal	Terminal		
P0138	F8	57 [HO2S2 (bank 1) signal]	59 (Sensor ground)	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be below 0.18 V
P0158	P0158	58 [HO2S2 (bank 2) signal]			at least once during this procedure.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

# 2.PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector terminals under the following conditions.

		ECM			Voltage	
DTC	Connec-	+ –		Condition		
tor		Terminal Terminal				
P0138	F8	57 [HO2S2 (bank 1) signal]	59 (Sensor	Keeping engine speed at idle for 10	The voltage should be below 0.18 V	
P0158	ΓŎ	58 [HO2S2 (bank 2) signal]	(Sensor ground)	minutes	at least once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

# 3.PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector terminals under the following conditions.

		ECM			
DTC Connec-		+	-	Condition	Voltage
tor	Terminal	Terminal	Ť		
P0138	EQ	57 [HO2S2 (bank 1) signal]	59	Coasting from 80 km/h (50 MPH) with selector lever in the D position	The voltage should be below 0.18 V at least once during this procedure.
P0158	P0158	58 [HO2S2 (bank 2) signal]	(Sensor ground)		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EC-225, "Diagnosis Procedure".

< DTC/CII	RCUIT DIA	GNOSIS	>	,-			[VQ35DE]	
Diagnos	is Proce	dure					INFOID:000000009651079	٨
1.INSPE	CTION STA	ART						A
Confirm th	e detected	malfunctio	n (A or B).	Refer to E	<u>C-222, "DT</u>	<u>C Logic"</u> .		EC
	Ifunction is							EC
	> GO TO 2 > GO TO 6							
•	K HO2S2 C		or for w	ATER				С
	nnect heate				nector.			
2. Check	that water	is not insid						D
-	ection resu							
	> GO TO 3 > Repair or		arness or o	connectors.				Е
•	•				AND SHOR	Г		
	nnect heate							_
2. Disco	nnect ECM	harness c	onnector.					F
3. Check conne		nuity betwe	en heated	oxygen se	ensor 2 (HC	02S2) harness cor	nnector and ECM harness	
								G
DTC		HO2S2		E	СМ	Continuity		
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity		Н
P0138	1	F72	1	F8	59	Existed		
P0158	2	F73	1					
	heck harne		rt to ground	d and short	to power.			
	ection resu							
	> GO TO 4 > Repair o		short to g	ound or sh	ort to powe	r in harness or con	nectors.	J
			-		PEN AND S			
1. Check	the contin	uitv betwee	en HO2S2	harness co	onnector and	d ECM harness co	nnector.	K
		,						I.X.
DTC		HO2S2		E	СМ	Continuity		
	Bank	Connector	Terminal	Connector	Terminal	Continuity		L
P0138	1	F72	4	F8	57	Existed		
P0158	2	F73	4		58			M
2. Check groun		nuity betwe	en HO2S2	2 harness	connector a	nd ground, or EC	M harness connector and	
groun	u.							
		HO2S2				_		Ν
DTC	Bank	Connector	Terminal	Ground	Continuity			
P0138	1	F72	4	Ground	Not existed	_		0
P0158	2	F73	4	Giouna	NUL EXISTED			
								Ρ
DTC		СМ	Ground	Continu	uity			1
	Connector	Terminal						
P0138	- F8	57	Ground	Not exis	ited			
P0158	1	58						

3. Also check harness for short to power. Is the inspection result normal?

58

P0158

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 5.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**5.**CHECK HEATED OXYGEN SENSOR 2

Check heated oxygen sensor 2. Refer to EC-227, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

NO >> Replace malfunctioning heated oxygen sensor 2. Refer to EM-33. "Exploded View".

**6.**CLEAR MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to EC-139, "Work Procedure".

2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 or P0175 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0172, P0175. Refer to <u>EC-245, "DTC Logic"</u>. NO >> GO TO 7.

7. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect heated oxygen sensor 2 harness connector.

3. Disconnect ECM harness connector.

4. Check the continuity between HO2S2 harness connector and ECM harness connector.

DTC		HO2S2		E	Continuity		
DIC	Bank	Connector	Terminal	Terminal Connector Term		Continuity	
P0138	1	F72	1	F8	59	Existed	
P0158	2	F73	1	10		LAISIEU	

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

 $\mathbf{8.}$  CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

DTC		HO2S2		E	Continuity		
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0138	1	F72	4	F8	57	Existed	
P0158	2	F73	4	1.0	58	LAISIEU	

2. Check the continuity between HO2S2 harness connector and ground, or ECM harness connector and ground.

DTC		HO2S2	Ground	Continuity		
DIC	Bank	Connector	Terminal	Ciouna	Continuity	
P0138	1	F72	4	Ground	Not existed	
P0158	2	F73	4	Gibunu		

DTC	E	СМ	Ground	Continuity	
DIC	Connector	Terminal	Cround		
P0138	F8	57	Ground	Not existed	
P0158	ГО	58	Ground	NUL EXISIEU	

3. Also check harness for short to power.

Is the inspection result normal?

P0138, P0158 HO2S2		
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
YES >> GO TO 9.		
NO >> Repair open circuit, short to ground or short to power in harness or connectors. 9.CHECK HEATED OXYGEN SENSOR 2	_	A
Check heated oxygen sensor 2. Refer to EC-227, "Component Inspection".		EC
Is the inspection result normal?		
<ul> <li>YES &gt;&gt; Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.</li> <li>NO &gt;&gt; Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-33, "Exploded View"</u>.</li> </ul>		C
Component Inspection	NFOID:000000009651080	C
1.INSPECTION START		D
Will CONSULT be used?		
Will CONSULT be used?		Е
YES >> GO TO 2. NO >> GO TO 3.		
2. CHECK HEATED OXYGEN SENSOR 2		F
With CONSULT		F
<ol> <li>Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.</li> <li>Start engine and warm it up to the normal operating temperature.</li> </ol>		
3. Turn ignition switch OFF and wait at least 10 seconds.		G
<ol> <li>Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute u</li> <li>Let engine idle for 1 minute.</li> </ol>	nder no load.	
6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the	monitor item	Н
with CONSULT. 7. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm$ 25%.		
V ≈ (Reference data)		
The voltage should be above		J
0.64 – 0.68V at least one time.		
The voltage sh		К
be below 0.18 0.00		
"HO2S2 (B1)/(B2)" should be above 0.68 V at least once when the "FUEL INJECTION"		1
"HO2S2 (B1)/(B2)" should be below 0.18 V at least once when the "FUEL INJECTION"	is – 25%.	
<u>Is the inspection result normal?</u> YES >> INSPECTION END		
NO >> Replace malfunctioning heated oxygen sensor 2. Refer to <u>EM-33. "Exploded View"</u> .		Μ
<b>3.</b> CHECK HEATED OXYGEN SENSOR 2-I		
Without CONSULT		Ν
<ol> <li>Start engine and warm it up to the normal operating temperature.</li> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> </ol>		
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute u	nder no load.	0
<ol> <li>Let engine idle for 1 minute.</li> <li>Check the voltage between ECM harness connector terminals under the following conditions</li> </ol>	j.	
U		Ρ

#### < DTC/CIRCUIT DIAGNOSIS >

	ECM				
Connector	+ –		Condition	Voltage	
Connector	Terminal	Terminal			
F8 [HO2S2	57 [HO2S2 (bank 1) signal]	59 (Sensor	Revving up to 4,000 rpm under no load at least 10 times	The voltage should be above 0.68 V at least once during this procedure.	
	58 [HO2S2 (bank 2) signal]	(Sensor ground)		The voltage should be below 0.18 V at least once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 4.

4.CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector terminals under the following conditions.

ECM					
Connector	+	_	Condition	Voltage	
Connector	Terminal	Terminal			
F8	57 [HO2S2 (bank 1) signal]	59 (Sensor	Keeping engine at idle for 10 minutes	The voltage should be above 0.68 V at least once during this procedure.	
	58 [HO2S2 (bank 2) signal]	ground)		The voltage should be below 0.18 V at least once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

### 5. CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector terminals under the following conditions.

ECM					
Connector	+	-	Condition	Voltage	
	Terminal	Terminal			
F8	57 [HO2S2 (bank 1) signal]	59 (Sensor	Coasting from 80 km/h (50 MPH) with se- lector lever in the D position	The voltage should be above 0.68 V at least once during this procedure.	
	58 [HO2S2 (bank 2) signal]	ground)		The voltage should be below 0.18 V at least once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning heated oxygen sensor 2. Refer to EM-33. "Exploded View".

#### < DTC/CIRCUIT DIAGNOSIS >

### P0139, P0159 HO2S2

### **DTC** Logic

#### DTC DETECTION LOGIC

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity of the three way catalyst 1 causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel cut.

~			EC
e '- er or	ОК 1 <b>V</b>	NG	С
s h	$\sum_{i=1}^{n}$	$\frown$	D
	0V		Ε

|--|--|

INFOID:000000009651081

DTC No. Trouble diagnosis name DTC detecting condition Possible cause Heated oxygen sensor 2 Harness or connectors P0139 (bank 1) circuit slow re-(The sensor circuit is open or shorted) The switching time between rich and lean of a sponse Heated oxygen sensor 2 heated oxygen sensor 2 signal delays more · Fuel system Heated oxygen sensor 2 than the specified time computed by ECM. EVAP system P0159 (bank 2) circuit slow re- Intake air system sponse

### DTC CONFIRMATION PROCEDURE

### **1.**INSPECTION START

#### Do you have CONSULT?

Do you have CONSULT?

YES	>> GO TO 2.

NO >> GO TO 7.

#### 2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following procedure before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

TESTING CONDITION:

For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- 6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 7. Let engine idle for 1 minute.
- 8. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- Drive the vehicle in a proper gear at 60 km/h (38MPH) and maintain the speed.
   CAUTION:
  - Always drive vehicle at a safe speed.

### EC-229

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#### < DTC/CIRCUIT DIAGNOSIS >

- 10. Release the accelerator pedal fully at least 5 seconds.
  - CAUTION:
    - Enable the engine brake.
    - Always drive carefully.
    - Never apply brake when releasing the accelerator pedal.
- 11. Repeat step 9 and 10 at least 8 times.
- 12. Check the following item of "DATA MONITOR".

Data monitor item	Status	
HO2 S2 DIAG1 (B1)		
HO2 S2 DIAG2 (B1)	CMPLT	
HO2 S2 DIAG1 (B2)	CIVIF ET	
HO2 S2 DIAG2 (B2)		
	HO2 S2 DIAG1 (B1) HO2 S2 DIAG2 (B1) HO2 S2 DIAG1 (B2)	

#### Is "CMPLT" displayed on CONSULT screen?

#### YES >> GO TO 6.

NO-1: "CMPLT" is not displayed on DIAG 1>>Perform DTC confirmation procedure again. NO-2: "CMPLT" is not displayed on DIAG 2>>GO TO 4.

# **4.**PERFORM DTC WORK SUPPORT

- 1. Open engine hood.
- Select "HO2S2 (B1) P0139" or "HO2S2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT.
- 3. Start engine and follow the instruction of CONSULT display. **NOTE:**

It will take at most 10 minutes until "COMPLETED" is displayed.

Is "COMPLETED" displayed on CONSULT screen?

YES >> GO TO 6.

NO >> GO TO 5.

#### **5.**PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).

2. Perform DTC confirmation procedure again.

#### >> GO TO 3.

**6.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

Perform ECM self-diagnosis.

Is DTC "P0139" or "P0159" detected?

YES >> Proceed to EC-232, "Diagnosis Procedure".

NO >> INSPECTION END

7.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-230, "Component Function Check".

#### NOTE:

Use component function check to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to <u>EC-232</u>, "Diagnosis Procedure".

**Component Function Check** 

**1.**PERFORM COMPONENT FUNCTION CHECK-I

#### Without CONSULT

1. Start engine and warm it up to the normal operating temperature.

INFOID:000000009651082

### P0139, P0159 HO2S2

#### < DTC/CIRCUIT DIAGNOSIS >

- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM					
DTC	Connec-	+	_	Condition	Voltage	
	tor	Terminal	Terminal			
P0139	F8	57 [HO2S2 (bank 1) signal]	59 (Sensor	Revving up to 4,000 rpm under no	A change of voltage should be more	
P0159	– F8	58 [HO2S2 (bank 2) signal]	ground)	load at least 10 times		

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

# 2.PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connector terminals under the following conditions.

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		ECM				
DTC	Connec-	+	-	Condition	Voltage	
	tor	Terminal	Terminal			
P0139	EQ	57 [HO2S2 (bank 1) signal]	59 (Sensor	Kooping opging at idle for 10 minutes	A change of voltage should be more than 0.8 V for 1 second during this	
P0159	P0159	58 [HO2S2 (bank 2) signal]	ground)	Keeping engine at idle for 10 minutes	procedure.	

YES >> INSPECTION END

NO >> GO TO 3.

**3.** PERFORM COMPONENT FUNCTION CHECK-III

Check the voltage between ECM harness connector terminals under the following conditions.

	ECM				
DTC	Connec-	+	_	Condition	Voltage
	tor	Terminal	Terminal		
P0139	FQ	57 [HO2S2 (bank 1) signal]	59 (Sanaar	Coasting from 80 km/h (50 MPH) in	A change of voltage should be more
P0159	58 [HO2S2 (bank 2) signal]	(Sensor ground)	D position	than 0.8 V for 1 second during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EC-232, "Diagnosis Procedure".

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[VQ35DE]

### P0139, P0159 HO2S2

### < DTC/CIRCUIT DIAGNOSIS >

#### Diagnosis Procedure

## 1.CLEAR MIXTURE RATIO SELF-LEARNING VALUE

- 1. Clear the mixture ratio self-learning value. Refer to EC-139, "Work Procedure".
- 2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to <u>EC-241, "DTC Logic"</u> or <u>EC-245, "DTC Logic"</u>.

NO >> GO TO 2.

2.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect heated oxygen sensor 2 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between heated oxygen sensor 2 (HO2S2) harness connector and ECM harness connector.

DTC		HO2S2		E	СМ	Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0139	1	F72	1	F8	59	Existed
P0159	2	F73	1	10	55	LAISIEU

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

3.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between HO2S2 harness connector and ECM harness connector.

DTC		HO2S2		E	CM	Continuity
ыс	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0139	1	F72	4	F8	57	Existed
P0159	2	F73	4	ГО	58	Existed

2. Check the continuity between HO2S2 harness connector and ground, or ECM harness connector and ground.

DTC		HO2S2		Ground	Continuity
DIC	Bank	Connector	Terminal	Giouna	Continuity
P0139	1	F72	4	Ground	Not existed
P0159	2	F73	4	Gibunu	NUL EXISIEU

DTC	E	CM	Ground	Continuity	
	Connector	Terminal	Ground		
P0139	F8	57	Ground	Not existed	
P0159	ГО	58	Giouna	INOL EXISTED	

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**4.**CHECK HEATED OXYGEN SENSOR 2

### P0139 P0159 H02S2

			1 0133, 1 0133 110232	
< DTC/CIR	CUIT DIAGNO	SIS >		[VQ35DE]
Check heat	ted oxygen sens	or 2. Refer to	EC-233, "Component Inspectio	<u>n"</u> .
s the inspe	ection result norr	nal?		
			Refer to <u>GI-42, "Intermittent Inci</u>	
	•	Ū	ted oxygen sensor 2. Refer to <u>E</u>	M-33, "Exploded View".
compone	ent Inspectio	n		INFOID:000000009651084
.INSPEC	TION START			
/ill CONS	ULT be used?			
/ill CONS	ULT be used?			
	• GO TO 2.			
-	• GO TO 3.			
.CHECK	HEATED OXYO	SEN SENSOF	₹2	
With CO				
			DATA MONITOR" mode with CC prmal operating temperature.	DNSULT.
			least 10 seconds.	
			eed between 3,500 and 4,000 rp	om for at least 1 minute under no load.
	gine idle for 1 mi "FUEL INJECTI		VE TEST" mode, and select "H	IO2S2 (B1)/(B2)" as the monitor item
with CO	ONSULT.			
Check	, , ,	2)" at idle spe	eed when adjusting "FUEL INJE	CTION" to $\pm 25\%$ .
	V ≈ 1.28 –		(Reference data)	
		(	The voltage should be above	
	0.64 —		. 0.68V at least one time.	
		÷	· ·	The voltage should
		· ·	· ·	be below 0.18V
	0.00			PBIB3458E
				he "FUEL INJECTION" is + 25%. he "FUEL INJECTION" is – 25%.
	ection result norr		w 0.16 v at least blice when th	$\mathbf{FOEL} \mathbf{INJECTION} \mathbf{IS} = \mathbf{25\%}.$
	> INSPECTION			
			ted oxygen sensor 2. Refer to <u>E</u>	M-33. "Exploded View"
CHECK	HEATED OXYO	SEN SENSOF	R 2-I	
Without	CONSULT			
Start er	ngine and warm		ormal operating temperature.	
			least 10 seconds.	om for at least 1 minute under no load.
	gine idle for 1 mi		eeu between 3,500 and 4,000 ip	
			rness connector terminals unde	r the following conditions.
	ECM			
			Condition	Voltago
Connector	+ Terminal	– Terminal	Condition	Voltage
	57	renninai		
	57 [HO2S2 (bank 1)			The voltage should be above 0.68 V at

signal]

58

[HO2S2 (bank 2)

59

(Sensor

ground)

F8

Revving up to 4,000 rpm under no load at

least 10 times

The voltage should be above 0.68 V at

The voltage should be below 0.18 V at

least once during this procedure.

least once during this procedure.

#### < DTC/CIRCUIT DIAGNOSIS >

#### YES >> INSPECTION END NO >> GO TO 4.

NO >> GO 10 4.

4.CHECK HEATED OXYGEN SENSOR 2-II

Check the voltage between ECM harness connector terminals under the following conditions.

	ECM				
Connector	+ –		Condition	Voltage	
	Terminal	Terminal			
F8	57 [HO2S2 (bank 1) signal]	59 (Sonsor	59 (Sensor Keeping engine at idle for 10 minutes ground)	The voltage should be above 0.68 V at least once during this procedure.	
10	58 [HO2S2 (bank 2) signal]	``		The voltage should be below 0.18 V at least once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

## 5.CHECK HEATED OXYGEN SENSOR 2-III

Check the voltage between ECM harness connector terminals under the following conditions.

	ECM				
Connector	+	_	Condition	Voltage	
Connector	Terminal	Terminal			
F8	57 [HO2S2 (bank 1) signal] 59 (Sons	59 (Sensor	Coasting from 80 km/h (50 MPH) with se-	The voltage should be above 0.68 V at least once during this procedure.	
10	58 [HO2S2 (bank 2) signal]	ground)	lector lever in the D position	The voltage should be below 0.18 V at least once during this procedure.	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning heated oxygen sensor 2. Refer to EM-33, "Exploded View".

#### P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1 [VQ35DE] < DTC/CIRCUIT DIAGNOSIS >

### P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1

### DTC Logic

INFOID:000000009651085

### DTC DETECTION LOGIC

To judge malfunctions, this diagnosis measures response time of the A/F signal computed by ECM from the A/ F sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and the A/F sensor 1 temperature index. Judgment is based on whether the compensated time (the A/F signal cycling time index) is inordinately long or not.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause	
P014C	Air fuel ratio (A/F) sensor 1			
P014D	(bank 1) circuit slow re- sponse			E
P015A	Air fuel ratio (A/F) sensor 1			
P015B	(bank 1) circuit delayed re- sponse	• The response time of a A/F sensor 1 signal de- lays more than the specified time computed by	Harness or connectors     (The A/F sensor 1 circuit is open or	F
P014E	Air fuel ratio (A/F) sensor 1	ECM.	shorted.) <ul> <li>A/F sensor 1</li> </ul>	
P014F	(bank 2) circuit slow re- sponse			G
P015C	Air fuel ratio (A/F) sensor 1			
P015D	(bank 2) circuit delayed re- sponse			Н

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following proc	cedure
before conducting the next test.	
1. Turn ignition switch OFF and wait at least 10 seconds.	

Turn ignition switch ON. 2.

Turn ignition switch OFF and wait at least 10 seconds. 3.

#### **TESTING CONDITION:**

#### Before performing the following procedure, confirm that battery voltage is more than 11 V at idle. Do you have CONSULT?

YES	>> GO TO 2.
	<u> </u>

NO >> GO TO 6.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

#### With CONSULT

- 1. Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds. 2.
- Turn ignition switch ON. 3.
- Turn ignition switch OFF and wait at least 10 seconds. 4.
- Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load. 5.
- Let engine idle for 1 minute. 6.
- Increase the engine speed up to about 3,600 rpm and keep it for 10 seconds. 7.
- Fully release accelerator pedal and then let engine idle for about 1 minute. 8.
- Check the items status of "DATA MONITOR" as follows. NOTE:

If "PRSNT" changed to "ABSNT", refer to EC-207, "Component Function Check".

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### P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1 < DTC/CIRCUIT DIAGNOSIS > [VQ35DE]

DTC	Data monitor item	Status	
<ul> <li>P014C</li> <li>P014D</li> <li>P015A</li> <li>P015B</li> </ul>	A/F SEN1 DIAG3 (B1)	PRSNT	
<ul> <li>P014E</li> <li>P014F</li> <li>P015C</li> <li>P015D</li> </ul>	A/F SEN1 DIAG3 (B2)	TRONT	

Is "PRSNT" displayed on CONSULT screen?

YES >> GO TO 4.

NO >> GO TO 3.

**3.** PERFORM DTC CONFIRMATION PROCEDURE-2

#### With CONSULT

Perform DTC confirmation procedure-1 again.

Is "PRSNT" displayed on CONSULT screen?

YES >> GO TO 4.

NO >> Refer to EC-207, "Component Function Check".

**4.**PERFORM DTC CONFIRMATION PROCEDURE-2

#### With CONSULT

- 1. Wait for about 20 seconds at idle.
- 2. Check the items status of "DATA MONITOR" as follows.
- NOTE: If "CMPLT" changed to "INCMP", refer to EC-207, "Component Function Check".

DTC	Data monitor item	Status
• P014C	A/F SEN1 DIAG1 (B1)	
<ul><li>P014D</li><li>P015A</li><li>P015B</li></ul>	A/F SEN1 DIAG2 (B1)	CMPLT
• P014E	A/F SEN1 DIAG1 (B2)	CIVIPLI
<ul><li>P014F</li><li>P015C</li><li>P015D</li></ul>	A/F SEN1 DIAG2 (B2)	

Is "CMPLT" displayed on CONSULT screen?

YES >> GO TO 5.

NO >> Refer to EC-207, "Component Function Check".

**5.**PERFORM SELF-DIAGNOSIS

#### (B) With CONSULT

Check the "SELF-DIAG RESULT".

#### Is any DTC detected?

YES >> Proceed to EC-237, "Diagnosis Procedure".

NO >> INSPECTION END

6.CHECK AIR-FUEL RATIO SELF-LEARNING VALUE

#### With GST

- T. Start engine and warm it up to normal operating temperature.
- 2. Select Service \$01 with GST.
- 3. Calculate the total value of "Short term fuel trim" and "Long term fuel trim" indications.

Is the total percentage within ±15%?

YES >> GO TO 8. NO >> GO TO 7. < DTC/CIRCUIT DIAGNOSIS >

7. DETECT MALFUNCTIONING PART А Check the following. · Intake air leaks Exhaust gas leaks EC Incorrect fuel pressure Lack of fuel Fuel injector Incorrect PCV hose connection PCV valve Mass air flow sensor D >> Repair or replace malfunctioning part. 8.PERFORM DTC CONFIRMATION PROCEDURE Ε 1. Turn ignition switch OFF and wait at least 10 seconds. Turn ignition switch ON. 2. 3. Turn ignition switch OFF and wait at least 10 seconds. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load. F 4. 5. Let engine idle for 1 minute. 6. Increase the engine speed up to about 3,600 rpm and keep it for 10 seconds. 7. Fully release accelerator pedal and then let engine idle for about 1 minute. Check 1st trip DTC. 8. Is 1st trip DTC detected? YES >> Proceed to EC-237, "Diagnosis Procedure". Н NO >> INSPECTION END Diagnosis Procedure INFOID:000000009651086 **1**.RETIGHTEN A/F SENSOR 1 Loosen and retighten the A/F sensor 1. Refer to EM-33, "Exploded View". >> GO TO 2. 2. CHECK EXHAUST GAS LEAK Κ 1. Start engine and run it at idle. Listen for an exhaust gas leak before three way catalyst 1. 2. L Three way catalyst 1 Three way catalyst 2 Muffler M A/F sensor 1 HO2S2 Ν To exhaust manifold : Exhaust gas PBIB1922E Is exhaust gas leak detected? YES >> Repair or replace. NO >> GO TO 3.  ${f 3.}$ CHECK FOR INTAKE AIR LEAK Ρ Listen for an intake air leak after the mass air flow sensor. Is intake air leak detected? YES >> Repair or replace. NO >> GO TO 4.

 ${f 4.}$ CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

### P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

1. Clear the mixture ratio self-learning value. Refer to EC-139, "Work Procedure".

Run engine for at least 10 minutes at idle speed. 2.

Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?

>> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to EC-241, "DTC Logic" YES or EC-245, "DTC Logic".

>> GO TO 5. NO

 ${f 5.}$  CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY

Disconnect A/F sensor 1 harness connector. 1.

2. Turn ignition switch ON.

Check the voltage between A/F sensor 1 harness connector and ground. 3.

DTC	A/F sensor 1			Ground	Voltage
DIC	Bank	Connector	Terminal	Giouna	voltage
<ul> <li>P014C</li> <li>P014D</li> <li>P015A</li> <li>P015B</li> </ul>	1	F27	4	Ground	Battery voltage
<ul> <li>P014E</li> <li>P014F</li> <li>P015C</li> <li>P015D</li> </ul>	2	F64	4	Ground	Dattery Voltage

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 6.

**O**.CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

Disconnect IPDM E/R harness connector. 2.

Check the continuity between A/F sensor 1 harness connector and IPDM E/R harness connector. 3.

DTC	A/F sensor 1			IPDN	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
<ul> <li>P014C</li> <li>P014D</li> <li>P015A</li> <li>P015B</li> </ul>	1	F27	4	F12	57	Existed
<ul> <li>P014E</li> <li>P014F</li> <li>P015C</li> <li>P015D</li> </ul>	2	F64	4	ΓIZ	57	Existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

7.CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

Check the continuity between A/F sensor 1 harness connector and ECM harness connector. 3.

[VQ35DE]

### P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1 < DTC/CIRCUIT DIAGNOSIS > [VQ35DE]

DTC	A/F sensor 1			EC	Continuity	
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
• P014C		F27 2 F8	1		69	
<ul><li>P014D</li><li>P015A</li><li>P015B</li></ul>	1		73	Existed		
• P014E			1	10	77	LAISIEU
<ul><li>P014F</li><li>P015C</li><li>P015D</li></ul>	2	F64	2		81	

4. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

DTC		A/F sensor 1		Ground	Continuity
DIC	Bank	Connector	Terminal	Ground	Continuity
• P014C			1		
<ul><li>P014D</li><li>P015A</li><li>P015B</li></ul>	1	F27	2	Ground	Not existed
• P014E			1	Ground	NUL EXISIEU
<ul><li>P014F</li><li>P015C</li><li>P015D</li></ul>	2	F64	2		

DTC		ECM		Ground	Ground Continuity
DIC	Bank	Connector	Terminal	Giouna	Continuity
• P014C			69		
<ul><li>P014D</li><li>P015A</li><li>P015B</li></ul>	1	F8	73	Ground	Not existed
• P014E		10	77	Giouna	NUL EXISIEU
<ul><li>P014F</li><li>P015C</li><li>P015D</li></ul>	2		81		

5. Also check harness for short to power. L Is the inspection result normal? YES >> GO TO 8. NO >> Repair open circuit, short to ground or short to power in harness or connectors. Μ 8.CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER Check air fuel ratio (A/F) sensor 1 heater. Refer to EC-173, "Component Inspection". Ν Is the inspection result normal? YES >> GO TO 9. NO >> Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to EM-33, "Exploded View". 9.CHECK MASS AIR FLOW SENSOR Check both mass air flow sensor (bank 1 and bank 2). Ρ

Refer to EC-181, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace malfunctioning mass air flow sensor. Refer to EM-26, "Exploded View".

**10.**CHECK PCV VALVE

Check PCV valve. Refer to <u>EC-459, "Work Procedure"</u>. <u>Is the inspection result normal?</u>

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# P014C, P014D, P014E, P014F, P015A, P015B, P015C, P015D A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

YES >> GO TO 11.

NO >> Repair or replace PCV valve. Refer to <u>EM-52, "Exploded View"</u>.

11.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to EM-33, "Exploded View".

NO >> Repair or replace error-detected parts.

#### < DTC/CIRCUIT DIAGNOSIS >

## P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

### **DTC Logic**

INFOID:000000009651087

[VQ35DE]

#### DTC DETECTION LOGIC

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 A/F sensor 1. 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 illuminates the MIL (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator
A/F sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	F
P0171	Fuel injection system too lean (bank 1)		<ul><li>Intake air leakage</li><li>A/F sensor 1</li></ul>	_ '
P0174	Fuel injection system too lean (bank 2)	<ul> <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> <li>Fuel injector</li> <li>Exhaust gas leakage</li> <li>Incorrect fuel pressure</li> <li>Lack of fuel</li> <li>Mass air flow sensor</li> <li>Incorrect PCV hose connection</li> </ul>	G

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

#### 2.PERFORM DTC CONFIRMATION PROCEDURE-I

- 1. Clear the mixture ratio self-learning value. Refer to EC-139, "Work Procedure".
- 2. Start engine.

Is it difficult to start engine?

YES	>> GO TO 3.
	·

NO >> GO TO 4.

3.RESTART ENGINE

If it is difficult to start engine, the fuel injection system has a malfunction, too. Crank engine while depressing accelerator pedal.

NOTE:

• When depressing accelerator pedal three-fourths (3/4) or more, the control system does not start the engine. Do not depress accelerator pedal too much.

Does engine start?

YES >> Proceed to EC-242, "Diagnosis Procedure".

NO >> Check exhaust and intake air leakage visually.

4.PERFORM DTC CONFIRMATION PROCEDURE-II

1. Keep engine idle for at least 5 minutes.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

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< DTC/CIRCUIT DIAGNOSIS >

YES >> Proceed to EC-242, "Diagnosis Procedure".

NO >> GO TO 5.

#### 5. PERFORM DTC CONFIRMATION PROCEDURE-III

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Start engine.
- 3. Maintain the following conditions for at least 10 consecutive minutes. Hold the accelerator pedal as steady as possible.
  - VHCL SPEED SE 50 120 km/h (31 75 mph)

#### CAUTION:

### Always drive vehicle at a safe speed.

4. Check 1st trip DTC.

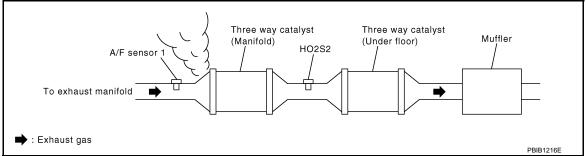
Is 1st trip DTC detected?

YES >> Proceed to <u>EC-242, "Diagnosis Procedure"</u>. NO >> INSPECTION END

### Diagnosis Procedure

## 1.CHECK EXHAUST GAS LEAKAGE

- 1. Start engine and run it at idle.
- 2. Listen for an exhaust gas leakage before three way catalyst (manifold).



Is exhaust gas leakage detected?

YES >> Repair or replace malfunctioning part.

NO >> GO TO 2.

**2.**CHECK FOR INTAKE AIR LEAKAGE

- 1. Listen for an intake air leakage after the mass air flow sensor.
- 2. Check PCV hose connection.

Is intake air leakage detected?

YES >> Repair or replace malfunctioning part.

NO >> GO TO 3.

 ${f 3.}$ CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

#### 1. Turn ignition switch OFF.

- 2. Disconnect corresponding A/F sensor 1 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC	A/F sensor 1			E	Continuity		
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity	
P0171	1	F27	1		69		
FUITI	1	2	Γ21	121	F8	73	Existed
P0174	2	F64 1		ГО	77	EXISTED	
FU174	2	F04	2		81		



[VQ35DE]

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#### < DTC/CIRCUIT DIAGNOSIS >

5. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

DTC	A/F sensor 1			Ground Continuity		
DIC	Bank	Connector	Terminal	Giouna	Continuity	
P0171	1	F27	1			
FUITI	I	1 21	1 121	2	Ground	Not existed
P0174	2	F64	1	Giouna	NUL EXISTED	
F0174	2	F04	2			

DTC	E	ECM		Continuity
DIC	Connector	Terminal	Ground	Continuity
P0171		69	Ground	Not existed
P0171	F8	73		
D0474	ГО	77		
P0174		81		

6. Also check harness for short to power.

Is the inspection result normal?

4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

#### **4.**CHECK FUEL PRESSURE

- Release fuel pressure to zero. Refer to EC-141, "Work Procedure". 1.
- Install fuel pressure gauge kit [SST: (J-44321)] and check fuel pressure. Refer to EC-141, "Work Proce-2. dure".

### At idling: Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)

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Is the inspection result normal?	
YES >> GO TO 6.	
NO >> GO TO 5.	Κ
5. DETECT MALFUNCTIONING PART	
Check fuel hoses and fuel tubes for clogging.	L
Is the inspection result normal?	
YES >> Replace "fuel filter and fuel pump assembly". Refer to <u>FL-5, "Exploded View"</u> . NO >> Repair or replace malfunctioning part.	M
6. CHECK MASS AIR FLOW SENSOR	
With CONSULT  I. Install all removed parts.	Ν
<ol> <li>Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT. For specification, refer to <u>EC-461, "Mass Air Flow Sensor"</u>.</li> <li>With GST</li> </ol>	0

#### Giller State G

- 1. Install all removed parts.
- Check mass air flow sensor signal in Service \$01 with GST. 2. For specification, refer to EC-461, "Mass Air Flow Sensor".

#### Is the measurement value within the specification?

- YES >> GO TO 7.
- NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to EC-184, "Diagnosis Procedure".

7. CHECK FUNCTION OF FUEL INJECTOR

#### (P) With CONSULT

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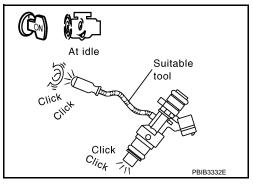
#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that each circuit produces a momentary engine speed drop.

#### With GST

- 1. Let engine idle.
- 2. Listen to each fuel injector operating sound.
- Is the inspection result normal?
- YES >> GO TO 8.
- NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to <u>EC-426, "Diagnosis Procedure"</u>.



### 8.CHECK FUEL INJECTOR

- 1. Turn ignition switch OFF.
- 2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
- 3. Disconnect all fuel injector harness connectors.
- 4. Remove fuel tube assembly. Refer to <u>EM-47</u>, "<u>Exploded View</u>". Keep fuel hose and all fuel injectors connected to fuel tube.
- For DTC P0171, reconnect fuel injector harness connectors on bank 1. For DTC P0174, reconnect fuel injector harness connectors on bank 2.
- 6. Disconnect all ignition coil harness connectors.
- 7. Prepare pans or saucers under each fuel injector.
- Crank engine for about 3 seconds. For DTC P0171, check that fuel sprays out from fuel injectors on bank 1.

For DTC P0174, check that fuel sprays out from fuel injectors on bank 2.

#### Fuel should be sprayed evenly for each fuel injector.

#### Is the inspection result normal?

- YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".
- NO >> Replace fuel injectors from which fuel does not spray out. Always replace O-ring with new ones. Refer to <u>EM-47</u>, "Exploded View".

#### < DTC/CIRCUIT DIAGNOSIS >

# P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

### **DTC** Logic

INFOID:000000009651089

[VQ35DE]

#### DTC DETECTION LOGIC

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 A/F sensor 1. 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 illuminates the MIL (2 trip detection logic).

Sensor	Input signal to ECM	ECM function	Actuator	D
A/F sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector	_

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0172	Fuel injection system too rich (bank 1)	<ul> <li>Fuel injection system does not operate properly.</li> <li>The amount of mixture ratio compensation is too</li> </ul>	<ul><li> A/F sensor 1</li><li> Fuel injector</li><li> Exhaust gas leakage</li></ul>
P0175	Fuel injection system too rich (bank 2)	large. (The mixture ratio is too rich.)	<ul><li>Incorrect fuel pressure</li><li>Mass air flow sensor</li></ul>
DTC CO	NFIRMATION PROC	EDURE	
1.PREC	ONDITIONING		
ing the ne 1. Turn 2. Turn	ext test. ignition switch OFF and ignition switch ON.	has been previously conducted, always perf d wait at least 10 seconds. d wait at least 10 seconds.	orm the following before conduct-
;	>> GO TO 2.		
2.PERF	ORM DTC CONFIRMA	TION PROCEDURE-I	
		earning value. Refer to <u>EC-139, "Work Proc</u>	edure".
	engine. I <u>lt to start engine?</u>		
	$\rightarrow$ GO TO 3.		
NO >	>> GO TO 4.		
3.REST/	ART ENGINE		
	cult to start engine, the gine while depressing a	fuel injection system has a malfunction, too accelerator pedal.	
• When d		r pedal three-fourths (3/4) or more, the co lerator pedal too much.	ontrol system does not start the
Does eng			
		"Diagnosis Procedure". Intake air leakage visually.	
4.PERF	ORM DTC CONFIRMA	TION PROCEDURE-II	
	engine idle for at least k 1st trip DTC.	5 minutes.	
-	DTC detected?		
YES >	>> Proceed to <u>EC-246.</u>	"Diagnosis Procedure".	

NO >> GO TO 5.

**5.**PERFORM DTC CONFIRMATION PROCEDURE-III

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#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Start engine.
- 3. Maintain the following conditions for at least 10 consecutive minutes. Hold the accelerator pedal as steady as possible.

VHCL SPEED SE	50 - 120 km/h (31 - 75 mph)
CAUTION:	

Always drive vehicle at a safe speed.

4. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Proceed to <u>EC-246, "Diagnosis Procedure"</u>. NO >> INSPECTION END

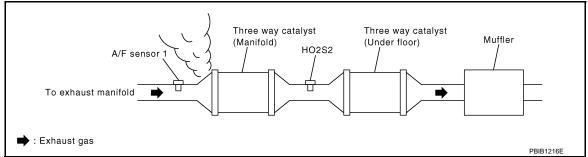
#### **Diagnosis** Procedure

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### 1.CHECK EXHAUST GAS LEAKAGE

- 1. Start engine and run it at idle.
- 2. Listen for an exhaust gas leakage before three way catalyst (manifold).



Is exhaust gas leakage detected?

YES >> Repair or replace malfunctioning part.

NO >> GO TO 2.

### 2. CHECK FOR INTAKE AIR LEAKAGE

Listen for an intake air leakage after the mass air flow sensor.

#### Is intake air leakage detected?

YES >> Repair or replace malfunctioning part.

NO >> GO TO 3.

**3.**CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect corresponding A/F sensor 1 harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

DTC		A/F sensor 1		E	CM	Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0172	1	F27	1		69	
F0172	I	FZ1	2	F8	73	Existed
P0175	2	F64	1	FO	77	EXISIEU
F0175	2	F04	2		81	

5. Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

### < DTC/CIRCUIT DIAGNOSIS >

DTC		A/F sensor 1		Ground	Continuity	
DIC	Bank	Connector	Terminal	Giouna	Continuity	
P0172	1	F27	1			
FUITZ	I	121	2	Ground	Not existed	
P0175	2	F64	1	Giouna	NOL EXISTEN	
F0175	2	Г04	2	•		

DTC	E	CM	Ground	Continuity
DIC	Connector	Terminal	Giouna	Continuity
P0172		69		
FUITZ	<b>F</b> 0	73	Cround	Not existed
D0175	F8	77	Ground	NOT EXISTED
P0175		81		

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**4.**CHECK FUEL PRESSURE

1.	Release fuel pressure to zero. Refer to	C-141, "Work Procedure".	
2	Install fuel pressure gauge kit [CCT /	(1221)] and shock fuel pressure Defar to EC 111 "	110

Install fuel pressure gauge kit [SST: — (J-44321)] and check fuel pressure. Refer to <u>EC-141, "Work Proce-dure"</u>.

#### At idling: Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)

Is the inspection result normal?

YES >> GO TO 5. NO >> Replace "fuel filter and fuel pump assembly". Refer to <u>EM-47, "Exploded View"</u>. **5.**CHECK MASS AIR FLOW SENSOR

#### With CONSULT

- 1. Install all removed parts.
- 2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT. For specification, refer to <u>EC-461, "Mass Air Flow Sensor"</u>.

#### With GST

- 1. Install all removed parts.
- 2. Check mass air flow sensor signal in "Service \$01" with GST. For specification, refer to <u>EC-461, "Mass Air Flow Sensor"</u>.

Is the measurement value within the specification?

YES >> GO TO 6.

NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to <u>EC-184, "Diagnosis Procedure"</u>.

**6.**CHECK FUNCTION OF FUEL INJECTOR

#### With CONSULT

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that each circuit produces a momentary engine speed drop.

#### With GST

1. Let engine idle.

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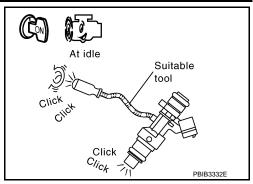
#### < DTC/CIRCUIT DIAGNOSIS >

2. Listen to each fuel injector operating sound.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Perform trouble diagnosis for FUEL INJECTOR, refer to <u>EC-426, "Diagnosis Procedure"</u>.



[VQ35DE]

## 7. CHECK FUEL INJECTOR

- 1. Remove fuel injector assembly. Refer to <u>EM-47, "Exploded View"</u>. Keep fuel hose and all fuel injectors connected to fuel tube.
- 2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
- 3. Disconnect all fuel injector harness connectors.
- 4. Disconnect all ignition coil harness connectors.
- 5. Prepare pans or saucers under each fuel injectors.
- 6. Crank engine for about 3 seconds. Check fuel does not drip from fuel injector.

#### Is the inspection result normal?

- YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".
- NO >> Replace the fuel injectors from which fuel is dripping. Always replace O-ring with new one. Refer to EM-47, "Exploded View".

### < DTC/CIRCUIT DIAGNOSIS >

# P0181 FTT SENSOR

# DTC Logic

DTC DETECTION LOGIC

	Trouble diagnosis (Trouble diagnosis content)		DTC detecting condition	Possible cause
		A)	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from ECT sensor and intake air temperature sensor.	<ul> <li>Harness or connectors (The FTT sensor circuit is open or shorted)</li> <li>FTT sensor</li> </ul>
P0181	FTT SENSOR [Fuel tank temperature (FTT) sensor circuit range/perfor- mance]	B)	The comparison result of signals trans- mitted to ECM from each temperature sensor (IAT sensor, ECT sensor, EOT sensor, and FTT sensor) shows that the voltage signal of the FTT sensor is higher/lower than that of other temper- ature sensors when the engine is start- ed with its cold state.	<ul> <li>Harness or connectors (High or low resistance in the FTT sensor circuit)</li> <li>FTT sensor</li> </ul>
DTC CO	NFIRMATION PROCEDU	RE		
1.INSPE	CTION START			
YES >	ssary to erase permanent D	<u>TC?</u>		
•	>> GO TO 2. ONDITIONING			
dure befo 1. Turn i 2. Turn i 3. Turn i	ONFIRMATION PROCEDUI re conducting the next test. ignition switch OFF and wai ignition switch ON. ignition switch OFF and wai	t at le	east 10 seconds.	ways perform the following proce-
~		PRO	DCEDURE FOR MALFUNCTION	A-I
2. Chec	ignition switch ON and wait k 1st trip DTC.	at lea	ast 10 seconds.	
YES >	<u>DTC detected?</u> >> Proceed to <u>EC-251, "Diad</u> >> GO TO 4.	gnosi	s Procedure".	
4.CHEC	K ENGINE COOLANT TEM	PER	ATURE	
	xt "COOLAN TEMP/S" in "D/ k "COOLAN TEMP/S" value		MONITOR" with CONSULT.	
Follow the	e procedure "With CONSUL"			
"COOLAN	<u>\ TEMP/S" less than 60°C ('</u> >> INSPECTION END	<u>140°</u>	<u>=)?</u>	
YES > NO >	>> GO TO 5.		DCEDURE FOR MALFUNCTION	

1. Cool engine down until "COOLAN TEMP/S" is less than 60°C (140°F).

### EC-249

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< DTC/CIRCUIT DIAGNOSIS >

2. Wait at least 10 seconds.

3. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT" above.

#### Is 1st trip DTC detected?

YES >> Proceed to EC-251, "Diagnosis Procedure".

NO >> GO TO 6.

**6.**PERFORM COMPONENT FUNCTION CHECK (FOR MALFUNCTION B)

Perform component function check. Refer to <u>EC-250, "Component Function Check"</u>.

#### NOTE:

Use the component function check to check the overall function of the FTT sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to <u>EC-251, "Diagnosis Procedure"</u>.

#### 7. PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

- Before performing the following procedure, do not add fuel.
- Before performing the following procedure, check that fuel level is between 1/4 and 4/4.
- Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.

>> GO TO 8.

**8.**PERFORM DTC CONFIRMATION PROCEDURE B

- 1. Start engine and let it idle for 60 minutes.
- 2. Move the vehicle to a cool place.
  - NOTE:

Cool the vehicle in an environment of ambient air temperature between –10°C (14°F) and 35°C (95°F).

3. Turn ignition switch OFF and soak the vehicle for 12 hours.

#### CAUTION: Never turn ignition switch ON during soaking. NOTE:

- The vehicle must be cooled with the food open.4. Start engine and let it idle for 5 minutes or more.
  - CAUTION:

#### Never turn ignition switch OFF during idling.

#### 5. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-251, "Diagnosis Procedure".
- NO >> INSPECTION END

#### **Component Function Check**

**1.**CHECK FUEL TANK TEMPERATURE (FTT) SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect fuel level sensor unit and fuel pump harness connector.
- 3. Remove fuel level sensor unit. Refer to <u>FL-5, "Exploded View"</u>.

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#### < DTC/CIRCUIT DIAGNOSIS >

4. Check resistance between fuel level sensor unit and fuel pump terminals by heating with hot water as shown in the figure.

Terminals	Condition	Resistance (k $\Omega$ )	
4 and 5	4 and 5 Temperature [°C (°F)]		2.3 – 2.7
4 and 5		50 (122)	0.79 – 0.90

Is the inspection result normal?

YES >> GO TO 2.

NO >> Proceed to EC-251, "Diagnosis Procedure".

# 2. CHECK INTERMITTENT INCIDENT

Z.CHECK INTE	RMITTENTINC	IDENT		
Check intermitte	nt incident. Refe	r to <u>GI-42, "Inter</u>	mittent Incident".	
Is the inspection	result normal?			
	PECTION END			
NO >> Proc	ceed to <u>EC-251,</u>	<u>"Diagnosis Proc</u>	<u>edure"</u> .	
Diagnosis Pr	ocedure			INFOID:00000009651093
	I START			
Confirm the dete	cted malfunction	n (A or B). Refer	to <u>EC-249, "DTC</u>	<u>Logic"</u> .
Which malfunction	on is detected?			
A >> GO				
B >> GO				
2.CHECK FUE	_ TANK TEMPE	RATURE SENSO	OR POWER SUP	PLY
<ol> <li>Disconnect f</li> <li>Turn ignition</li> </ol>			•	nector. mp harness connector and ground.
Fuel level sensor	unit and fuel pump	Oracinad		
Connector	Terminal	Ground	Voltage	

		Ground	Voltage
Connector	Terminal	Ground	voltage
B40	4	Ground	Approx. 5 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

# ${f 3.}$ CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between fuel tank temperature sensor harness connector and ECM harness connector tor.

	Fuel level sensor unit and fuel pump		ECM	
Connector	Terminal	Connector	Terminal	
B40	4	E16	111	Existed

#### Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

### **4.**CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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#### < DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between fuel level sensor unit and fuel pump harness connector and ECM harness connector.

Fuel level sensor unit and fuel pump		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
B40	5	E16	120	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit, short to ground or short to power in harness or connector.

**5.**CHECK FUEL TANK TEMPERATURE SENSOR

Check fuel tank temperature sensor. Refer to EC-252, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42. "Intermittent Incident".

NO >> Replace fuel level sensor unit and fuel pump. Refer to <u>FL-5</u>, "Exploded View".

### Component Inspection

### **1.**CHECK FUEL TANK TEMPERATURE SENSOR

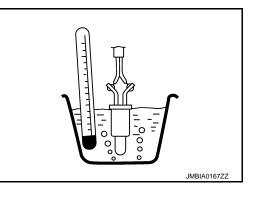
- 1. Turn ignition switch OFF.
- 2. Remove fuel level sensor unit. Refer to FL-5, "Exploded View".
- 3. Check resistance between "fuel level sensor unit and fuel pump" terminals by heating with hot water as shown in the figure.

Terminals	Condition		Resistance
4 and 5	Temperature [°C (°F)]	20 (68)	2.3 - 2.7 kΩ
4 010 0		50 (122)	0.79 - 0.90 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel level sensor unit and fuel pump. Refer to <u>FL-5, "Exploded View"</u>.



INFOID:000000009651094

## P0182, P0183 FTT SENSOR

## < DTC/CIRCUIT DIAGNOSIS >

# P0182, P0183 FTT SENSOR

# DTC Logic

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[VQ35DE]

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC d	etecting condition	Possible cause
P0182	Fuel tank temperature sensor circuit low input	An excessively low sent to ECM.	v voltage from the sensor is	Harness or connectors     (The sensor circuit is open or shorted.)
P0183	Fuel tank temperature sensor circuit high input	An excessively hig sent to ECM.	h voltage from the sensor is	Fuel tank temperature sensor
DTC CON	FIRMATION PROCE	EDURE		
1.PRECO	NDITIONING			
		as been previou	sly conducted, always p	perform the following before conduct-
ing the nex 1. Turn ig	t test. Inition switch OFF and	wait at least 10	seconds	
	inition switch ON.	wait at least 10	3600103.	
3. Turn ig	nition switch OFF and	wait at least 10	seconds.	
	• GO TO 2.			
•	RM DTC CONFIRMAT		IDE	
	nition switch ON and v 1st trip DTC.	wait at least 5 Se	CONUS.	
	TC detected?			
	Proceed to <u>EC-253</u> ,	<u>'Diagnosis Proc</u>	<u>edure"</u> .	
-	NSPECTION END			
Diagnosi	s Procedure			INFOID:00000009651096
1.снеск	GROUND CONNECT	ION		
	nition switch OFF.			
	-	8. Refer to Grou	Ind Inspection in <u>GI-45.</u>	"Circuit Inspection".
	ection result normal? GO TO 2.			
	Repair or replace gro	ound connection		
2.снеск	FUEL TANK TEMPER	RATURE SENSO	OR POWER SUPPLY C	IRCUIT
	nition switch OFF.			
		unit and fuel pu	imp" harness connector.	
	nition switch ON. the voltage between "	fuel level senso	unit and fuel pump" ha	rness connector and ground.
	-		· ·	
Fuel level s	ensor unit and fuel pump	Ground	Voltage	
Connect	or Terminal	Ground	voliage	
B40	4	Ground	Approx. 5 V	
•	ection result normal?			
	• GO TO 4. • GO TO 3.			
NO >>	, GO IO 3.			

# 3. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E104, B4

• Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

## EC-253

# P0182, P0183 FTT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

>> Repair open circuit, short to ground or short to power in harness or connector.

### **4.**CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between "fuel level sensor unit and fuel pump" harness connector and ECM harness connector.

Fuel level sensor	unit and fuel pump	E	Continuity	
Connector	Connector Terminal		Terminal	Continuity
B40	5	E16	120	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

Harness connectors E105, M11

Harness connectors M77, B11

• Harness for open or short between "fuel level sensor unit and fuel pump" and ECM

>> Repair open circuit, short to ground or short to power in harness or connector.

### **6.**CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-254, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace "fuel level sensor unit and fuel pump".

**1**.CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

>> INSPECTION END

**Component Inspection** 

1.CHECK FUEL TANK TEMPERATURE SENSOR

1. Turn ignition switch OFF.

2. Remove fuel level sensor unit. Refer to FL-5, "Exploded View".

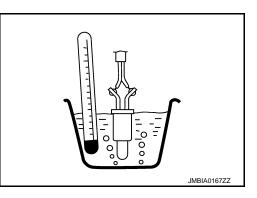
 Check resistance between "fuel level sensor unit and fuel pump" terminals by heating with hot water as shown in the figure.

Terminals	Condition	Resistance	
4 and 5	Temperature [°C (°E)]	20 (68)	2.3 - 2.7 kΩ
4 410 5	Temperature [°C (°F)]	50 (122)	0.79 - 0.90 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel level sensor unit and fuel pump. Refer to <u>FL-5. "Exploded View"</u>.



INFOID:000000009651097

# P0196 EOT SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# P0196 EOT SENSOR

# **DTC Logic**

# DTC DETECTION LOGIC

### NOTE:

If DTC P0196 is displayed with DTC P0197 or P0198, first perform the trouble diagnosis for DTC P0197 or P0198. Refer to <u>EC-259, "DTC Logic"</u>.

DTC No.	Trouble diagnosis (Trouble diagnosis content)		DTC detecting condition	Possible cause
		A)	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from EOT sensor and intake air temperature sensor.	<ul> <li>Harness or connectors (The EOT sensor circuit is open or shorted)</li> <li>EOT sensor</li> </ul>
P0196	EOT SENSOR [Engine oil temperature (EOT) sensor circuit range/perfor- mance]	B)	The comparison result of signals trans- mitted to ECM from each temperature sensor (IAT sensor, ECT sensor, FTT sensor, and EOT sensor) shows that the signal voltage of the EOT sensor is high- er/lower than that of other temperature sensors when the engine is started with its cold state.	<ul> <li>Harness or connectors (High or low resistance in the EOT sensor circuit)</li> <li>EOT sensor</li> </ul>
	NFIRMATION PROCEDU	JRE		
I.INSPE	ECTION START			
dure befo 1. Turn 2. Turn 3. Turn <b>TESTING</b>	ore conducting the next test. ignition switch OFF and wa ignition switch ON. ignition switch OFF and wa CONDITION:	it at I it at I		
_	>> GO TO 3.			
			OCEDURE FOR MULFUNCTION	A-I
2. Turn 3. Turn 4. Turn 5. Start	engine and warm it up to no ignition switch OFF and wa ignition switch ON. ignition switch OFF and wa engine and let it idle for 5 n ck 1st trip DTC.	it at l it at l	east 10 seconds. east 10 seconds.	
YES	<u>DTC detected?</u> >> Proceed to <u>EC-257, "Dia</u> >> GO TO 4.	ignos	sis Procedure".	
4.PERF	ORM DTC CONFIRMATION	N PR	OCEDURE FOR MULFUNCTION	A-II
2. Cheo	CONSULT ct "DATA MONITOR" mode ck that "COOLAN TEMP/S"	indica	ates above 70°C (158°F).	

If it is above 70°C (158°F), go to the following steps.

# EC-255

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# P0196 EOT SENSOR

## < DTC/CIRCUIT DIAGNOSIS >

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If it is below 70°C (158°F), warm engine up until "COOLAN TEMP/S" indicates more than 70°C (158°F). Then perform the following steps.

- 3. Turn ignition switch OFF and soak the vehicle in a cool place.
- 4. Turn ignition switch ON. NOTE: Do not turn ignition switch OFE until s

**Do not turn ignition switch OFF until step 8.** 5. Select "DATA MONITOR" mode with CONSULT.

6. Check the following.

COOLAN TEMP/S	Below 40°C (104°F)
INT/A TEMP SE	Below 40°C (104°F)
Difference between "COOLAN TEMP/S" and "INT/A TEMP SE"	Within 6°C (11°F)

If they are within the specified range, perform the following steps.

If they are out of the specified range, soak the vehicle to meet the above conditions. Then perform the following steps.

NOTE:

• Do not turn ignition switch OFF.

- If it is supposed to need a long period of time, do not deplete the battery.
- 7. Start engine and let it idle for 5 minutes.
- 8. Check 1st trip DTC.

With GST

Follow the procedure "With CONSULT" above.

Is 1st trip DTC detected?

YES >> Proceed to EC-257, "Diagnosis Procedure".

NO >> GO TO 5.

**5.**PERFORM COMPONENT FUNCTION CHECK (FOR MULFUNCTION B)

Perform component function check. Refer to EC-257, "Component Function Check".

### NOTE:

Use the component function check to check the overall function of the EOT sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EC-257, "Diagnosis Procedure".

## 6.PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

**TESTING CONDITION:** 

- Before performing the following procedure, do not add fuel.
- Before performing the following procedure, check that fuel level is between 1/4 and 4/4.
- Before performing the following procedure, confirm that battery voltage is 11 V or more at idle.

## >> GO TO 7.

7.PERFORM DTC CONFIRMATION PROCEDURE B

- 1. Start engine and let it idle for 60 minutes.
- 2. Move the vehicle to a cool place.
- NOTE:

Cool the vehicle in an environment of ambient air temperature between  $-10^{\circ}C$  (14°F) and 35°C (95°F). 3. Turn ignition switch OFF and soak the vehicle for 12 hours.

CAUTION: Never turn ignition switch ON during soaking. NOTE:

The vehicle must be cooled with the food open.

# < DTC/CIRCUIT DIAGNOSIS >

- Start engine and let it idle for 5 minutes or more. CAUTION:
  - Never turn ignition switch OFF during idling.
- 5. Check 1st trip DTC.
- Is 1st trip DTC detected?
- YES >> Proceed to <u>EC-257, "Diagnosis Procedure"</u>. NO >> INSPECTION END

## Component Function Check

# 1.CHECK ENGINE OIL TEMPERATURE (EOT) SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect EOT sensor harness connector.
- 3. Remove EOT sensor. Refer to CO-26, "Exploded View".
- Check resistance between EOT sensor terminals by heating with hot water as shown in the figure.

Terminals	Condition	Resistance (k $\Omega$ )	
		20 (68)	2.1 – 2.9
1 and 2	Temperature [°C (°F)]	50 (122)	0.68 – 1.00
		90 (194)	0.236 - 0.260

### Is the inspection result normal?

YES >> GO TO 2.

- NO >> Proceed to EC-257, "Diagnosis Procedure".
- 2. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-42, "Intermittent Incident".
Is the inspection result normal?
YES >> INSPECTION END
NO >> Proceed to <u>EC-257, "Diagnosis Procedure"</u> .
Diagnosis Procedure

# 1.CHECK ENGINE OIL TEMPERATURE SENSOR

Check engine oil temperature sensor. Refer to <u>EC-257. "Component Inspection"</u>.

### Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace engine oil temperature sensor. Refer to EM-66. "Exploded View".

## Component Inspection

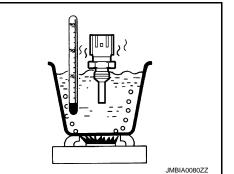
# 1.CHECK ENGINE OIL TEMPERATURE SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect engine oil temperature sensor harness connector.
- 3. Remove engine oil temperature sensor. Refer to EM-66, "Exploded View".
- 4. Check resistance between engine oil temperature sensor terminals by heating with hot water as shown in the figure.

Terminals	Condition	Resistance	
		20 (68)	2.1 - 2.9 kΩ
1 and 2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00 kΩ
		90 (194)	0.236 - 0.260 kΩ

Is the inspection result normal?

YES >> INSPECTION END

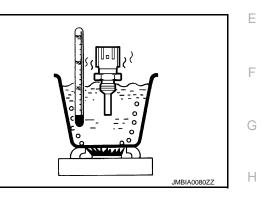


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# **P0196 EOT SENSOR**

## < DTC/CIRCUIT DIAGNOSIS >

NO >> Replace engine oil temperature sensor. Refer to <u>EM-66, "Exploded View"</u>.

# P0197, P0198 EOT SENSOR

## < DTC/CIRCUIT DIAGNOSIS >

# P0197, P0198 EOT SENSOR

# DTC Logic

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INFOID:000000009651102

[VQ35DE]

## DTC DETECTION LOGIC

DTC No.	Trouble Diagr Name	nosis	DTC detecting	condition	Possible Cause
P0197	Engine oil temp ture sensor circu input	uit low	An excessively low voltage sent to ECM.	e from the sensor is	<ul> <li>Harness or connectors</li> <li>(The sensor circuit is open or shorted.)</li> </ul>
P0198	Engine oil temp ture sensor circ high input	tit	An excessively high voltag sent to ECM.	e from the sensor is	Engine oil temperature sensor
DTC CON	FIRMATION	I PRO	CEDURE		
1.PRECO		3			
ing the nex 1. Turn i 2. Turn i	xt test. gnition switch gnition switch	OFF a ON.	e has been previously nd wait at least 10 se nd wait at least 10 se	conds.	even by the following before conduct-
>	> GO TO 2.				
2.PERFC	ORM DTC CO	NFIRM	ATION PROCEDURE	E	
	engine and wa		ast 5 seconds.		
	DTC detected				
YES >	> Proceed to	EC-259	9, "Diagnosis Procedu	ure".	
	> INSPECTIC		)		
Diagnos	is Procedu	Ire			INFOID:000000009651103
<b>1.</b> CHECK	EOT SENSO		WER SUPPLY		
			perature (EOT) senso	r harness conneo	ctor.
	gnition switch		n EOT sensor harnes	s connector and	around
	the voliage L			S connector and	ground.
EOT	sensor	Ground	Voltage		
Connector		Giouna	voltage		
F66	1	Ground	Approx. 5 V		
•	ection result r	normal?	2		
	> GO TO 2. > Repair oper	n circuit	t. short to around or s	hort to power in h	narness or connectors.
-			OUND CIRCUIT FOR		
	gnition switch				
	nnect ECM ha	arness			
3. Check					d ECM harness connector.

EOT s	ensor	EC	Continuity	
Connector	Terminal	Connector Terminal		Continuity
F66	2	F8	76	Existed

4. Also check harness for short to ground and short to power.

### EC-259

# P0197, P0198 EOT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**3.**CHECK ENGINE OIL TEMPERATURE SENSOR

Check engine oil temperature sensor. Refer to EC-260, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace engine oil temperature sensor. Refer to EM-66, "Exploded View".

## Component Inspection

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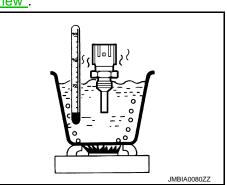
# 1.CHECK ENGINE OIL TEMPERATURE SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect engine oil temperature sensor harness connector.
- 3. Remove engine oil temperature sensor. Refer to EM-66, "Exploded View".
- 4. Check resistance between engine oil temperature sensor terminals by heating with hot water as shown in the figure.

Terminals	Condition	Resistance	
		20 (68)	2.1 - 2.9 kΩ
1 and 2	Temperature [°C (°F)]	50 (122)	0.68 - 1.00 kΩ
		90 (194)	0.236 - 0.260 kΩ

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace engine oil temperature sensor. Refer to <u>EM-66.</u> <u>"Exploded View"</u>.



## P0222, P0223 TP SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

# P0222, P0223 TP SENSOR

# **DTC** Logic

## DTC DETECTION LOGIC

### NOTE:

If DTC P0222 or P0223 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-337, "DTC Logic"</u>.

DTC No. T	rouble diagnosis name	DT	C detecting condition	Possible cause
P(1)))	hrottle position sensor circuit low input	An excessively 1 is sent to EC	low voltage from the TP sensor M.	Harness or connectors     (TP sensor 1 circuit is open or shorted.)
			high voltage from the TP sensor M.	Electric throttle control actuator (TP sensor 1)
DTC CONFI	RMATION PROC	EDURE		
1.PRECOND	ITIONING			
ing the next te 1. Turn igniti 2. Turn igniti 3. Turn igniti <b>TESTING CO</b>	est. ion switch OFF and ion switch ON. ion switch OFF and <b>NDITION:</b>	l wait at least I wait at least	10 seconds. 10 seconds.	berform the following before conduct- tage is more than 10 V at idle.
>> G	O TO 2.			
2.perform	1 DTC CONFIRMA	TION PROCE	DURE	
	ne and let it idle for	1 second.		
<ol> <li>Check DT Is DTC detect</li> </ol>				
	roceed to <u>EC-261.</u>	"Diagnosis Pr	ocedure".	
NO >> IN	ISPECTION END	-		
Diagnosis I	Procedure			INFOID:00000009651106
1. СНЕСК ТН	ROTTLE POSITIC		1 POWER SUPPLY	
			r harness connector.	
2. Turn igniti	ion switch ON.		e control actuator harness	connector and ground
3. Check the	e voltage between e			
Electric thrott	le control actuator	Ground	Voltago	
Connector	Terminal	Ground	Voltage	
F29	1	Ground	Approx. 5 V	
-	on result normal?			
	O TO 2.	short to aroun	d or short to power in harn	oss or connectors
-	· ·	-	1 GROUND CIRCUIT FOR	

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between electric throttle control actuator and ECM harness connector.

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# P0222, P0223 TP SENSOR

## < DTC/CIRCUIT DIAGNOSIS >

Electric throttle	control actuator	E	CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F29	4	F7	19	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

3.CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

#### 1. Check the continuity between electric throttle control actuator and ECM harness connector.

Electric throttle	control actuator	EC	СМ	Continuity
Connector	Terminal	Connector	Terminal	Continuity
F29	2	F7	22	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

### **4.**CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to EC-262, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

NO >> Replace electric throttle control actuator. Refer to <u>EM-28, "Exploded View"</u>.

## Component Inspection

INFOID:000000009651107

## 1. CHECK THROTTLE POSITION SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Perform EC-136, "Work Procedure".
- 4. Turn ignition switch ON.
- 5. Set selector lever to D position.

6. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM				
Connector	+	-	Conditi	ion	Voltage
Connector	Terminal	Terminal			
	22			Fully released	More than 0.36 V
F7	(TP sensor 1 sig- nal)	19	Accelerator pedal	Fully depressed	Less than 4.75 V
17	23	(Sensor ground)	Accelerator pedar	Fully released	Less than 4.75 V
	(TP sensor 2 sig- nal)			Fully depressed	More than 0.36 V

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electric throttle control actuator. Refer to EM-28. "Exploded View".

## < DTC/CIRCUIT DIAGNOSIS >

# P0300, P0301, P0302, P0303, P0304, P0305, P0306 MISFIRE

## **DTC** Logic

INFOID:000000009651108

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### DTC DETECTION LOGIC

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input signal to ECM	ECM function	0
Crankshaft position sensor (POS)	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 1st trip, when 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 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.

 Two Trip Detection Logic (Exhaust quality deterioration) For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only illuminate when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.

A misfire malfunction can be detected in any one cylinder or in multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300	Multiple cylinder misfires detected	Multiple cylinders misfire.	Improper spark plug
P0301	No. 1 cylinder misfire detected	No. 1 cylinder misfires.	Insufficient compression     Incorrect fuel pressure
P0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	The fuel injector circuit is open or shorted
P0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	<ul> <li>Fuel injector</li> <li>Intake air leakage</li> </ul>
P0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	• The ignition signal circuit is open or shorted
P0305	No. 5 cylinder misfire detected	No. 5 cylinder misfires.	Lack of fuel     Signal plate
P0306	No. 6 cylinder misfire detected	No. 6 cylinder misfires.	<ul> <li>A/F sensor 1</li> <li>Incorrect PCV hose connection</li> </ul>

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following procedure before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

- 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. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Restart engine and let it idle for approximately 15 minutes.
- 6. Check 1st trip DTC.

## Is 1st trip DTC detected?

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< DTC/CIRCUIT DIAGNOSIS >

YES >> Proceed to EC-264. "Diagnosis Procedure".

NO >> GO TO 3.

**3.**PERFORM DTC CONFIRMATION PROCEDURE-II

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Start engine and drive the vehicle under similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to the table below.

#### Hold the accelerator pedal as steady as possible.

Similar conditions to (1st trip) Freeze Frame Data mean that the following conditions should be satisfied at the same time.

#### **CAUTION:**

Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving.

Engine speed	Engine speed in the freeze frame data $\pm400$ rpm
Vehicle speed	Vehicle speed in the freeze frame data $\pm$ 10 km/h (6 MPH)
Basic fuel schedule	Basic fuel schedule in freeze frame data $\times$ (1 $\pm$ 0.1)
Engine coolant temperature (T)	When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F).
condition	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).

Driving time varies according to the engine speed in the freeze frame data.

Engine speed	Time
Around 1,000 rpm	Approximately 10 minutes
Around 2,000 rpm	Approximately 5 minutes
More than 3,000 rpm	Approximately 3.5 minutes

- 5. Check 1st trip DTC.
- Is 1st trip DTC detected?

YES >> Proceed to EC-264, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

1. CHECK FOR INTAKE AIR LEAKAGE AND PCV HOSE

- 1. Start engine and run it at idle speed.
- 2. Listen for the sound of the intake air leakage.
- 3. Check PCV hose connection.

### Is intake air leakage detected?

YES >> Discover air leakage location and repair.

NO >> GO TO 2.

### 2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

Is the inspection result normal?

- YES-1 >> With CONSULT: GO TO 3.
- YES-2 >> Without CONSULT: GO TO 4.
- NO >> Repair or replace malfunctioning part.

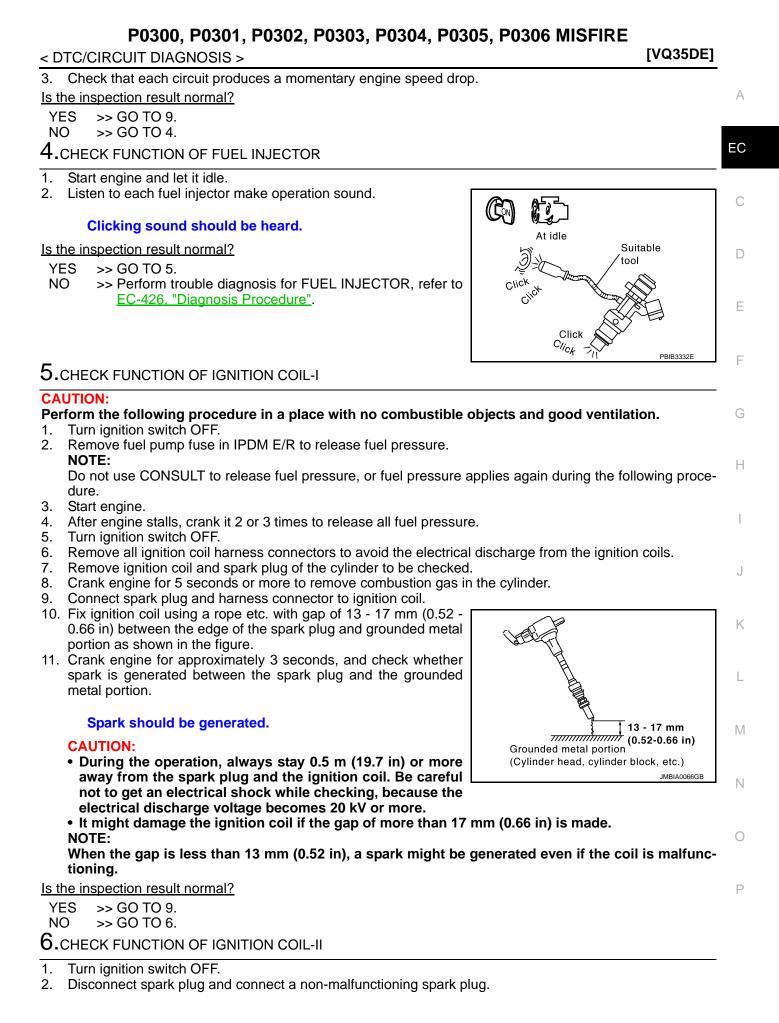
**3.** PERFORM POWER BALANCE TEST

### () With CONSULT

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.

## EC-264

INFOID:000000009651109



## EC-265

### < DTC/CIRCUIT DIAGNOSIS >

3. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

### Spark should be generated.

Is the inspection result normal?

YES >> GO TO 7.

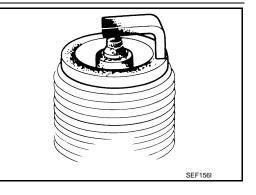
NO >> Check ignition coil, power transistor and their circuits. Refer to EC-431, "Diagnosis Procedure".

**7.**CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

### Is the inspection result normal?

- YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>MA-31, "SPARK PLUG : Spark Plug"</u>.
- NO >> Repair or clean spark plug. Then GO TO 8.



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# 8.CHECK FUNCTION OF IGNITION COIL-III

- 1. Reconnect the initial spark plugs.
- 2. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

### Spark should be generated.

### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to <u>MA-31, "SPARK</u> <u>PLUG : Spark Plug"</u>.

## **9.**CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to EM-23, "Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

## **10.**CHECK FUEL PRESSURE

- 1. Install all removed parts.
- 2. Release fuel pressure to zero. Refer to EC-141. "Work Procedure".
- Install fuel pressure gauge kit [SST: (J-44321)] and check fuel pressure. Refer to <u>EC-141, "Work Proce-dure"</u>.

## At idle: Approximately 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check fuel hoses and fuel tubes for clogging.

### Is the inspection result normal?

- YES >> Replace "fuel filter and fuel pump assembly". Refer to <u>FL-5, "Exploded View"</u>.
- NO >> Repair or replace malfunctioning part.

12. CHECK IGNITION TIMING

Check idle speed and ignition timing.

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For procedure, refer to <u>EC-129, "Work Procedure"</u> . For specification, refer to <u>EC-461, "Idle Speed"</u> and <u>EC-461, "Ignition Timing"</u> .	A
Is the inspection result normal?	
YES >> GO TO 13. NO >> Follow the <u>EC-129, "Work Procedure"</u> .	EC
13. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT	

1. Turn ignition switch OFF.

2. Disconnect corresponding A/F sensor 1 harness connector.

3. Disconnect ECM harness connector.

4. Check the continuity between A/F sensor 1 harness connector and ECM harness connector.

	A/F sensor 1		EC	CM	Continuity
Bank	Connector	Terminal	Connector	Terminal	Continuity
1	F27	1		69	
I	121	2	F8	73	Existed
2	F64	1	FO	77	EXISIEU
2	F04	2		81	

 Check the continuity between A/F sensor 1 harness connector and ground, or ECM harness connector and ground.

	A/F sensor 1		Ground	Continuity
Bank	Connector	Terminal	Gibunu	Continuity
1	F27	1		
I	121	2	Ground	Not existed
2	F64	1	Ground	NUL EXISIEU
2	F04	2		

E	СМ	Ground	Continuity
Connector	Terminal	Giouna	Continuity
	69		
F8	73	Ground	Not existed
ГО	77	Giouna	NUL EXISIEU
	81		

6. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 14.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**14.**CHECK A/F SENSOR 1 HEATER

Check A/F sensor 1 heater. Refer to EC-173, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace malfunctioning A/F sensor 1. Refer to EM-33, "Exploded View".

15. CHECK MASS AIR FLOW SENSOR

## With CONSULT

- 1. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT.
- 2. For specification, refer to EC-461, "Mass Air Flow Sensor".

With GST

- 1. Check mass air flow sensor signal in Service \$01 with GST.
- 2. For specification, refer to EC-461, "Mass Air Flow Sensor".

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Is the measurement value within the specification?

YES >> GO TO 16.

NO >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to <u>EC-184, "Diagnosis Procedure"</u>.

**16.**CHECK SYMPTOM TABLE

Check items on the rough idle symptom in EC-450, "Symptom Table".

Is the inspection result normal?

YES >> GO TO 17.

NO >> Repair or replace malfunctioning part.

**17.**ERASE THE 1ST TRIP DTC

Some tests may cause a 1st trip DTC to be set.

Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to <u>EC-69. "CONSULT Func-</u>tion".

>> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

## < DTC/CIRCUIT DIAGNOSIS >

# P0327, P0328, P0332, P0333 KS

## **DTC** Logic

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EC

INFOID:000000009651110

[VQ35DE]

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DT	C detected condition		Possible cause
P0327	Knock sensor (bank 1) circuit low input	An excessively sent to ECM.	v low voltage from the sense	or is	
P0328	Knock sensor (bank 1) circuit high input	An excessively sent to ECM.	v high voltage from the sens	• Har	ness or connectors
P0332	Knock sensor (bank 2) circuit low input	An excessively sent to ECM.	v low voltage from the senso		e sensor circuit is open or shorted.) ock sensor
P0333	Knock sensor (bank 2) circuit high input	An excessively sent to ECM.	high voltage from the sens	or is	
OTC CONF	IRMATION PRO	CEDURE			
	NDITIONING				
		e has been pre	eviously conducted, alv	ways perfor	rm the following before conduct-
ing the next	test.			· ·	0
	nition switch OFF a nition switch ON.	nd wait at leas	St 10 seconds.		
3. Turn iğr	nition switch OFF a	nd wait at leas	st 10 seconds.		
TESTING C	ONDITION:				
Poforo por	orming the follow	ing procedur	o confirm that batta	w voltago	is more than 10 V at idle
Before perf	orming the follow	ing procedur	e, confirm that batter	ry voltage	is more than 10 V at idle.
	-	ving procedur	e, confirm that batte	ry voltage	is more than 10 V at idle.
>>	GO TO 2.			ry voltage	is more than 10 V at idle.
>> 2.perfor	GO TO 2. RM DTC CONFIRM	IATION PROC	EDURE	ry voltage	is more than 10 V at idle.
>> 2.PERFOF 1. Start en	GO TO 2. RM DTC CONFIRM	IATION PROC	EDURE	ry voltage	is more than 10 V at idle.
>> 2.PERFOF 1. Start en 2. Check	GO TO 2. RM DTC CONFIRM	IATION PROC	EDURE	ry voltage	is more than 10 V at idle.
>> 2.PERFOF 1. Start en 2. Check ls 1st trip D	GO TO 2. RM DTC CONFIRM gine and run it for 1st trip DTC.	IATION PROC	EDURE ands at idle speed.	ry voltage	is more than 10 V at idle.
>> 2.PERFOF 1. Start en 2. Check Is 1st trip D YES >>	GO TO 2. RM DTC CONFIRM gine and run it for 1st trip DTC. TC detected?	IATION PROC at least 5 secc 9, "Diagnosis I	EDURE ands at idle speed.	ry voltage	is more than 10 V at idle.
>> 2.PERFOF 1. Start en 2. Check ls 1st trip D YES >> NO >>	GO TO 2. RM DTC CONFIRM gine and run it for 1st trip DTC. TC detected? Proceed to <u>EC-26</u> INSPECTION ENI	IATION PROC at least 5 secc 9, "Diagnosis I	EDURE ands at idle speed.	ry voltage	is more than 10 V at idle.
>> 2.PERFOF 1. Start en 2. Check Is 1st trip D YES >> NO >> Diagnosis	GO TO 2. RM DTC CONFIRM gine and run it for 1st trip DTC. TC detected? Proceed to <u>EC-26</u> INSPECTION ENI S <b>Procedure</b>	IATION PROC at least 5 secc 9, "Diagnosis I D	EDURE onds at idle speed. Procedure".		
>> 2.PERFOF 1. Start en 2. Check Is 1st trip D YES >> NO >> Diagnosis	GO TO 2. RM DTC CONFIRM gine and run it for 1st trip DTC. TC detected? Proceed to <u>EC-26</u> INSPECTION ENI S <b>Procedure</b>	IATION PROC at least 5 secc 9, "Diagnosis I D	EDURE ands at idle speed.		
>> 2.PERFOF 1. Start en 2. Check Is 1st trip D YES >> NO >> Diagnosis 1.CHECK 1. Disconr	GO TO 2. RM DTC CONFIRM Igine and run it for 1st trip DTC. <u>TC detected?</u> Proceed to <u>EC-26</u> INSPECTION ENI <b>S Procedure</b> KNOCK SENSOR nect knock sensor	IATION PROC at least 5 secc 9, "Diagnosis I D GROUND CIR	EDURE onds at idle speed. Procedure". RCUIT FOR OPEN AN	D SHORT	INFOID:00000009651111
>> 2.PERFOF 1. Start en 2. Check Is 1st trip D YES >> NO >> Diagnosis 1.CHECK 1. Disconr	GO TO 2. RM DTC CONFIRM Igine and run it for 1st trip DTC. <u>TC detected?</u> Proceed to <u>EC-26</u> INSPECTION ENI <b>S Procedure</b> KNOCK SENSOR nect knock sensor	IATION PROC at least 5 secc 9, "Diagnosis I D GROUND CIR	EDURE onds at idle speed. Procedure". RCUIT FOR OPEN AN	D SHORT	INFOID:00000009651111
>> 2.PERFOF 1. Start en 2. Check Is 1st trip D YES >> NO >> Diagnosis 1.CHECK 1. Disconr	GO TO 2. RM DTC CONFIRM gine and run it for 1st trip DTC. <u>TC detected?</u> Proceed to <u>EC-26</u> INSPECTION ENI S <b>Procedure</b> KNOCK SENSOR nect knock sensor he continuity betwo	IATION PROC at least 5 seco 9, "Diagnosis I O GROUND CIR narness conne een knock sen	EDURE onds at idle speed. Procedure". RCUIT FOR OPEN AN ector and ECM harness isor harness connector	D SHORT	INFOID:00000009651111
>> 2.PERFOF 1. Start en 2. Check Is 1st trip D YES >> NO >> Diagnosis 1.CHECK 1. Disconr	GO TO 2. M DTC CONFIRM gine and run it for 1st trip DTC. <u>TC detected?</u> Proceed to <u>EC-26</u> INSPECTION ENI S Procedure KNOCK SENSOR he continuity betwo	IATION PROC at least 5 seco 9, "Diagnosis I O GROUND CIR narness conne een knock sen	EDURE onds at idle speed. Procedure". RCUIT FOR OPEN AN ector and ECM harness isor harness connector	D SHORT	INFOID:000000009651111 r. harness connector.
>> 2.PERFOF 1. Start en 2. Check Is 1st trip D YES >> NO >> Diagnosis 1.CHECK 1. Disconr 2. Check t	GO TO 2. RM DTC CONFIRM gine and run it for 1st trip DTC. <u>TC detected?</u> Proceed to <u>EC-26</u> INSPECTION END <b>S Procedure</b> KNOCK SENSOR he continuity betwo Knock sensor	IATION PROC at least 5 seco 9, "Diagnosis I O GROUND CIR narness conne een knock sen ensor ctor Terminal	EDURE onds at idle speed. Procedure". RCUIT FOR OPEN AN ector and ECM harness isor harness connector	D SHORT s connector r and ECM	INFOID:000000009651111 r. harness connector.
>> 2.PERFOF 1. Start en 2. Check 1. Start pD YES >> NO >> Diagnosis 1.CHECK 1. Disconr 2. Check t	GO TO 2. RM DTC CONFIRM Igine and run it for 1st trip DTC. TC detected? Proceed to EC-26 INSPECTION ENI S Procedure KNOCK SENSOR he continuity betwo Knock sensor he continuity betwo Bank Conne 8 1 F20	IATION PROC at least 5 seco 9, "Diagnosis I O GROUND CIR narness conne een knock sen ensor ctor Terminal 1 2	EDURE onds at idle speed. Procedure". RCUIT FOR OPEN AN ector and ECM harness isor harness connector	D SHORT s connector r and ECM	INFOID:000000009651111 r. harness connector.

### 3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

2.check knock sensor input signal circuit for open and short

1. Check the continuity between knock sensor harness connector and ECM harness connector.

## EC-269

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# P0327, P0328, P0332, P0333 KS

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

DTC		Knock senso	r	EC	CM	Continuity
DIC	Bank	Connector	Terminal	Connector	Terminal	Continuity
P0327, P0328	1	F201	1	F8	85	Existed
P0332, P0333	2	F202	1	10	86	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

3.CHECK KNOCK SENSOR

Check knock sensor. Refer to EC-270, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

NO >> Replace malfunctioning knock sensor. Refer to <u>EM-104, "Exploded View"</u>.

## Component Inspection

INFOID:000000009651112

# 1.CHECK KNOCK SENSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect knock sensor harness connector.
- 3. Check resistance between knock sensor terminal as per the following. **NOTE:**

It is necessary to use an ohmmeter which can measure more than 10  $\text{M}\Omega.$ 

Terminals	Resistance
1 and 2	Approx. 532 - 588 kΩ [at 20°C (68°F)]

### **CAUTION:**

Never use any knock sensors that have been dropped or physically damaged. Use only new ones.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning knock sensor. Refer to <u>EM-104, "Exploded View"</u>.

< DTC/CIRCUIT DIAGNOSIS >

# P0335 CKP SENSOR (POS)

## **DTC** Logic

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335	Crankshaft position sen- sor (POS) circuit	<ul> <li>The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking.</li> <li>The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running.</li> <li>The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.</li> </ul>	<ul> <li>Harness or connectors [CKP sensor (POS) circuit is open or shorted.]</li> <li>(APP sensor 2 circuit is shorted.)</li> <li>(EVAP control system pressure sensor circuit is shorted.)</li> <li>(Refrigerant pressure sensor circuit is shorted.)</li> <li>Crankshaft position sensor (POS)</li> <li>Accelerator pedal position sensor</li> <li>EVAP control system pressure sensor</li> <li>Refrigerant pressure sensor</li> <li>Signal plate</li> </ul>
	FIRMATION PROCI	EDURE	
DTC Cor g the nex Turn ig Turn ig	nfirmation Procedure h t test. gnition switch OFF and gnition switch ON.	as been previously conducted, always p wait at least 10 seconds. wait at least 10 seconds.	perform the following before conduct-

>> GO TO 2.

- 1. Start engine and let it idle for at least 5 seconds.
- If engine does not start, crank engine for at least 2 seconds.

# Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-271, "Diagnosis Procedure". NO >> INSPECTION END

## **Diagnosis** Procedure

1.CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY

Disconnect crankshaft position (CKP) sensor (POS) harness connector. 1.

Turn ignition switch ON. 2.

Check the voltage between CKP sensor (POS) harness connector and ground. 3.

CKP sen	sor (POS)	Ground	Voltage (V)
Connector	Terminal	Ground	voltage (v)
F20	1	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 2.

2.check crankshaft position (ckp) sensor (pos) power supply circuit

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INFOID:000000009651113



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# P0335 CKP SENSOR (POS)

### < DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch ON.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F20	1	F8	54	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit.

**3.**CHECK SENSOR POWER SUPPLY CIRCUIT

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor				
Connector	Terminal	Name	Connector	Terminal		
F8	96	Refrigerant pressure sensor	E300	1		
FO	54	CKP sensor (POS)	F20	1		
E16	103	APP sensor	E110	5		
E16	107	EVAP control system pressure sensor	B22	3		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair short to ground or short to power in harness or connectors.

### **4.**CHECK COMPONENTS

Check the following.

- EVAP control system pressure sensor (Refer to EC-305, "Component Inspection".)
- Refrigerant pressure sensor (Refer to <u>EC-442, "Diagnosis Procedure"</u>.)

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning components.

**5.**CHECK APP SENSOR

Check APP sensor. Refer to EC-405, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace accelerator pedal assembly. Refer to <u>ACC-3, "Exploded View"</u>.

**O**.CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

CKP sensor (POS)		E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F20	2	F8	84	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**I**.CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between CKP sensor (POS) harness connector and ECM harness connector.

# P0335 CKP SENSOR (POS)

### < DTC/CIRCUIT DIAGNOSIS >

CKP sens	or (POS)	EC	M		-	1
Connector	Terminal	Connector	Terminal	Continuity		
F20	3	F8	89	Existed	_	E
2. Also chec	k harness for	short to grour	nd and short t	o power.	-	
Is the inspection		<u>mal?</u>				
	O TO 8. opair opan ci	reuit short to c	around or cho	rt to power in h	arness or connectors.	(
	• •	-	•	•	amess of connectors.	
					nt Increation"	-
Is the inspection				273, "Compone	nt inspection.	
-	0 TO 9.					
NO >> Re	eplace crank	shaft position s	sensor (POS)	. Refer to <u>EM-3</u>	8. "Exploded View".	I
9.CHECK GE	AR TOOTH					
Visually check	for chipping	signal plate ge	ear tooth.			-
Is the inspection						
				<u>, "Intermittent Ir</u> "Exploded View		(
_	-		ei lu <u>Livi-04,</u>			
Component	t inspectio	n			INFOID:0000000965111	
1.CHECK CR	RANKSHAFT	POSITION SE	ENSOR (POS	)-I		ŀ
		of the sensor.		-		-
2. Disconneo	ct crankshaft		or (POS) harn	ess connector.		
<ol> <li>Remove tl</li> <li>Visually cl</li> </ol>		sor for chipping	J.	ſ		1
Is the inspection			5.			
	O TO 2.					
	eplace cranks 3, "Exploded	shaft position s	sensor (POS)	. Refer to <u>EM-</u>		
<u></u>		<u></u>				ŀ
					$\sim$	
2. СНЕСК СБ				<u>ا</u>	JMBIA0063ZZ	l
						-
Uneck resistar	ice cranksha	in position sen	sor (POS) ter	minals as per th	ie ioliowing.	
Terminal N	lo. (Polarity)		Resistance			ľ
	- 2 (-)					
	- 3 (-)	Except 0	or $\infty \Omega$ [at 25°C	(77°F)]		(
	- 3 (-)		·			(
Is the inspection	on result norr	nal?				
YES >> IN	SPECTION	END				I
NO >> Re		shaft position s	( )			

## P0340, P0345 CMP SENSOR (PHASE)

### < DTC/CIRCUIT DIAGNOSIS >

# P0340, P0345 CMP SENSOR (PHASE)

## DTC Logic

## DTC DETECTION LOGIC

#### NOTE:

If DTC P0340 or P0345 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-337, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340	Camshaft position sen- sor (PHASE) (bank 1) circuit	<ul> <li>The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking.</li> </ul>	<ul> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Camshaft position sensor (PHASE)</li> </ul>
P0345	Camshaft position sen- sor (PHASE) (bank 2) circuit	<ul> <li>The cylinder No. signal is not sent to ECM during engine running.</li> <li>The cylinder No. signal is not in the normal pattern during engine running.</li> </ul>	<ul> <li>Camshaft (INT)</li> <li>Starter motor (Refer to <u>STR-5, "System</u> <u>Description"</u>.)</li> <li>Starting system circuit (Refer to <u>STR-5, "System Description"</u>.)</li> <li>Dead (Weak) battery</li> </ul>

## DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

- Start engine and let it idle for at least 5 seconds. If engine does not start, crank engine for at least 2 seconds.
- 2. Check 1st trip DTC.

### Is 1st trip DTC detected?

YES >> Proceed to EC-274, "Diagnosis Procedure".

# **3.**PERFORM DTC CONFIRMATION PROCEDURE-I

1. Maintaining engine speed at more than 800 rpm for at least 5 seconds.

2. Check 1st trip DTC.

### Is 1st trip DTC detected?

- YES >> Proceed to EC-274, "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

## 1.CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over? Does the starter motor operate?

- YES >> GO TO 2.
- NO >> Check starting system. Refer to <u>STR-9, "Work Flow (With GR8-1200 NI)"</u> or <u>STR-12, "Work Flow (Without GR8-1200 NI)"</u>.

INFOID:000000009651117

[VQ35DE]

INFOID:000000009651116

# P0340, P0345 CMP SENSOR (PHASE)

Turn ignitic Check the DTC E P0340	on switch voltage	h ON.	. ,	,	HASE) harne	ess connector.	
Check the DTC E P0340	voltage		CMP sens				
P0340	CMP s			or (PHAS	E) harness o	connector and g	ound.
P0340		sensor (PHA	ASE)			_	
	ank	Connector	Terminal	Ground	Voltage (V)		
D0045	1	F26	1	Ground	Approx. 5	_	
P0345	2	F69	1	Ground	Αρριολ. Ο		
O >> Re CHECK CM Turn ignitic	P SENS	SOR (PHA	ASE) GRO		•	r in harness or c PEN AND SHO	
Disconnect Check the				nsor (PH/	ASE) harnes	s connector and	ECM harness connector.
DTC		sensor (PHA			ECM	Continuity	
B		Connector	Terminal	Connector			
P0340	1 2	F26	2	F8	88 92	Existed	
P0345 Also check		F69			-		
O >> Re CHECK CM	) TO 4. pair ope P SENS	en circuit, SOR (PHA	ASE) INPU	IT SIGNAI	L CIRCUIT F	r in harness or c OR OPEN AND	SHORT
Check the	continui	ty betwee	n CMP se	nsor (PHA	ASE) harnes	s connector and	ECM harness connector.
	CMP s	sensor (PHA	ASE)	E	ECM	<b>2</b>	
DTC B	ank	Connector	Terminal	Connector	r Terminal	Continuity	
P0340	1	F26	3	F8	94	Existed	
P0345	2	F69	3		93		
	<u>n result</u> ) TO 5. pair ope	normal? en circuit, T POSITI	short to gr ON SENS	ound or si OR (PHA	hort to powe SE)	r in harness or c	
CHECK CA eck camsha	•		(PHASE).	Refer to	<u>EC-276, "Co</u>	mponent Inspec	<u>tion"</u> .

Check the following.

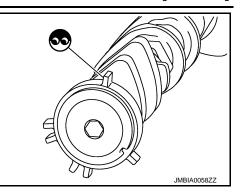
# P0340, P0345 CMP SENSOR (PHASE)

### < DTC/CIRCUIT DIAGNOSIS >

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

### Is the inspection result normal?

- YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent</u> <u>Incident"</u>.
- NO >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to <u>EM-84.</u> <u>"Exploded View"</u>.



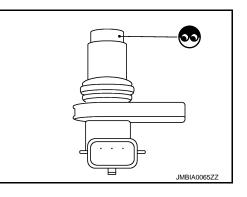
**Component Inspection** 

1.CHECK CAMSHAFT POSITION SENSOR (PHASE)-I

- 1. Turn ignition switch OFF.
- 2. Loosen the fixing bolt of the sensor.
- 3. Disconnect camshaft position sensor (PHASE) harness connector.
- 4. Remove the sensor.
- 5. Visually check the sensor for chipping.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to EM-52, "Exploded View".



# 2.CHECK CAMSHAFT POSITION SENSOR (PHASE)-II

Check resistance camshaft position sensor (PHASE) terminals as per the following.

Terminal No. (Polarity)	Resistance
1 (+) - 2 (-)	
1 (+) - 3 (-)	Except 0 or $\infty \Omega$ [at 25°C (77°F)]
2 (+) - 3 (-)	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning camshaft position sensor (PHASE). Refer to EM-52, "Exploded View".

### [VQ35DE]

INFOID:000000009651118

### < DTC/CIRCUIT DIAGNOSIS >

# P0420, P0430 THREE WAY CATALYST FUNCTION

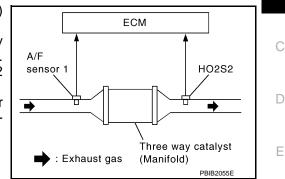
## **DTC Logic**

## DTC DETECTION LOGIC

The ECM monitors the switching frequency ratio of air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2.

A three way catalyst (manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.

When the frequency ratio of A/F sensor 1 and heated oxygen sensor 2 approaches a specified limit value, the three way catalyst (manifold) malfunction is diagnosed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0420	Catalyst system efficien- cy below threshold (bank 1)	<ul> <li>Three way catalyst (manifold) does not oper- ate properly.</li> </ul>	<ul> <li>Three way catalyst (manifold)</li> <li>Exhaust tube</li> <li>Intake air leakage</li> </ul>	
P0430	Catalyst system efficien- cy below threshold (bank 2)	<ul> <li>Three way catalyst (manifold) does not have enough oxygen storage capacity.</li> </ul>	<ul> <li>Fuel injector</li> <li>Fuel injector leakage</li> <li>Spark plug</li> <li>Improper ignition timing</li> </ul>	

## DTC CONFIRMATION PROCEDURE

**1.**INSPECTION START

Will CONSULT be used?

Will CONSULT be used?

YES >> GO TO 2. NO >> GO TO 7.

## 2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

**TESTING CONDITION:** 

Do not maintain engine speed for more than the specified minutes below.

>> GO TO 3. **3.**PERFORM DTC CONFIRMATION PROCEDURE-I

### With CONSULT

- 1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT.
- 2. Start engine and warm it up to the normal operating temperature.
- 3. Turn ignition switch OFF and wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF and wait at least 10 seconds.
- 6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 7. Let engine idle for 1 minute.
- 8. Check that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches 70°C (158°F).
- 9. Open engine hood.
- 10. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT.

## EC-277

[VQ35DE]

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< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

11. Rev engine between 2,000 and 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.

12. Check the indication of "CATALYST".

Which is displayed on CONSULT screen?

CMPLT>> GO TO 6.

INCMP >> GO TO 4.

**4.**PERFORM DTC CONFIRMATION PROCEDURE-II

1. Wait 5 seconds at idle.

2. Rev engine between 2,000 and 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to "CMPLT" (It will take approximately 5 minutes).

Does the indication change to "CMPLT"?

YES >> GO TO 6.

NO >> GO TO 5.

**5.**PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Stop engine and cool it down to less than  $70^{\circ}C$  (158°F).

2. Perform DTC CONFIRMATION PROCEDURE again.

>> GO TO 3.

**6.**PERFORM DTC CONFIRMATION PROCEDURE-III

Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to <u>EC-279, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

7.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-278, "Component Function Check".

### NOTE:

Use component function check to check the overall function of the three way catalyst (manifold). During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to <u>EC-279</u>, "Diagnosis Procedure".

## Component Function Check

INFOID:000000009651120

**1.**PERFORM COMPONENT FUNCTION CHECK

### Without CONSULT

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Open engine hood.
- 8. Check the voltage between ECM harness connector terminals under the following conditions.

## < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

		ECM				
DTC	Connec-	+	-	Condition	Voltage (V)	
	tor	Terminal	Terminal			
P0420	- F8	57 [HO2S2 (bank 1) signal]	59 (Sensor	Keeping engine speed at 2,500 rpm	The voltage fluctuation cycle takes more than 5 seconds.	
P0430		58 [HO2S2 (bank 2) signal]	ground)	constant under no load	• 1 cycle: 0.6 - 1.0 → 0 - 0.3 → 0.6 - 1.0	
	•	ult normal?				
YES NO		CTION END d to <u>EC-279, "Dia</u>	anosis Pr	ocedure"		
	sis Proce			<u>ocedule</u> .	INFOID:000000009651121	
<b>1.</b> CHEC	CK EXHAUS	ST SYSTEM				
		ust tubes and mu	Iffler for d	ents.		
-		ult normal?				
YES	>> GO TO					
	•	or replace malfur	• •	part.		
-		ST GAS LEAKAO	6E			
		d run it at idle. haust das leakad	e hefore t	the three way catalyst (manifold	))	
		nausi yas ieakay		ane anee way calaiysi (mahii010	<i></i>	
		A/F sensor 1	~ ~	nree way catalyst Three way catal Ianifold) (Under floor) HO2S2	yst Muffler	
	To exha	ust manifold 🛛 🕁			→	
	📫 : Exhaust g	jas				
L Is exhau	st gas leaka	age detected?			PBIB1216E	
YES NO	>> Repair of >> GO TO	or replace malfur 3.	ctioning p	part.		
<b>3.</b> снес	CK INTAKE	AIR LEAKAGE				
Listen fo	r an intake a	air leakage after	the mass	air flow sensor.		
<u>Is intake</u>	air leakage	detected?				
YES NO	>> Repair o >> GO TO	or replace malfur 4.	ctioning p	part.		
<b>4.</b> CHEC	CK IGNITIO	N TIMING				
For proc	edure, refer	nd ignition timing. to <u>EC-129, "Wo</u> fer to <u>EC-461, "Ic</u>	k Proced	<u>ure"</u> . " and <u>EC-461, "Ignition Timing</u> ".		
	spection res					
YES NO	>> GO TO	5. he <u>EC-129, "Wo</u> l	k Drocod	uro"		
_	SS FOIIOW L		K FIUCEO	<u>uic</u> .		
		then turn ianitio				

1. Stop engine and then turn ignition switch ON.

2. Check the voltage between ECM harness connector terminals.

## < DTC/CIRCUIT DIAGNOSIS >

	+	-		Voltage
Connector	Terminal	Connector Terminal		
	33	E16	128	Battery voltage
	44			
F7	45			
Γ7	46	EIO		
	47			
	48			

### Is the inspection result normal?

YES >> GO TO 6.

NO >> Perform <u>EC-426, "Diagnosis Procedure"</u>.

6. CHECK FUNCTION OF IGNITION COIL-I

### CAUTION:

### Perform the following procedure in a place with no combustible objects and good ventilation.

- 1. Turn ignition switch OFF.
- 2. Remove fuel pump fuse in IPDM E/R to release fuel pressure.
- NOTE:

Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following procedure.

- 3. Start engine.
- 4. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 5. Turn ignition switch OFF.
- 6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
- 7. Remove ignition coil and spark plug of the cylinder to be checked.
- 8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
- 9. Connect spark plug and harness connector to ignition coil.
- 10. Fix ignition coil using a rope etc. with gap of 13 17 mm (0.52 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
- 11. Crank engine for approximately 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

### Spark should be generated.

### CAUTION:

• During the operation, always stay 0.5 m (19.7 in) or more away from the spark plug and the ignition coil. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV or more.

• It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken. NOTE:

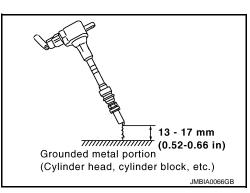
When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

YES >> GO TO 10. NO >> GO TO 7.

**7.**CHECK FUNCTION OF IGNITION COIL-II

- 1. Turn ignition switch OFF.
- 2. Disconnect spark plug and connect a known-good spark plug.
- 3. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.



## EC-280

### < DTC/CIRCUIT DIAGNOSIS >

Spark should be generated. А Is the inspection result normal? >> GO TO 8. YES EC NO >> Check ignition coil, power transistor and their circuit. Refer to EC-431, "Diagnosis Procedure". 8.CHECK SPARK PLUG Check the initial spark plug for fouling, etc. Is the inspection result normal? YES >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-31, "SPARK PLUG : Spark D Plua". NO >> Repair or clean spark plug. Then GO TO 9. Ε F SEF156I 9. CHECK FUNCTION OF IGNITION COIL-III 1. Reconnect the initial spark plugs. 2. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion. Spark should be generated. Н Is the inspection result normal? YES >> INSPECTION END NO >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-31, "SPARK PLUG : Spark Plug". 10. CHECK FUEL INJECTOR Turn ignition switch OFF. 1. Remove fuel injector assembly. Refer to EM-47, "Exploded View". 2. Refer to EM-47, "Exploded View". Κ Keep fuel hose and all fuel injectors connected to fuel tube. 3. Disconnect all ignition coil harness connectors. 4. Reconnect all fuel injector harness connectors disconnected. Turn ignition switch ON. 5. L 6. Check that the fuel does not drip from fuel injector. Does fuel drip from fuel injector? YES >> Replace the fuel injector(s) from which fuel is dripping. Refer to EM-47, "Exploded View". Μ >> GO TO 11. NO 11.CHECK INTERMITTENT INCIDENT Ν Check intermittent incident. Refer to GI-42, "Intermittent Incident". Is the inspection result normal? YES >> Replace three way catalyst assembly. Refer to EM-33, "Exploded View". NO >> Repair or replace error-detected parts.

Ρ

## **P0441 EVAP CONTROL SYSTEM**

### < DTC/CIRCUIT DIAGNOSIS >

# P0441 EVAP CONTROL SYSTEM

## **DTC Logic**

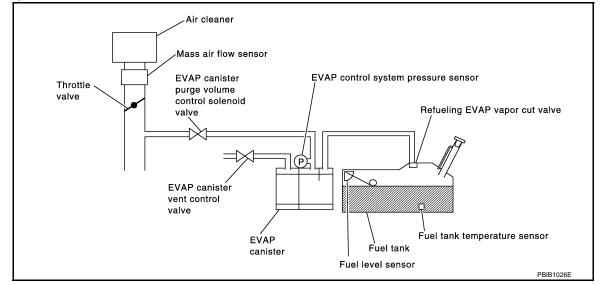
DTC DETECTION LOGIC

#### NOTE:

# If DTC P0441 is displayed with other DTC such as P2122, P2123, P2127, P2128 or P2138, first perform trouble diagnosis for other DTC.

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.

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a malfunction is determined.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0441	EVAP control system in- correct purge flow	EVAP control system does not operate proper- ly, EVAP control system has a leakage between intake manifold and EVAP control system pres- sure sensor.	<ul> <li>EVAP canister purge volume control solenoid valve stuck closed</li> <li>EVAP control system pressure sensor and the circuit</li> <li>Loose, disconnected or improper connection of rubber tube</li> <li>Blocked rubber tube</li> <li>Cracked EVAP canister</li> <li>EVAP canister purge volume control solenoid valve circuit</li> <li>Accelerator pedal position sensor</li> <li>Blocked purge port</li> <li>EVAP canister vent control valve</li> </ul>

## DTC CONFIRMATION PROCEDURE

**1.**INSPECTION START

Will CONSULT be used?

Will CONSULT be used?

YES >> GO TO 2. NO >> GO TO 6.

2. PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

INFOID:000000009651122

P	0441 EVAP CONTROL SYSTEM				
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	_			
<ol> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and w</li> <li>TESTING CONDITION:</li> <li>Always perform test at a temperative</li> </ol>		A			
		EC			
>> GO TO 3.					
3.PERFORM DTC CONFIRMATION PROCEDURE-I					
<ul> <li>With CONSULT</li> <li>Start engine and warm it up to</li> <li>Turn ignition switch OFF and w</li> <li>Turn ignition switch ON.</li> <li>Turn ignition switch OFF and w</li> <li>Start engine and let it idle for a</li> <li>Select "PURG FLOW P0441" of</li> </ul>	vait at least 10 seconds. vait at least 10 seconds.	D			
SULT.	DI EVAPORATIVE STSTEM III DIC WORK SUPPORT HIDDE WIII CON-	E			
7. Touch "START".					
<u>Is "COMPLETED" displayed on CC</u> YES >> GO TO 5.	JNSULT Screen?	F			
NO >> GO TO 4.					
<b>4.</b> PERFORM DTC CONFIRMATION	ON PROCEDURE-II	G			
	met, "TESTING" will be displayed on the CONSULT screen. Maintain the	;			
conditions continuously until "TEST	TING" changes to "COMPLETED". (It will take at least 35 seconds.)	Н			
Selector lever	Suitable position				
VHCL SPEED SE	32 - 120 km/h (20 - 75 mph)				
ENG SPEED	500 - 3,000 rpm	I			
B/FUEL SCHDL	1.3 - 9.0 msec				
COOLAN TEMP/S	More than 0°C (32°F)	J			
CAUTION: Always drive vehicle at a safe sp If "TESTING" does not change for Is "COMPLETED" displayed on CO YES >> GO TO 5. NO >> Perform DTC CONFIR 5.PERFORM DTC CONFIRMATION	or a long time, retry from step 2. DNSULT screen? MATION PROCEDURE again. GO TO 3.	K			
Touch "SELF-DIAG RESULTS".		M			
Which is displayed on CONSULT s	creen?				
OK >> INSPECTION END NG >> Proceed to <u>EC-284</u> , "D	Diagnosis Procedure".	NI			
6.PERFORM COMPONENT FUN		Ν			
NOTE:	Refer to <u>EC-283, "Component Function Check"</u> .	0			
monitoring. During this check, a 1s	check the overall monitoring function of the EVAP control system purge flow t trip DTC might not be confirmed.	P			
YES >> INSPECTION END NO >> Proceed to <u>EC-284</u> , "D	Diagnosis Procedure".				
Component Function Check	-	3			
1.PERFORM COMPONENT FUN					
Without CONSULT		-			

# P0441 EVAP CONTROL SYSTEM

### < DTC/CIRCUIT DIAGNOSIS >

- 1. Lift up drive wheels.
- 2. Start engine (VDC switch OFF) and warm it up to normal operating temperature.
- 3. Turn ignition switch OFF, wait at least 10 seconds.
- 4. Turn ignition switch ON.
- 5. Turn ignition switch OFF, wait at least 10 seconds.
- 6. Start engine and wait at least 70 seconds.
- 7. Set voltmeter probes to ECM harness connector terminals under the following conditions.

ECM					
Connector	+	_			
Connector	Terminal	Terminal			
E16	102 (EVAP control system pressure sensor signal)	112 (Sensor ground)			

8. Check EVAP control system pressure sensor value at idle speed and note it.

9. Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Head lamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than P, N or R

10. Verify that EVAP control system pressure sensor value stays 0.1 V less than the value at idle speed (measured at step 6) for at least 1 second.

Is the inspection result normal?

YES >> INSPECTION END NO >> Proceed to <u>EC-284</u>, "Diagnosis Procedure".

## Diagnosis Procedure

## **1.**CHECK EVAP CANISTER

1. Turn ignition switch OFF.

2. Check EVAP canister for cracks.

### Is the inspection result normal?

- YES-1 >> With CONSULT: GO TO 2.
- YES-2 >> Without CONSULT: GO TO 3.
- NO >> Replace EVAP canister. Refer to <u>FL-16, "Exploded View"</u>.

### 2.CHECK PURGE FLOW

### With CONSULT

- Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. For the location of EVAP service port, refer to <u>EC-49</u>, "EVAPORATIVE <u>EMISSION SYSTEM</u>: System Description".
- 2. Start engine and let it idle.
- 3. Select "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT.
- Touch "Qd" and "Qu" on CONSULT screen to adjust "PURG VOL C/V" opening and check vacuum existence.

PURG VOL C/V	Vacuum
100%	Existed
0%	Not existed

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 4.

INFOID:0000000009651124

# P0441 EVAP CONTROL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

#### **3.**CHECK PURGE FLOW А **Without CONSULT** 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. EC 3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. For the location of EVAP service port, refer to EC-49, "EVAPORATIVE EMISSION SYSTEM : System Description". 4. Start engine and let it idle. Do not depress accelerator pedal even slightly. Check vacuum gauge indication before 60 seconds pass after starting engine. 5. D Vacuum should not exist. 6. Rev engine up to 2,000 rpm after 100 seconds pass after starting engine. Vacuum should exist. Is the inspection result normal? F YES >> GO TO 7. NO >> GO TO 4. 4.CHECK EVAP PURGE LINE 1. Turn ignition switch OFF. 2. Check EVAP purge line for improper connection or disconnection. Refer to EC-49, "EVAPORATIVE EMISSION SYSTEM : System Description". Н Is the inspection result normal? YES >> GO TO 5. NO >> Repair EVAP purge line. ${f 5.}$ CHECK EVAP PURGE HOSE AND PURGE PORT 1. Disconnect purge hoses connected to EVAP service port A and EVAP service port EVAP canister purge volume control solenoid valve B. Blow air into each hose and EVAP purge port C. 2. B (A) $(\mathbf{\hat{C}})$ EVAP canister purge volume control solenoid valve Intake manifold SEF367U M Check that air flows freely. Is the inspection result normal? Ν YES-1 >> With CONSULT: GO TO 6. YES-2 >> Without CONSULT: GO TO 7. ך ל NO >> Repair or clean hoses and/or purge port. Intake manifold SEF368U

## ${f 6}.$ CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

### With CONSULT

- 1. Start engine.
- 2. Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening.

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE1

P0441 EVAP CONTROL SYSTEM Does engine speed vary according to the valve opening? YES >> GO TO 8. NO >> GO TO 7. 7.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE Check EVAP canister purge volume control solenoid valve. Refer to EC-290, "Component Inspection". Is the inspection result normal? YES >> GO TO 8. NO >> Replace EVAP canister purge volume control solenoid valve. Refer to FL-16, "Exploded View". f 8.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR 1. Disconnect EVAP control system pressure sensor harness connector. 2. Check that water is not inside connectors. Is the inspection result normal? >> GO TO 9. YES NO >> Replace EVAP control system pressure sensor. Refer to FL-16, "Exploded View". 9.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION Check EVAP control system pressure sensor function. Refer to EC-306, "DTC Logic" for DTC P0452, EC-310, "DTC Logic" for DTC P0453. Is the inspection result normal? YES >> GO TO 10. NO >> Replace EVAP control system pressure sensor. Refer to FL-16, "Exploded View". 10. CHECK RUBBER TUBE FOR CLOGGING 1 Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging. Is the inspection result normal? YES >> GO TO 11. NO >> Clean the rubber tube using an air blower. 11.CHECK EVAP CANISTER VENT CONTROL VALVE Check EVAP canister vent control valve. Refer to EC-297, "Component Inspection". Is the inspection result normal? >> GO TO 12. YES NO >> Replace EVAP canister vent control valve. Refer to FL-16, "Exploded View". 12.CHECK EVAP PURGE LINE Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leakage. Refer to EC-49, "EVAPORATIVE EMISSION SYSTEM : System Description". Is the inspection result normal? YES >> GO TO 13. NO >> Repair EVAP purge line.

**13.**CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

## < DTC/CIRCUIT DIAGNOSIS >

# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

# **DTC Logic**

INFOID:000000009651125

[VQ35DE]

А

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# DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name		DTC detecting condition	Possible cause
P0443	EVAP canister purge volume control solenoid valve	A	The canister purge flow is detected dur- ing the cehicle is stopped while the en- gine is running, even when EVAP canister purge volume control solenoid valve is completely closed.	<ul> <li>EVAP control system pressure sensor</li> <li>EVAP canister purge volume control so lenoid valve (The valve is stuck open.)</li> </ul>
		В	The canister purge flow is detected dur- ing the specified driving conditions, even when EVAP canister purge volume con- trol solenoid valve is completely closed.	<ul> <li>EVAP canister vent control valve</li> <li>EVAP canister</li> <li>Hoses <ul> <li>(Hoses are connected incorrectly or clogged.)</li> </ul> </li> </ul>

If DTC Confirmation Procedure has been previously conducted, always perform the following procedure before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

TESTING CONDITION:

- Perform "DTC CONFIRMATION PROCEDURE" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Always perform test at a temperature of 5 to 60°C (41 to 140°F).

• Cool the vehicle so that engine coolant temperature becomes same level as ambient temperature.	
Do you have CONSULT	J
YES >> GO TO 2. NO >> GO TO 4.	V
2. PERFORM DTC CONFIRMATION PROCEDURE A	K
With CONSULT	
1. Turn ignition switch ON.	L
2. Check that the following condition are met.	
FUEL T/TMP SE: 0 - 35°C (32 - 95°F)	
3. Start enfine and wait at least 60 seconds.	M
4. Check 1st trip DTC.	IVI
IS 1st trip DTC detected?	

YES >> Proceed to <u>EC-288, "Diagnosis Procedure"</u>. NO >> GO TO 3.

NO >> GO 10 3.

3. PERFORM DTC CONFIRMATION PROCEDURE B

### With CONSULT

- T. 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. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT.
- 7. Touch "START".
- 8. Start engine and let it idle until "TESTING" on CONSULT changes to "COMPLETED". (It will take approximately 10 seconds.)
  - If "TESTING" is not displayed after 5 minutes, retry from step 2.

## EC-287

# P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

9. Touch "SELF-DIAG RESULTS".

Which is displayed on CONSULT screen?

YES >> INSPECTION END

NO >> Proceed to <u>EC-288, "Diagnosis Procedure"</u>.

**4.**PERFORM DTC CONFIRMATION PROCEDURE A

#### With GST

1. Turn ignition switch ON.

2. Set voltmeter probes to ECM harness connector terminals.

Connector	+	-	Voltage (V)
Connector	Terminal	Terminal	*
E16	111 (Fuel tank temperature sensor signal)	120 (Sensor ground)	3.1 - 4.0

3. Start engine and wait at least 60 seconds.

4. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-288, "Diagnosis Procedure".

NO >> GO TO 5.

## **5.**PERFORM DTC CONFIRMATION PROCEDURE B

#### 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. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and let it idle for at least 20 seconds.
- 6. Check 1st trip DTC.

### Is 1st trip DTC displayed?

YES >> Proceed to EC-288, "Diagnosis Procedure".

NO >> INSPECTION END

## **Diagnosis** Procedure

INFOID:000000009651126

# 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

	rge volume control id valve	Ground	Voltage	
Connector	Terminal			
F30	1	Ground	Battery voltage	

### Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect IPDM E/R harness connector.
- Check the continuity between EVAP canister purge volume control solenoid valve harness connector and IPDM E/R harness connector.

## EC-288

## P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

EVAP canister control sole		IPDN	I E/R	Continuity	
Connector	Terminal	Connector	Terminal		
F30	1	E10	10	Existed	
YES >> Pe NO >> Re	epair or replace	ble diagnosis e error-detect	•	ply circuit. ROL SOLENOID VALVE OUTPUT SIGNAL CIRCU	IT
OR OPEN AN	ND SHORT				
Disconnec Check the	on switch OFF et ECM harnes continuity bet ess connector	s connector. ween EVAP c	anister purge	volume control solenoid valve harness connector a	nd
	ourge volume con noid valve	-	ECM	Continuity	
Connector	Terminal	Connecto		al	
F30 Also checl	2	F7	d and short to	Existed	
YES >> G( NO >> Re	· ·	uit, short to g		to power in harness or connectors. NSOR CONNECTOR	
Check tha the inspection (ES >> GO NO >> Re	t water is not i on result norm: O TO 5. eplace EVAP c	nside connec al? control system	tors.	arness connector. sor. Refer to <u>FL-16, "Exploded View"</u> . NSOR	
heck EVAP c	ontrol system	pressure sen	sor. Refer to <u>E</u>	C-305. "Component Inspection".	
YES-1 >> W YES-2 >> W	on result norma ith CONSULT: ithout CONSU eplace EVAP c	GO TO 6. LT: GO TO 7.		sor. Refer to <u>FL-16, "Exploded View"</u> .	
.CHECK EV	AP CANISTER	R PURGE VO	LUME CONTF	ROL SOLENOID VALVE	
. Reconnec . Start engir . Perform "I	on switch OFF t harness conr ne.	nectors discor		de with CONSULT. Check that engine speed vari	es
YES >> G(	peed vary acc O TO 8. O TO 7.	ording to the	valve opening?	2	
CHECK EV	AP CANISTER	R PURGE VO	LUME CONTR	ROL SOLENOID VALVE	
the inspection	anister purge on result norma O TO 8.		ol solenoid valv	ve. Refer to EC-290, "Component Inspection".	

## P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

## **8.**CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.

2. Check the rubber tube for clogging.

#### Is the inspection result normal?

YES >> GO TO 9.

NO >> Clean the rubber tube using an air blower.

**9.**CHECK EVAP CANISTER VENT CONTROL VALVE

Check EVAP canister vent control valve. Refer to EC-297. "Component Inspection".

#### Is the inspection result normal?

YES >> GO TO 10.

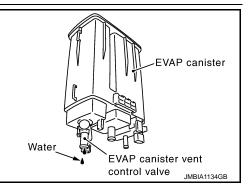
NO >> Replace EVAP canister vent control valve. Refer to <u>FL-16. "Exploded View"</u>.

## 10. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-16</u>, <u>"Exploded View"</u>.

Does water drain from the EVAP canister?

- YES >> GO TO 11.
- NO >> Check intermittent incident. Refer to <u>GI-42. "Intermittent</u> <u>Incident"</u>.



## **11.**CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

#### The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42. "Intermittent Incident".

NO >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-16, "Exploded View".

#### Component Inspection

INFOID:000000009651127

## 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### With CONSULT

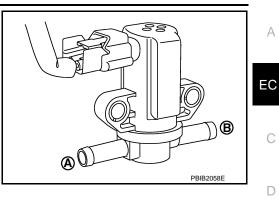
- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
- 4. Turn ignition switch ON.
- 5. Select "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT.

#### P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [VQ35DE]

#### < DTC/CIRCUIT DIAGNOSIS >

6. Touch "Qd" and "Qu" on CONSULT screen to adjust "PURG VOL C/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL C/V value)	Air passage continuity between (A) and (B)	
100%	Existed	
0%	Not existed	



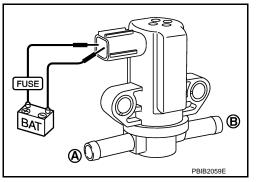
#### Without CONSULT

- Turn ignition switch OFF. Ĩ.
- 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
- 3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
- 4. Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between (A) and (B)	
12 V direct current supply between terminals 1 and 2	Existed	
No supply	Not existed	

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace EVAP canister purge volume control solenoid valve. Refer to FL-16, "Exploded View".



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#### P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

# P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

DTC Logic

INFOID:000000009651128

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	<ul> <li>Harness or connectors (The solenoid valve circuit is open or shorted.)</li> <li>EVAP canister purge volume control so- lenoid valve</li> </ul>
P0445	EVAP canister purge volume control solenoid valve circuit shorted	An excessively high voltage signal is sent to ECM through the valve	<ul> <li>Harness or connectors (The solenoid valve circuit is shorted.)</li> <li>EVAP canister purge volume control so- lenoid valve</li> </ul>

## DTC CONFIRMATION PROCEDURE

### 1.CONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

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

>> GO TO 2.

## **2.** PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for at least 13 seconds.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to EC-292, "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000009651129

## 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between EVAP canister purge volume control solenoid valve harness connector and ground.

	rge volume control id valve	Ground	Voltage	
Connector	Terminal			
F30	1	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

## EC-292

# P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

2. Disconnect IPDM E/R harness connector.

 Check the continuity between EVAP canister purge volume control solenoid valve harness connector and A IPDM E/R harness connector.

EVAP canister purge volume control solenoid valve		IPDI	/I E/R	Continuity
Connector	Terminal	Connector Terminal		
F30	1	E10	10	Existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

<b>3.</b> CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT	
FOR OPEN AND SHORT	E

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

 Check the continuity between EVAP canister purge volume control solenoid valve harness connector and ECM harness connector.

EVAP canister purge volume con- trol solenoid valve		E	Continuity	
Connector	Terminal	Connector	Terminal	
F30	2	F7	42	Existed

4. Also check harness for short to ground and short to power.

#### Is the inspection result normal?

YES-1 >> With CONSULT: GO TO 4.

- YES-2 >> Without CONSULT: GO TO 5.
- NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**4.**CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

#### With CONSULT

- 1. Reconnect all harness connectors disconnected.
- 2. Start engine.
- Perform "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT. Check that engine speed varies according to the valve opening.

Does engine speed vary according to the valve opening?

- YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.
- NO >> GO TO 5.

 ${f 5.}$ CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Check EVAP canister purge volume control solenoid valve. Refer to EC-293, "Component Inspection".

#### Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>FL-16</u>, "<u>Exploded View</u>".

#### Component Inspection

# 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### With CONSULT

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
- 4. Turn ignition switch ON.
- 5. Select "PURG VOL C/V" in "ACTIVE TEST" mode with CONSULT.

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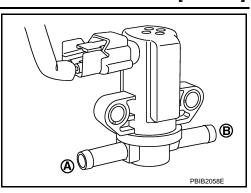
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## P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### < DTC/CIRCUIT DIAGNOSIS >

6. Touch "Qd" and "Qu" on CONSULT screen to adjust "PURG VOL C/V" opening and check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL C/V value)	Air passage continuity between (A) and (B)	
100%	Existed	
0%	Not existed	



[VQ35DE]

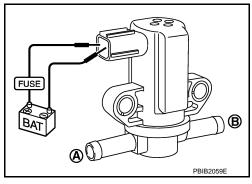
#### **Without CONSULT**

- 1. Turn ignition switch OFF.
- 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
- 3. Disconnect EVAP purge hoses connected to EVAP canister purge volume control solenoid valve.
- 4. Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between (A) and (B)	
12 V direct current supply between terminals 1 and 2	Existed	
No supply	Not existed	

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>FL-16. "Exploded View"</u>.



< DTC/CIRCUIT DIAGNOSIS >

# P0447 EVAP CANISTER VENT CONTROL VALVE

# DTC Logic

INFOID:000000009651131

[VQ35DE]

# EC

#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0447	EVAP canister vent con- trol valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	<ul> <li>Harness or connectors (The valve circuit is open or shorted.)</li> <li>EVAP canister vent control valve</li> <li>Hoses (Hoses are connected incorrectly or clogged.)</li> </ul>
DTC CON	FIRMATION PROC	EDURE	
1.PRECO	NDITIONING		
ing the nex 1. Turn ig 2. Turn ig 3. Turn ig <b>TESTING</b> (	t test. Inition switch OFF and Inition switch ON. Inition switch OFF and <b>CONDITION:</b>	nas been previously conducted, always I wait at least 10 seconds. I wait at least 10 seconds. Ing procedure, confirm battery voltag	s perform the following before conduct- ge is more than 11 V at idle.
>>	> GO TO 2.		
-	RM DTC CONFIRMA	TION PROCEDURE	
1. Start e	ngine and wait at leas		
	1st trip DTC. DTC detected?		
		"Diagnosis Procedure".	
NO >>	> INSPECTION END	-	
Diagnosi	s Procedure		INFOID:00000009651132
1.INSPEC	TION START		
Will CONS	ULT be used?		
	ULT be used?		
	> GO TO 2. > GO TO 3.		
2.снеск	EVAP CANISTER VE	ENT CONTROL VALVE CIRCUIT	
With CO			
	inition switch OFF and "VENT CONTROL/V"	I then ON. in "ACTIVE TEST" mode with CONSL	JLT.
3. Touch	"ON/OFF" on CONSU	ILT screen.	
4. Check	for operating sound o	t the valve.	
Clic	king sound should	be heard.	
-	ection result normal?		
	> GO TO 6. > GO TO 3.		
•		NT CONTROL VALVE POWER SUPP	PLY
	inition switch OFF		

1. Turn ignition switch OFF.

2. Disconnect EVAP canister vent control valve harness connector.

## EC-295

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#### < DTC/CIRCUIT DIAGNOSIS >

#### 3. Turn ignition switch ON.

4. Check the voltage between EVAP canister vent control valve harness connector and ground.

EVAP canister v	ent control valve	Ground	Voltage	
Connector Terminal		Ground	voitage	
B66	1	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 4.

NO >> GO 10 4.

#### 4.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect IPDM E/R harness connector.
- Check the continuity between EVAP canister purge volume control solenoid valve harness connector and IPDM E/R harness connector.

	er vent control Ive	IPDM E/R		Continuity	
Connector	Terminal	Connector	Terminal		
B66	1	F12	53	Existed	

Is the inspection result normal?

- YES >> Perform the trouble diagnosis for power supply circuit.
- NO >> Repair or replace error-detected parts.

5. Check evap canister vent control valve output signal circuit for open and short

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between ECM harness connector and EVAP canister vent control valve harness connector.

Refer to Wiring Diagram.

EVAP canister vent control valve		ECM		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
B66	2	E16	106	Existed	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**6.**CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.

2. Check the rubber tube for clogging.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Clean the rubber tube using an air blower.

**I**.CHECK EVAP CANISTER VENT CONTROL VALVE

Check EVAP canister vent control valve. Refer to EC-297, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace EVAP canister vent control valve. Refer to <u>FL-16</u>, "Exploded View".

[VQ35DE]

#### < DTC/CIRCUIT DIAGNOSIS >

## **Component Inspection**

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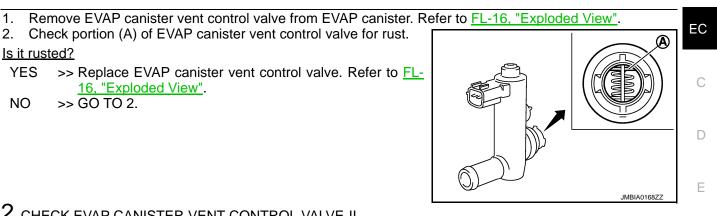
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[VQ35DE]

# 1.CHECK EVAP CANISTER VENT CONTROL VALVE-I



## 2. CHECK EVAP CANISTER VENT CONTROL VALVE-II

#### (P)With CONSULT

- 1. Reconnect harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- 4. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between (A) and (B)
ON	Not existed
OFF	Existed

Operation takes less than 1 second.

#### Without CONSULT

- 1. Disconnect EVAP canister vent control valve harness connector.
- Check air passage continuity and operation delay time under the 2.
- following conditions. Check that new O-ring is installed properly.

Condition	Air passage continuity between (A) and (B)	
12 V direct current supply between terminals 1 and 2	Not existed	
OFF	Existed	
Operation takes less than 1 second.		
Is the inspection result normal?		
YES >> INSPECTION END		
NO >> GO TO 3.		
3.CHECK EVAP CANISTER V	ENT CONTROL VALVE-III	
	ion (A) to (B)] of EVAP canister vent of	ontrol valve using an air blower.

2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.



#### < DTC/CIRCUIT DIAGNOSIS >

3. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between (A) and (B)
ON	No
OFF	Yes

Operation takes less than 1 second.

#### Without CONSULT

- 1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 2. Check air passage continuity and operation delay time under the following conditions.

#### Check that new O-ring is installed properly.

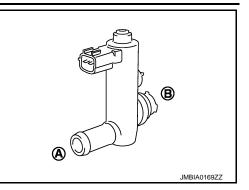
Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals (1) and (2)	No
OFF	Yes

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve. Refer to <u>FL-16, "Exploded View"</u>.



[VQ35DE]

< DTC/CIRCUIT DIAGNOSIS >

# P0448 EVAP CANISTER VENT CONTROL VALVE

# DTC Logic

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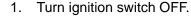
[VQ35DE]

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## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0448	EVAP canister vent con- trol valve close	EVAP canister vent control valve remains closed under specified driving conditions.	<ul> <li>EVAP canister vent control valve</li> <li>EVAP control system pressure sensor and the circuit</li> <li>Blocked rubber tube to EVAP canister vent control valve</li> <li>EVAP canister is saturated with water</li> </ul>
	FIRMATION PROCI	EDURE	
ing the nex 1. Turn ig 2. Turn ig	t test. Inition switch OFF and Inition switch ON.	as been previously conducted, always I wait at least 10 seconds. I wait at least 10 seconds.	s perform the following before conduct-
~	> GO TO 2. RM DTC CONFIRMAT		
1. Turn ig 2. Turn ig 3. Turn ig	nition switch ON and nition switch OFF and	wait at least 5 seconds. I wait at least 10 seconds. select "DATA MONITOR" mode with C at least 1 minute.	ONSULT.
	t next procedures 3 tir se the engine speed u		or 2 minutes and 50 seconds to 3 min-
	ceed 3 minutes.	edal and keep engine idle for about 5 s	seconds
6. Repea - Quickly	t next procedure 20 tir y increase the engine		re and keep it for 25 to 30 seconds.
	Engine speed 4,000 rpm 3,000 rpm		3
	Idle 0 rpm	5 seconds 25 to 30 More th 1 minute 2 minutes and 50 seconds 35 seconds 25 to 30 More th 1 minute 2 minutes and 50 seconds 35 seconds	
7. Check	1st trip DTC.	start	PBIB0972E
<u>ls 1st trip D</u> YES >>	TC detected?	"Diagnosis Procedure".	
Diagnosi	s Procedure		INFOID:00000009651135
	RUBBER TUBE		
	inition switch OFF.		



< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

- 2. Disconnect rubber tube connected to EVAP canister vent control valve.
- 3. Check the rubber tube for clogging.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Clean rubber tube using an air blower.

**2.**CHECK EVAP CANISTER VENT CONTROL VALVE

Check EVAP canister vent control valve. Refer to EC-301, "Component Inspection".

Is he inspection result normal?

YES >> GO TO 3.

NO >> Replace EVAP canister vent control valve. Refer to <u>FL-16</u>, "Exploded View".

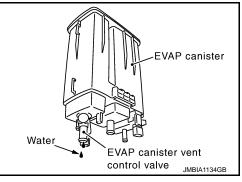
**3.**CHECK IF EVAP CANISTER SATURATED WITH WATER

 Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-16</u>, "Exploded View".

2. Check if water will drain from the EVAP canister.

Does water drain from the EVAP canister?

- YES >> GO TO 4.
- NO >> GO TO 6.



## **4.**CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

#### The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

YES >> GO TO 6. NO >> GO TO 5.

**5.**DETECT MALFUNCTIONING PART

Check the following.

EVAP canister for damage

• EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-16. "Exploded View".

**6.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.

2. Check that water is not inside connectors.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16, "Exploded View"</u>.

**7.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Check EVAP control system pressure sensor. Refer to EC-305, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16. "Exploded View"</u>.

## < DTC/CIRCUIT DIAGNOSIS >

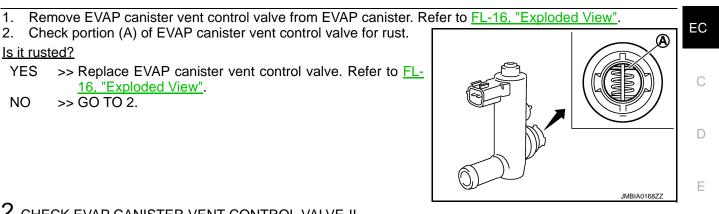
## **Component Inspection**

1.

INFOID:000000009651136

[VQ35DE]

# 1.CHECK EVAP CANISTER VENT CONTROL VALVE-I



## 2. CHECK EVAP CANISTER VENT CONTROL VALVE-II

#### (P)With CONSULT

- 1. Reconnect harness connectors disconnected.
- 2. Turn ignition switch ON.
- 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- 4. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between (A) and (B)
ON	Not existed
OFF	Existed

Operation takes less than 1 second.

#### Without CONSULT

- 1. Disconnect EVAP canister vent control valve harness connector.
- Check air passage continuity and operation delay time under the 2.
- following conditions. Check that new O-ring is installed properly.

Condition	Air passage continuity between (A) and (B)	
12 V direct current supply between terminals 1 and 2	Not existed	
OFF	Existed	
Operation takes less than 1 second.		
Is the inspection result normal?		
YES >> INSPECTION END	)	
NO >> GO TO 3.		
3.CHECK EVAP CANISTER V	/ENT CONTROL VALVE-III	
With CONSULT		
	tion (A) to (B)] of EVAP canister vent	control valve using an air blower.

2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.

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#### < DTC/CIRCUIT DIAGNOSIS >

3. Check air passage continuity and operation delay time. Check that new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between (A) and (B)
ON	No
OFF	Yes

Operation takes less than 1 second.

#### Without CONSULT

- 1. Clean the air passage [portion (A) to (B)] of EVAP canister vent control valve using an air blower.
- 2. Check air passage continuity and operation delay time under the following conditions.

#### Check that new O-ring is installed properly.

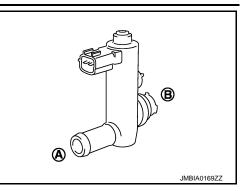
Condition	Air passage continuity between (A) and (B)
12 V direct current supply between terminals (1) and (2)	No
OFF	Yes

Operation takes less than 1 second.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP canister vent control valve. Refer to <u>FL-16, "Exploded View"</u>.



[VQ35DE]

< DTC/CIRCUIT DIAGNOSIS >

# P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

# DTC Logic

INFOID:000000009651137

[VQ35DE]

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0451	EVAP control system pressure sensor perfor- mance	ECM detects a sloshing signal from the EVAP control system pressure sensor	<ul> <li>Harness or connectors (EVAP control system pressure sensor circuit is shorted.) [CKP sensor (POS) circuit is shorted.] (APP sensor 2 circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.)</li> <li>EVAP control system pressure sensor</li> <li>Crankshaft position sensor (POS)</li> <li>Accelerator pedal position sensor</li> <li>Refrigerant pressure sensor</li> </ul>
DTC CON	<b>IFIRMATION PROC</b>	EDURE	
NOTE:			
4	•	ring DTC confirmation procedure.	
			and the fall is the
	onfirmation Procedure ducting the next test.	has been previously conducted, alwa	ays perform the following procedure
. Turn ig	gnition switch OFF and	l wait at least 10 seconds.	
	gnition switch ON.	Lucit at locat 10 accords	
3. Turn ig	gnillon switch OFF and	l wait at least 10 seconds.	
/□)W/ith C(	ONSULT>>GO TO 2.		
	t CONSULT>>GO TO Z.	5.	
ົ	RM DTC CONFIRMA		
(P)With CO	NSULT		
9	ingine and let it idle for	least 40 seconds.	
NOTE		n en e de la compa e l'arte (ba	
	1 st trip DTC.	r pedal even slightly.	
	DTC detected?		
•		"Diagnosis Procedure".	
NO >:	> GO TO 3.	-	
<b>3.</b> PERFO	RM DTC CONFIRMA	TION PROCEDURE-2	
With CO	NSULT		
		in "DATA MONITOR" mode of "ENGIN	E".
2. Let it id NOTE		P DIAG READY" changes to "ON".	
-		until "OFF" of "EVAP DIAG READY"	changes to "ON".
3. Turn ig	gnition switch OFF and	wait at least 90 minutes.	5
NOTE		ON during 00 minutes	
	quition switch ON.	ON during 90 minutes.	
5. Select	"EVAP LEAK DIAG" ii	n "DATA MONITOR" mode of "ENGINE"	
<u> </u>	that "EVAP LEAK DIA		

6. Check that "EVAP LEAK DIAG" indication.

## Which is displayed on CONSULT?

CMPLT>> GO TO 4.

- >> 1. Perform DTC CONFIRMATION PROCEDURE again. YET
  - 2. GO TO 1.

## EC-303

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	PERFORM DTC CONFIRMATION PROCEDURE-3
With CONSULT Check 1st trip DTC.	

Is 1st trip DTC detected?

YES >> Proceed to EC-304, "Diagnosis Procedure".

NO >> INSPECTION END

**5.**PERFORM DTC CONFIRMATION PROCEDURE-4

#### With GST

1. Start engine and let it idle for least 40 seconds. **NOTE:** 

#### Do not depress accelerator pedal even slightly.

2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-304, "Diagnosis Procedure".
- NO >> GO TO 6.

**6.**PERFORM DTC CONFIRMATION PROCEDURE-5

#### With GST

- 1. Let it idle for at least 2 hours.
- 2. Turn ignition switch OFF and wait at least 90 minutes. NOTE:

#### Never turn ignition switch ON during 90 minutes.

- 3. Turn ignition switch ON.
- 4. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-304, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000009651138

## **1.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR FOR WATER

- 1. Disconnect EVAP control system pressure sensor harness connector.
- 2. Check that water is not inside connectors.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace harness connector.

2.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY

1. Turn ignition switch ON.

2. Check the voltage between EVAP control system pressure sensor harness connector and ground.

EVAP control syste	em pressure sensor	Ground	Voltage (V)	
Connector	Terminal	Ground	voltage (v)	
B22	B22 3		Approx. 5	

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 3.

 $\mathbf{3}.$ check sensor power supply circuit

Check harness for short to power and short to ground, between the following terminals.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Connector	CM		Sensor			
	Terminal	Name	Conr	nector 7	Ferminal	
F8	96 Refrige	rant pressure senso	or E3	800	1	
10	54 CKP se	ensor (POS)	F	20	1	
<b>E16</b>	103 APP se	ensor	E1	10	5	
E16	107 EVAP 0	control system press	sure sensor B2	22	3	
<u>s the inspec</u>	tion result normal?					
NO >>	GO TO 4. Repair short to gro COMPONENTS	und or short to p	ower in harness o	r connect	ors.	
Refrigeran	t position sensor (P t pressure sensor (	Refer to <u>EC-442</u>			tion".)	
	tion result normal?					
	GO TO 5. Replace malfunctic	ning component	S.			
_	APP SENSOR					
			opt loop options "			
	sensor. Refer to <u>EC</u>		ent inspection".			
•	<u>ction result normal?</u> Check intermittent		CL-12 "Intermitte	nt Incido	nt"	
	Replace accelerato					
~	EVAP CONTROL S	•	•			
	control system pre			`ompone	nt Inspecti	on"
	ction result normal?		leiei lo <u>LC-303, C</u>			<u>on</u> .
	Check intermittent		o GI-42 "Intermitte	ent Incide	nt"	
	Replace EVAP con					<u>⊧d View"</u> .
Compone	nt Inspection					INFOID:00000000965113
	-					
CHECK E	EVAP CONTROL S	YSTEM PRESS	URE SENSOR			
. Turn ign	ition switch OFF.					
	e EVAP control sys	tem pressure s	ensor with its har	ness con	nector. Re	efer to FL-16, "Exploded
<u>View"</u> . Alwavs	replace O-ring wi	th a new one.				
3. Install a	vacuum pump to E	VAP control sys				
1. Turn ign	ition switch ON and	d check output v	oltage between EC	CM termir	nals under	the following conditions.
						_
	ECM		Applied vacuum kPa			
Connector	+	-	(kg/cm <sup>2</sup> , psi)	V	oltage	
	Terminal	Terminal				
	102	112	Not applied	1.8	3 - 4.8 V	
E16	(EVAP control system pressure sensor signal)	(Sensor around)	-26.7 (-0.272, -3.87)		5 V lower that we value	n
					ve value	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor. Refer to FL-16. "Exploded View".

## EC-305

< DTC/CIRCUIT DIAGNOSIS >

## P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

## DTC Logic

INFOID:000000009651140

[VQ35DE]

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0452	EVAP control system pressure sensor low in- put	An excessively low voltage from the sensor is sent to ECM.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted.) [CKP sensor (POS) circuit is shorted.] (APP sensor 2 circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.)</li> <li>EVAP control system pressure sensor</li> <li>Crankshaft position sensor (POS)</li> <li>Accelerator pedal position sensor</li> <li>Refrigerant pressure sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Always perform test at a temperature of 5°C (41°F) or more.

#### >> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

#### (B) With CONSULT

- 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. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Select "DATA MONITOR" mode with CONSULT.
- 7. Check that "FUEL T/TMP SE" is more than 0°C (32°F).
- 8. Start engine and wait at least 20 seconds.
- 9. Check 1st trip DTC.

#### With GST

- 1. Start engine and warm it up to normal operating temperature.
- 2. Set voltmeter probes to ECM harness connector terminals under the following conditions.

	ECM					
Connector	+	-				
Connector	Terminal	Terminal				
E16	111 (Fuel tank temperature sensor signal)	120 (Sensor ground)				

- 3. Check that the voltage is less than 4.2 V.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Turn ignition switch OFF and wait at least 10 seconds.
- 7. Start engine and wait at least 20 seconds.
- 8. Check 1st trip DTC.

Is 1st trip DTC detected?

DTC/CIRC								
	Proceed to INSPECTIO		<u>"Diagnosis Proc</u>	<u>edure"</u> .				
iagnosis	Procedu	re						INFOID:000000009651141
-	CONNECTO							
				anaar harn		<u>.</u>		
			stem pressure se e connector.	ensorname	ess connect	01.		
	ction result n	ormal?						
	GO TO 2. Renair or re	nlace ha	rness connector	-				
	•	-	STEM PRESSU			SUPPLY		
	ition switch					001121		
			EVAP control sys	stem press	ure sensor l	narness co	nnector and	ground.
VAP control	system pressu	re sensor	Ground	Voltage (	V)			
Connector	r Terr	minal	Giounu	vollage (	× )			
B22		3	Ground	Approx.	5			
	tion result n	ormal?						
-	GO TO 7. GO TO 3.							
-		ROL SY	STEM PRESSU	IRE SENSO		SUPPLY	CIRCUIT	
Disconn Check t		rness co	nnector. en EVAP contro	l system pr	essure sen	sor harnes	s connector	and ECM har-
Disconn Check ti ness cor	ect ECM ha he continuit nnector.	rness co y betwee	en EVAP contro		essure sen	sor harnes	s connector	and ECM har-
Disconn Check the ness con	ect ECM ha he continuit nnector.	rness co y betwee re sensor	en EVAP contro	CM	Cont	sor harnes	s connector	and ECM har-
Disconn Check ti ness con EVAP control	ect ECM ha he continuit nnector. system pressu	rness co y betwee re sensor ninal	en EVAP contro EC Connector	CM Termina	Cont	inuity	s connector	and ECM har-
Disconn     Check th     ness con     EVAP control     Connector     B22	ect ECM ha he continuit nnector. system pressu	rness co y betwee re sensor ninal 3	en EVAP contro	CM	Cont		s connector	and ECM har-
Disconn Check th ness con EVAP control Connector B22 the inspec	ect ECM ha he continuit nnector. system pressu r Terr ction result n	rness co y betwee re sensor ninal 3	en EVAP contro EC Connector	CM Termina	Cont	inuity	s connector	and ECM har-
Disconn Check ti ness con EVAP control Connector B22 the inspec YES >>	ect ECM ha he continuit nnector. system pressu	rress co y betwee re sensor ninal 3 ormal?	en EVAP contro EC Connector	CM Termina	Cont	inuity	s connector	and ECM har-
Disconn Check ti ness con EVAP control Connector B22 the inspec YES >> NO >>	ect ECM ha he continuit nnector. system pressu r Terr ction result n GO TO 4. Repair open	rresensor ninal aormal?	en EVAP contro EC Connector	CM Termina 107	Cont	inuity	s connector	and ECM har-
Disconn Check ti ness con EVAP control Connector B22 the inspec YES >> NO >> CHECK S	ect ECM ha he continuity nnector. system pressu Terr ction result n GO TO 4. Repair open SENSOR PC	rress co y betweet resensor ninal <u>aormal?</u> n circuit. DWER SI	EVAP contro	CM Termina 107 T	Cont	inuity sted		and ECM har-
Disconn Check ti ness con EVAP control Connector B22 the inspec (ES >> CHECK S heck harne	ect ECM ha he continuity nnector. system pressu Terr ction result n GO TO 4. Repair open SENSOR PC	rress co y betweet resensor ninal <u>aormal?</u> n circuit. DWER SI	EVAP contro	CM Termina 107 T Tound, betw	Cont	inuity sted		and ECM har-
Disconn Check ti ness con EVAP control Connector B22 the inspec (ES >> CHECK S heck harne	ect ECM ha he continuit nnector. system pressu <u>Terr</u> ction result n GO TO 4. Repair open SENSOR PC	rress co y betweet resensor ninal <u>aormal?</u> n circuit. DWER SI	EVAP contro	CM Termina 107 T	Cont	inuity sted		and ECM har-
Disconn Check th ness con EVAP control Connector B22 the inspec (ES >> NO >> CHECK S heck harne EC Connector	ect ECM ha he continuit nnector. system pressu r Terr ction result n GO TO 4. Repair open SENSOR PC ess for short	rresensor ninal aormal? to power	EVAP contro	CM Termina 107 T Tound, betw	Cont Exist	inuity sted		and ECM har-
Disconn Check th ness con EVAP control Connector B22 the inspec (ES >> NO >> CHECK S heck harne	ect ECM ha he continuit nnector. system pressu r Terr ction result n GO TO 4. Repair open SENSOR PC ess for short CM Terminal	re sensor ninal ormal? o circuit. DWER SI to power	EVAP contro	CM Termina 107 T Tound, betw	Cont Connector	inuity sted owing term Terminal		and ECM har-
Disconn Check ti ness con EVAP control Connector B22 the inspec (ES >> NO >> CHECK S heck harne EC Connector F8	ect ECM ha he continuit nnector. system pressu r Terr ction result n GO TO 4. Repair open SENSOR PC ess for short CM Terminal 96	re sensor ninal ormal? o circuit. DWER SI to power	en EVAP contro EC Connector E16 UPPLY CIRCUI r and short to gr Name Int pressure sensor sor (POS)	CM Termina 107 T Tound, betw	Cont Exis	inuity sted owing term Terminal 1		and ECM har-
Disconn Check ti ness con EVAP control Connector B22 the inspec YES >> NO >> CHECK S heck harne EC Connector	ect ECM ha he continuit nnector. system pressu r Terr ction result n GO TO 4. Repair open SENSOR PC ess for short CM Terminal 96 54	re sensor ninal aormal? o circuit. DWER SI to power Refrigera CKP sen APP sens	en EVAP contro EC Connector E16 UPPLY CIRCUI r and short to gr Name Int pressure sensor sor (POS)	CM Termina 107 T ound, betwo Sensor	Cont Connector E300 F20	inuity sted owing term Terminal 1 1		and ECM har-
Disconn Check til ness con EVAP control Connector B22 the inspec YES >> NO >> CHECK S heck harne ECC Connector F8 E16	ect ECM ha he continuit nnector. system pressu r Terr ction result n GO TO 4. Repair open SENSOR PC ess for short CM Terminal 96 54 103 107 ction result n	rress co y betwee ninal aormal? o circuit. DWER SI to powe Refrigera CKP sen APP sen EVAP co	EVAP contro	CM Termina 107 T ound, betwo Sensor	Cont Exis een the follo Connector E300 F20 E110	inuity sted owing term Terminal 1 1 5		and ECM har-
Disconn Check ti ness con EVAP control Connector B22 the inspec YES >> 1 NO >> 1 CONNECTOR ECC Connector F8 E16 the inspec YES >> 1	ect ECM ha he continuit nnector. system pressu r Terr GO TO 4. Repair open SENSOR PC ess for short CM Terminal 96 54 103 107 ction result n GO TO 5.	re sensor ninal aormal? ocircuit. DWER SI to power Refrigera CKP sen APP sens EVAP co oormal?	EVAP contro	CM Termina 107 T ound, betwo Sensor	Connector E300 F20 E110 B22	inuity sted owing term Terminal 1 1 5 3		and ECM har-
Disconn Check ti ness con EVAP control Connector B22 the inspec YES >> CONNECTOR F8 E16 the inspec YES >> K0 >>	ect ECM ha he continuit nnector. system pressu r Terr GO TO 4. Repair open SENSOR PC ess for short CM Terminal 96 54 103 107 ction result n GO TO 5.	rress co y betwee ninal a ormal? o circuit. DWER SI to powel Refrigera CKP sen APP sen EVAP co ormal? to grour	EVAP contro	CM Termina 107 T ound, betwo Sensor	Connector E300 F20 E110 B22	inuity sted owing term Terminal 1 1 5 3		and ECM har-

Crankshaft position sensor (POS) (Refer to <u>EC-273, "Component Inspection"</u>.)
Refrigerant pressure sensor (Refer to <u>EC-442, "Diagnosis Procedure"</u>.)

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace malfunctioning components.

**6.**CHECK APP SENSOR

Check APP sensor. Refer to EC-405. "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace accelerator pedal assembly. Refer to <u>FL-16, "Exploded View"</u>.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control syste	em pressure sensor	E	CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
B22	1	E16	112	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

 $\mathbf{8}$ .CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control syste	em pressure sensor	E	CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
B22	2	E16	102	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

#### 9.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Check EVAP control system pressure sensor. Refer to EC-308, "Component Inspection".

#### Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16, "Exploded View"</u>.

## **Component Inspection**

INFOID:000000009651142

## **1.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

- 1. Turn ignition switch OFF.
- Remove EVAP control system pressure sensor with its harness connector. Refer to <u>FL-16</u>, "<u>Exploded</u> <u>View</u>".

#### Always replace O-ring with a new one.

- 3. Install a vacuum pump to EVAP control system pressure sensor.
- 4. Turn ignition switch ON and check output voltage between ECM terminals under the following conditions.

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	ECM				
	+	_	Applied vacuum kPa	Voltage	_
Connector	Terminal	Terminal	(kg/cm <sup>2</sup> , psi)		
	102		Not applied	1.8 - 4.8 V	
E16	(EVAP control system pressure sensor signal)	112 (Sensor ground)	-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value	_
CAUTI					
• Neve	nys calibrate the vac er apply below -93.3 9 psi).				3 kPa (1.033 kg/cm <sup>2</sup> ,
	ection result normal?				
YES >>	INSPECTION END	rol system pres	sure sensor. Refer	to FL-16, "Exploded '	<mark>∕iew"</mark> .

< DTC/CIRCUIT DIAGNOSIS >

## P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

## DTC Logic

INFOID:000000009651143

[VQ35DE]

#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0453	EVAP control system pressure sensor high in- put	An excessively high voltage from the sensor is sent to ECM.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted.) [CKP sensor (POS) circuit is shorted.] (APP sensor 2 circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.)</li> <li>EVAP control system pressure sensor</li> <li>Crankshaft position sensor (POS)</li> <li>Accelerator pedal position sensor</li> <li>Refrigerant pressure sensor</li> <li>EVAP canister vent control valve</li> <li>EVAP canister</li> <li>Rubber hose from EVAP canister vent control valve to vehicle frame</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

#### Always perform test at a temperature of 5°C (41°F) or more.

>> GO TO 2.

#### 2. PERFORM DTC CONFIRMATION PROCEDURE

#### With CONSULT

- T. 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. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON.
- 6. Select "DATA MONITOR" mode with CONSULT.
- 7. Check that "FUEL T/TMP SE" is more than 0°C (32°F).
- 8. Start engine and wait at least 20 seconds.
- 9. Check 1st trip DTC.

#### With GST

- 1. Start engine and warm it up to normal operating temperature.
- 2. Set voltmeter probes to ECM harness connector terminals.

	ECM	
Connector	+	_
Connector	Terminal	Terminal
E16	111 (Fuel tank temperature sensor signal)	120 (Sensor ground)

3. Check that the voltage is less than 4.2 V.

4. Turn ignition switch OFF and wait at least 10 seconds.

5. Turn ignition switch ON.

< DTC/CIRC							[VQ35DE]	
<ol> <li>7. Start eng</li> <li>8. Check 1</li> </ol>	gine and wa st trip DTC.	it at leas	d wait at least 10 st 20 seconds.	) seconds.				A
Is 1st trip DT		_		e dune "				
	INSPECTIC		<u>"Diagnosis Proc</u>	<u>eaure</u> .				EC
Diagnosis	Procedu	re					INFOID:00000009651144	4
1.снеск с	CONNECTO	R						C
			stem pressure s le connectors.	ensor harne	ess connec	tor.		D
Is the inspec								
	GO TO 2.							Е
•	•	•	arness connector					
-			STEM PRESSU	JRE SENSO	DR POWER	R SUPPLY		_
	ition switch ne voltage b		EVAP control sy	stem press	ure sensor	harness cor	nnector and ground.	F
EVAP control	system pressu	ire sensor	Ground	Voltage (				G
Connector	Ter	minal	Ground	voltage (	v)			
B22		3	Ground	Approx.	5			Н
3. СНЕСК Е	GO TO 3. EVAP CONT		STEM PRESSU	JRE SENSO	DR POWEF	R SUPPLY (	CIRCUIT	 -
2. Disconn	ect ECM ha he continuit	rness co		l system pr	essure ser	nsor harnes	s connector and ECM har-	J - K
EVAP control	system pressu	re sensor	EC	CM				
Connector	Terr	ninal	Connector	Termina	l Con	itinuity		
B22		3	E16	107	Ex	isted		L
NO >>	GO TO 4. Repair oper	n circuit.		_				Μ
			UPPLY CIRCUI r and short to gr		een the foll	owing termi	nals.	N
EC	CM			Sensor			-	~
Connector	Terminal		Name		Connector	Terminal	-	0
F8	96	-	ant pressure sensor		E300	1	_	
-	54		nsor (POS)		F20	1	-	Ρ
E16	103	APP ser			E110	5	-	
	107	EVAP co	ontrol system pressu	ire sensor	B22	3	-	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair short to ground or short to power in harness or connectors.

#### < DTC/CIRCUIT DIAGNOSIS >

#### CHECK COMPONENTS

#### Check the following.

- Crankshaft position sensor (POS) (Refer to <u>EC-273, "Component Inspection"</u>.)
  Refrigerant pressure sensor (Refer to <u>EC-442, "Diagnosis Procedure"</u>.)

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace malfunctioning components.

6.CHECK APP SENSOR

Check APP sensor. Refer to EC-405, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace accelerator pedal assembly. Refer to FL-16, "Exploded View".

7.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control system pressure sensor ECM		СМ	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
B22	1	E16	112	Existed

Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

8.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1 Check the continuity between EVAP control system pressure sensor harness connector and ECM harness connector.

EVAP control system pressure sensor		ECM		Continuity
Connector	Terminal	Connector Terminal		Continuity
B22	2	E16	102	Existed

Also check harness for short to ground and short to power. 2.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

9.CHECK RUBBER TUBE

1. Disconnect rubber tube connected to EVAP canister vent control valve.

2. Check the rubber tube for clogging.

Is the inspection result normal?

YES >> GO TO 10.

NO >> Clean the rubber tube using an air blower, repair or replace rubber tube.

**10.**CHECK EVAP CANISTER VENT CONTROL VALVE

Check EVAP canister vent control valve. Refer to EC-297, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace EVAP canister vent control valve. Refer to FL-16, "Exploded View".

## EC-312

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

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INFOID:000000009651145

## 11.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Check EVAP control system pressure sensor. Refer to EC-313. "Component Inspection".

Is the inspection result normal?

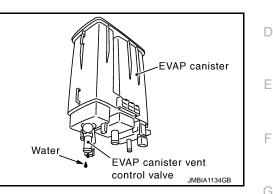
- YES >> GO TO 12.
- NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16. "Exploded View"</u>.

# 12. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

 Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-16</u>, "<u>Exploded View</u>".

2. Check if water will drain from the EVAP canister.

- Does water drain from the EVAP canister?
- YES >> GO TO 13.
- NO >> Check intermittent incident. Refer to <u>GI-42, "Intermittent</u> <u>Incident"</u>.



## **13.**CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

## The weight should be less than 2.1 kg (4.6 lb).

#### Is the inspection result normal?

NO	<ul> <li>&gt;&gt; Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.</li> <li>&gt;&gt; GO TO 14.</li> <li>TECT MALFUNCTIONING PART</li> </ul>	
	he following.	J

• EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-16, "Exploded View".

#### **Component Inspection**

## **1.**CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

#### 1. Turn ignition switch OFF.

Remove EVAP control system pressure sensor with its harness connector. Refer to <u>FL-16</u>, "<u>Exploded</u> <u>View</u>".

#### Always replace O-ring with a new one.

- 3. Install a vacuum pump to EVAP control system pressure sensor.
- 4. Turn ignition switch ON and check output voltage between ECM terminals under the following conditions.

ECM			Applied veguum kDe		
Connector	+	-	Applied vacuum kPa (kg/cm <sup>2</sup> , psi)	Voltage	
Connector	Terminal				
	102	112	Not applied	1.8 - 4.8 V	
E16	(EVAP control system pressure sensor signal)	(Sensor ground)	-26.7 (-0.272, -3.87)	2.1 to 2.5 V lower than above value	

#### **CAUTION:**

• Always calibrate the vacuum pump gauge when using it.

Never apply below -93.3 kPa (-0.952 kg/cm<sup>2</sup>, -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm<sup>2</sup>, 14.69 psi).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16, "Exploded View"</u>.

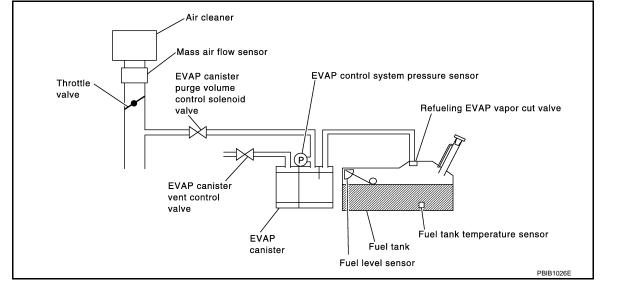
## P0456 EVAP CONTROL SYSTEM

## **DTC** Logic

#### DTC DETECTION LOGIC

This diagnosis detects leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the negative pressure caused by decrease of fuel temperature in the fuel tank after turning ignition switch OFF.

If ECM judges there are no leaks, the diagnosis will be OK.



DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0456	Evaporative emission control system leak	<ul> <li>EVAP system has a leak.</li> <li>EVAP system does not operate properly.</li> </ul>	<ul> <li>Incorrect fuel tank vacuum relief valve</li> <li>Incorrect fuel filler cap used</li> <li>Fuel filler cap remains open or does not close.</li> <li>Foreign matter caught in fuel filler cap.</li> <li>Leakage is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>Foreign matter caught in EVAP canister vent con- trol valve.</li> <li>EVAP canister or fuel tank leakage</li> <li>EVAP purge line (pipe and rubber tube) leakage</li> <li>EVAP purge line rubber tube bent</li> <li>Loose or disconnected rubber tube</li> <li>EVAP canister purge volume control solenoid valve and the circuit</li> <li>Fuel tank temperature sensor</li> <li>O-ring of EVAP canister is saturated with water</li> <li>EVAP control system pressure sensor</li> <li>Refueling EVAP vapor cut valve</li> <li>ORVR system leakage</li> <li>Fuel level sensor and the circuit</li> <li>Foreign matter caught in EVAP canister purge vol- ume control solenoid valve</li> </ul>

#### CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.
- If the fuel filler cap is not tightened properly, the MIL may illuminate.
- Use only a genuine NISSAN rubber tube as a replacement.

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#### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

Do you have CONSULT?

YES >> GO TO 2.

NO >> GO TO 4.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

#### WITH CONSULT

- 1. Turn ignition switch ON and select "EVAP DIAG READY" in "DATA MONITOR" mode with CONSULT.
- 2. Start engine and wait at idle until "OFF" of "EVAP DIAG READY" changes to "ON". **NOTE:**

#### It will take at most 2 hours until "OFF" of "EVAP DIAG READY" changes to "ON".

3. Turn ignition switch OFF and wait at least 90 minutes. **NOTE:** 

#### Never turn ignition switch ON during 90 minutes.

- 4. Turn ignition switch ON and select "EVAP LEAK DIAG" in "DATA MONITOR" mode with CONSULT.
- 5. Check that "EVAP LEAK DIAG" indication.

#### Which is displayed on CONSULT?

CMPLT >> GO TO 3.

YET >> Perform DTC CONFIRMATION PROCEDURE again. GO TO 1.

#### **3.**PERFORM DTC CONFIRMATION PROCEDURE-II

#### Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to EC-316, "Diagnosis Procedure".

NO >> INSPECTION END.

**4.**PERFORM DTC CONFIRMATION PROCEDURE

#### @WITH GST

- 1. Start engine and wait engine idle for at least 2 hours.
- 2. Turn ignition switch OFF and wait at least 90 minutes. **NOTE:**

#### Never turn ignition switch ON during 90 minutes.

- 3. Turn ignition switch ON.
- 4. Check 1st trip DTC.
- Is 1st trip DTC detected?
- YES >> Proceed to EC-316, "Diagnosis Procedure".
- NO >> INSPECTION END.

#### **Diagnosis** Procedure

INFOID:000000009651147

#### **1.**CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.

#### < DTC/CIRCUIT DIAGNOSIS >

#### [VQ35DE]

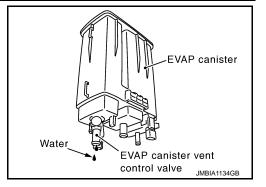
2. Check for genuine NISSAN fuel filler cap design.			
Is the inspection result normal?	А		
YES >> GO TO 2. NO >> Replace with genuine NISSAN fuel filler cap. Refer to <u>FL-12, "Exploded View"</u> .	EC C		
SEF915U			
2.CHECK FUEL FILLER CAP INSTALLATION	D		
Check that the cap is tightened properly by rotating the cap clockwise.			
Is the inspection result normal?	Е		
<ul> <li>YES &gt;&gt; GO TO 3.</li> <li>NO &gt;&gt; Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. Then retighten until reteaching sound is heard.</li> </ul>	F		
<b>3.</b> CHECK FUEL FILLER CAP FUNCTION			
Check for air releasing sound while opening the fuel filler cap.			
Is the inspection result normal?	G		
YES >> GO TO 5. NO >> GO TO 4.			
4. CHECK FUEL TANK VACUUM RELIEF VALVE	Н		
Refer to EC-320, "Component Inspection".			
Is the inspection result normal?	-		
YES >> GO TO 5.			
NO >> Replace fuel filler cap with a genuine one. Refer to <u>FL-12. "Exploded View"</u> .	.1		
5.CHECK FOR EVAP LEAK	0		
Refer to <u>FL-17, "Inspection"</u> . Is there any leak in EVAP line?			
YES >> Repair or replace.	Κ		
NO $>>$ GO TO 6.			
6.CHECK EVAP CANISTER VENT CONTROL VALVE	L		
Check the following.			
<ul> <li>EVAP canister vent control valve is installed properly. Refer to <u>FL-16</u>, "Exploded View".</li> </ul>	M		
EVAP canister vent control valve.	IVI		
Refer to <u>EC-301. "Component Inspection"</u> .			
Is the inspection result normal?	Ν		
YES >> GO TO 7. NO >> Repair or replace EVAP canister vent control valve and O-ring. Refer to <u>FL-16, "Exploded View"</u> .			
7. CHECK IF EVAP CANISTER SATURATED WITH WATER			
	-		

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#### < DTC/CIRCUIT DIAGNOSIS >

#### [VQ35DE]

- 1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
- 2. Check if water will drain from the EVAP canister.
- Does water drain from EVAP canister?
- YES >> GO TO 8.
- NO-1 >> With CONSULT: GO TO 10.
- NO-2 >> Without CONSULT: GO TO 11.



## 8. CHECK EVAP CANISTER

Weigh the EVAP canister assembly with the EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-16</u>, "<u>Exploded View</u>". **The weight should be less than 2.1 kg (4.6 lb)**.

Is the inspection result normal?

YES-1 >> With CONSULT: GO TO 10. YES-2 >> Without CONSULT: GO TO 11. NO >> GO TO 9.

**9.**DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to FL-15, "Hydraulic Layout".

10. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

**WITH CONSULT** 

- 1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
- 2. Start engine and let it idle.
- 3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode.
- 4. Touch "Qu" on CONSULT screen to increase "PURG VOL CONT/V" opening to 100%.
- 5. Check vacuum hose for vacuum.

#### Vacuum should exist.

Is the inspection result normal?

YES >> GO TO 13.

NO >> GO TO 12.

**11.**CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

#### **WITHOUT CONSULT**

1. Start engine and warm it up to normal operating temperature.

- 2. Stop engine.
- 3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
- 4. Start engine and let it idle for at least 80 seconds.
- 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

#### Vacuum should exist.

Is the inspection result normal?

YES >> GO TO 13. NO >> GO TO 12.

12. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to <u>FL-15, "Hydraulic Layout"</u>. <u>Is the inspection result normal?</u>

P0456 EVAP CONTROL SYSTEM	
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
YES >> GO TO 13. NO >> Repair or reconnect the hose.	A
13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
Refer to EC-293, "Component Inspection".	EC
Is the inspection result normal?	
YES >> GO TO 14. NO >> Replace EVAP canister purge volume control solenoid valve. Refer to <u>EM-28. "Ex</u>	ploded View"
14.CHECK FUEL TANK TEMPERATURE SENSOR	C
Refer to EC-252. "Component Inspection".	D
Is the inspection result normal? YES >> GO TO 15.	D
NO >> Replace fuel level sensor unit. Refer to <u>FL-5, "Removal and Installation"</u> .	
15. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR	E
Refer to EC-305, "Component Inspection".	
Is the inspection result normal?	F
YES >> GO TO 16.	
NO >> Replace EVAP control system pressure sensor. Refer to <u>FL-16</u> , <u>"Exploded View"</u> . <b>16.</b> CHECK EVAP PURGE LINE	G
Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or imprope Refer to <u>FL-15, "Hydraulic Layout"</u> .	
Is the inspection result normal?	F
YES >> GO TO 17.	
NO >> Repair or reconnect the hose. 17.CLEAN EVAP PURGE LINE	I
Clean EVAP purge line (pipe and rubber tube) using air blower.	J
>> GO TO 18.	
18. CHECK EVAP/ORVR LINE	
Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and	d improper con-
nection. For location, refer to <u>FL-15, "Hydraulic Layout"</u> .	
Is the inspection result normal? YES >> GO TO 19.	L
NO >> Repair or replace hoses and tubes.	
19. CHECK RECIRCULATION LINE	Ν
Check recirculation line between fuel filler tube and fuel tank for clogging, kink, cracks, improper connection.	looseness and
Is the inspection result normal?	١
YES >> GO TO 20.	
NO >> Repair or replace hose, tube or fuel filler tube. Refer to <u>FL-12, "Exploded View"</u> .	C
20.CHECK REFUELING EVAP VAPOR CUT VALVE	
Refer to EC-440, "Component Inspection".	
Is the inspection result normal?	F
YES >> GO TO 21. NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to <u>FL-12, "Exploded</u>	View".
21. CHECK FUEL LEVEL SENSOR	
Refer to <u>MWI-78</u> , "Component Inspection".	
Is the inspection result normal?	

YES >> GO TO 22.

#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Replace fuel level sensor unit. Refer to <u>FL-5</u>, "Removal and Installation".

22.CHECK INTERMITTENT INCIDENT

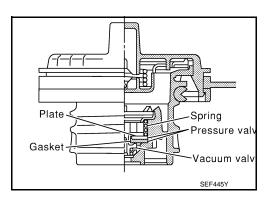
Refer to GI-42, "Intermittent Incident".

#### >> INSPECTION END

#### Component Inspection

## **1.**CHECK FUEL FILLER CAP

- 1. Turn ignition switch OFF.
- 2. Remove fuel filler cap. Refer to FL-12, "Exploded View".
- 3. Wipe clean valve housing.



Vacuum/Pressure gauge

One-way valve

Fuel filler

Fuel filler cap adapter

cap

되

- 4. Install fuel filler cap adapter (commercial service tool) to fuel filler cap.
- 5. 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 -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup>,

–0.87 to –0.48 psi)

Is the inspection result normal?

YES >> INSPECTION END NO >> GO TO 2.

2.REPLACE FUEL FILLER CAP

Replace fuel filler cap. Refer to FL-12, "Exploded View".

#### CAUTION:

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may illuminate.

>> INSPECTION END

#### INFOID:000000009651148

Vacuum/

Pressure pump

SEF943S

## **P0460 FUEL LEVEL SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

## P0460 FUEL LEVEL SENSOR

## **DTC Logic**

#### DTC DETECTION LOGIC

#### NOTE:

- If DTC P0460 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0460 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-336, "DTC Logic"</u>.

When the vehicle is parked, the fuel level in the fuel tank is naturally 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.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	
P0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal be- ing varied is sent from the fuel level sensor to ECM.	<ul> <li>Harness or connectors (The CAN communication line is open or shorted)</li> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Combination meter</li> <li>Fuel level sensor</li> </ul>	F

### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

1.	Start engine and wait maximum of 2 consecutive minutes.
2.	Check 1st trip DTC.

#### Is 1st trip DTC detected?

## YES >> Proceed to <u>EC-321</u>, "Diagnosis Procedure".

NO >> INSPECTION END

#### Diagnosis Procedure

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#### **1.**CHECK COMBINATION METER FUNCTION

Check combination meter function. Refer to <u>MWI-35, "CONSULT Function"</u>.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Proceed to <u>MWI-77, "Diagnosis Procedure"</u>.

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## **P0461 FUEL LEVEL SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

## P0461 FUEL LEVEL SENSOR

#### DTC Logic

DTC DETECTION LOGIC

#### NOTE:

- If DTC P0461 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0461 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-336, "DTC Logic"</u>.

Driving long distances naturally affect fuel gauge level.

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461	Fuel level sensor circuit range/performance	The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long dis- tance.	<ul> <li>Harness or connectors (The CAN communication line is open or shorted)</li> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Combination meter</li> <li>Fuel level sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### **1.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-322, "Component Function Check".

Use component function check to check the overall function of the fuel level sensor. During this check, a 1st trip DTC might not be confirmed.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to EC-323, "Diagnosis Procedure".

#### Component Function Check

INFOID:000000009651152

## **1.**PRECONDITIONING

#### WARNING:

When performing the following procedure, always observe the handling of the fuel. Refer to <u>FL-5</u>, <u>"Exploded View"</u>.

#### **TESTING CONDITION:**

Before starting component function check, preparation of draining fuel and refilling fuel is required.

Will CONSULT be used?

YES >> GO TO 2. NO >> GO TO 3.

2. PERFORM COMPONENT FUNCTION CHECK

#### With CONSULT NOTE:

Start from step 10, if it is possible to confirm that the fuel cannot be drained by 30  $\ell$  (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 <u>EC-457, "Work Procedure"</u>.
- 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 and wait at least 10 seconds then turn ON.
- 6. Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT.
- 7. Check "FUEL LEVEL SE" output voltage and note it.
- 8. Select "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT.

## EC-322

INFOID:000000009651151

## P0461 FUEL LEVEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
<ol> <li>Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.</li> <li>Check "FUEL LEVEL SE" output voltage and note it.</li> <li>Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).</li> <li>Check "FUEL LEVEL SE" output voltage and note it.</li> <li>Check "FUEL LEVEL SE" output voltage and note it.</li> <li>Confirm whether the voltage changes more than 0.03 V during step 7 to 10 and 10 to 12.</li> </ol>		A
Is the inspection result normal? YES >> INSPECTION END NO >> Proceed to <u>EC-323, "Diagnosis Procedure"</u> .		С
3. PERFORM COMPONENT FUNCTION CHECK	US gal, 6-5/8	D
<ol> <li>Release fuel pressure from fuel line. Refer to <u>EC-457, "Work Procedure"</u>.</li> <li>Remove the fuel feed hose on the fuel level sensor unit. Refer to <u>FL-5, "Exploded View"</u>.</li> <li>Connect a spare fuel hose where the fuel feed hose was removed.</li> <li>Turn ignition switch ON.</li> <li>Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.</li> <li>Confirm that the fuel gauge indication varies.</li> </ol>		E F
<ul> <li>8. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).</li> <li>9. Confirm that the fuel gauge indication varies.</li> <li><u>Is the inspection result normal?</u></li> <li>YES &gt;&gt; INSPECTION END</li> <li>NO &gt;&gt; Proceed to <u>EC-323</u>, "Diagnosis Procedure".</li> </ul>		G
Diagnosis Procedure 1.check combination meter function	INFOID:000000009651153	Ι
Check combination meter function. Refer to <u>MWI-35, "CONSULT Function"</u> . Is the inspection result normal?		J
<ul> <li>YES &gt;&gt; Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.</li> <li>NO &gt;&gt; Proceed to <u>MWI-77, "Diagnosis Procedure"</u>.</li> </ul>		K
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## P0462, P0463 FUEL LEVEL SENSOR

## DTC Logic

INFOID:000000009651154

[VQ35DE]

#### DTC DETECTION LOGIC

#### NOTE:

- If DTC P0462 or P0463 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0462 or P0463 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607.Refer to <u>EC-336, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462	Fuel level sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors     (The CAN communication line is open or
P0463	Fuel level sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul> <li>shorted)</li> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Combination meter</li> <li>Fuel level sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

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

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 5 seconds.
- 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-324, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000009651155

1. CHECK COMBINATION METER FUNCTION

Check combination meter function. Refer to MWI-35, "CONSULT Function".

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".
- NO >> Proceed to <u>MWI-77, "Diagnosis Procedure"</u>.

# P0500 VSS

### Description

ECM receives vehicle speed signals from two different paths via CAN communication line: One is from the ABS actuator and electric unit (control unit) via the combination unit and the other is from TCM.

# DTC Logic

INFOID:000000009651157

INFOID:000000009651156

# DTC DETECTION LOGIC

#### NOTE:

- If DTC P0500 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P0500 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to EC-336, "DTC Logic".

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause	
P0500	VEH SPEED SEN/CIRC (Vehicle speed sensor)	At 20 km/h (13 MPH), ECM detects the fol- lowing status continuously for 5 seconds or more: The difference between a vehicle speed calculated by a secondary speed sen- sor transmitted from TCM to ECM via CAN communication and the vehicle speed indi- cated on the combination meter exceeds 15km/h (10 MPH).	<ul> <li>Harness or connector (The CAN communication line is open or shorted.)</li> <li>Combination meter</li> <li>ABS actuator and electric unit (control unit)</li> <li>Wheel sensor</li> <li>TCM</li> <li>Secondary speed sensor</li> </ul>	F G H

# DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

If DTC CONFIRMATION PROCEDURE has been previously conducted, always perform the following procedure before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is 10 V or more at idle.

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

 Start engine.
 Shift the selector lever to D range and wait at least for 2 seconds.
 Drive the vehicle at least 5 seconds at 20 km/h (13 MPH) or more.
 CAUTION: Always drive vehicle at a safe speed. NOTE:

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.

- 4. Check 1st trip DTC.
- Is 1st trip DTC detected?

YES >> Proceed to <u>EC-325, "Diagnosis Procedure"</u>

- NO >> INSPECTION END
- Diagnosis Procedure
- **1.**CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-35, "CONSULT Function".

Is the inspection result normal?

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# P0500 VSS

< DTC/CIRCUIT DIAGNOSIS >

NO >> Perform trouble shooting relevant to DTC indicated.

 $2. {\sf CHECK} \ {\sf DTC} \ {\sf WITH} \ {\sf ABS} \ {\sf ACTUATOR} \ {\sf AND} \ {\sf ELECTRIC} \ {\sf UNIT} \ ({\sf CONTROL} \ {\sf UNIT})$ 

Check DTC with ABS actuator and electric unit (control unit). Refer to BRC-30, "CONSULT Function".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble shooting relevant to DTC indicated.

**3.**CHECK DTC WITH COMBINATION METER

Check DTC with combination meter. Refer to <u>MWI-35, "CONSULT Function"</u>.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble shooting relevant to DTC indicated.

**4.**CHECK SECONDARY SPEED SENSOR

Check secondary speed sensor. Refer to TM-88, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace or replace error-detected parts.

**5.**CHECK WHEEL SENSOR

Check wheel sensor. Refer to BRC-64, "Diagnosis Procedure".

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.
- NO >> Replace or replace error-detected parts.

# **P0506 ISC SYSTEM**

# < DTC/CIRCUIT DIAGNOSIS >

# P0506 ISC SYSTEM

# Description

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the 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 warming up, deceleration and engine load (air conditioner, power steering and cooling fan operation, etc.).

# **DTC Logic**

INFOID:000000009651160

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### DTC DETECTION LOGIC

#### NOTE:

If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0506 Idle speed control sys- tem RPM lower than ex- pected		The idle speed is less than the target idle speed by 100 rpm or more.	<ul><li>Electric throttle control actuator</li><li>Intake air leakage</li></ul>
OTC CON	FIRMATION PROC	EDURE	
	NDITIONING	-	
ing the nex 1. Turn ig 2. Turn ig 3. Turn ig if the targeducting D TESTING ( • Before p	t test. nition switch OFF and nition switch ON. at idle speed is out of CCONFIRMATION I CONDITION: erforming the follow	as been previously conducted, always p I wait at least 10 seconds. I wait at least 10 seconds. of the specified value, perform <u>EC-13</u> PROCEDURE. ing procedure, confirm that battery ve temperature above –10°C(14°F).	37, "Work Procedure", before con-
>>	GO TO 2.		
2.perfo	RM DTC CONFIRMA	FION PROCEDURE	
		to normal operating temperature.	
2. Turn ig	nition switch OFF and	l wait at least 10 seconds	
3 Turn io		i wait at least 10 seconds.	
4. Turn ig	nition switch ON. nition switch OFF and	l wait at least 10 seconds.	
4. Turn ig 5. Restar	nition switch ON. nition switch OFF anc t engine and run it for		
4. Turn ig 5. Restar 6. Check	nition switch ON. nition switch OFF and t engine and run it for 1st trip DTC.	l wait at least 10 seconds.	
4. Turn ig 5. Restar 6. Check <u>Is 1st trip D</u> YES >>	nition switch ON. nition switch OFF and t engine and run it for 1st trip DTC. <u>TC detected?</u> Proceed to <u>EC-327.</u>	l wait at least 10 seconds.	
4. Turn ig 5. Restar 6. Check <u>Is 1st trip D</u> YES >>	nition switch ON. nition switch OFF and t engine and run it for 1st trip DTC. <u>TC detected?</u>	l wait at least 10 seconds. at least 1 minute at idle speed.	
4. Turn ig 5. Restar 6. Check <u>Is 1st trip D</u> YES >> NO >>	nition switch ON. nition switch OFF and t engine and run it for 1st trip DTC. <u>TC detected?</u> Proceed to <u>EC-327.</u>	l wait at least 10 seconds. at least 1 minute at idle speed.	INFOID:000000009651161
4. Turn ig 5. Restar 6. Check I <u>s 1st trip D</u> YES >> NO >> Diagnosi	nition switch ON. nition switch OFF and t engine and run it for 1st trip DTC. <u>TC detected?</u> Proceed to <u>EC-327.</u> NSPECTION END	l wait at least 10 seconds. at least 1 minute at idle speed. <u>"Diagnosis Procedure"</u> .	INFOID:000000009651161

2. Listen for an intake air leakage after the mass air flow sensor.

Is intake air leakage detected?

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# P0506 ISC SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Replace ECM. Refer to <u>EC-460, "Removal and Installation"</u>.

# **P0507 ISC SYSTEM**

# < DTC/CIRCUIT DIAGNOSIS >

# P0507 ISC SYSTEM

# Description

INFOID:000000009651162

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[VQ35DE]

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value С memorized in the 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 warming up, deceleration and engine load (air conditioner, power steering and cooling fan operation, etc.).

# DTC Logic

INFOID:000000009651163

### DTC DETECTION LOGIC

#### NOTE:

#### If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0507	Idle speed control sys- tem RPM higher than expected	The idle speed is more than the target idle speed by 200 rpm or more.	<ul><li>Electric throttle control actuator</li><li>Intake air leakage</li><li>PCV system</li></ul>
DTC CON	FIRMATION PROC	EDURE	
-	NDITIONING		
If DTC Con	firmation Procedure h	has been previously conducted, always	perform the following before conduct-
ing the nex		Lweit at least 10 seconds	
	nition switch OPF and	I wait at least 10 seconds.	
		wait at least 10 seconds.	27 "Werk Presedure" before ser
	C Confirmation Pro	of the specified value, perform <u>EC-1</u> cedure.	137, WORK Procedure, before con-
<b>TESTING</b>	CONDITION:		
		ing procedure, confirm that battery v temperature above –10°C(14°F).	voltage is more than 11 V at idle.
, anayo p			
>>	GO TO 2.		
2.PERFO	RM DTC CONFIRMAT	TION PROCEDURE	
		to normal operating temperature.	
	nition switch OFF and nition switch ON.	l wait at least 10 seconds.	
		l wait at least 10 seconds.	
		at least 1 minute at idle speed.	
	1st trip DTC. <u>TC detected?</u>		
		"Diagnosis Procedure".	
NO >>	INSPECTION END	<u> </u>	
Diagnosi	s Procedure		INFOID:00000009651164
<b>1.</b> CHECK			
	PCV HOSE CONNEC	CTION	
-	PCV HOSE CONNEC		

Revision: 2014 May

>> GO TO 2.

YES

# P0507 ISC SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace malfunctioning part.

2. CHECK INTAKE AIR LEAKAGE

1. Start engine and let it idle.

Listen for an intake air leakage after the mass air flow sensor.

Is intake air leakage detected?

- YES >> Discover air leakage location and repair.
- NO >> Replace ECM. Refer to EC-460, "Removal and Installation".

# P050A, P050E COLD START CONTROL

### Description

ECM controls ignition timing and engine idle speed when engine is started with pre-warming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

# DTC Logic

# DTC DETECTION LOGIC

#### NOTE: If DTC P050A, P050E is displayed with other DTC, first perform the trouble diagnosis for other DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P050A	Cold start idle air control system performance	ECM does not control engine idle speed properly when engine is started with pre-warming up con- dition.	<ul> <li>Lack of intake air volume</li> <li>Fuel injection system</li> </ul>
P050E	Cold start engine exhaust temper- ature too low	The temperature of the catalyst inlet does not rise to the proper temperature when the engine is started with pre-warming up condition.	• ECM
DTC CON	FIRMATION PROCEDURE		
1.PRECO	NDITIONING		
before cond 1. Turn ig 2. Turn ig 3. Turn ig <b>TESTING</b>	ducting the next test. Inition switch OFF and wait at Inition switch ON. Inition switch OFF and wait at CONDITION:		
~	> GO TO 2.		
<b>Z</b> .PERFO	RM DTC CONFIRMATION PF	ROCEDURE-I	
<ol> <li>Turn ig</li> <li>Select</li> <li>Check</li> <li>With GS</li> </ol>	nition switch OFF and wait at nition switch ON. "DATA MONITOR" mode with the indication of "COOLAN T	CONSULT. EMP/S".	
Is the value	e of "COOLAN TEMP/S" betwe	<u>een 4°C (39°F) and 36°C (97°F)?</u>	
NO-1 [If it NO-2 [If it	(39°F) or more. Retry from s	engine down to less than 36°C (97°F). F	
<ol> <li>Start th (104°F</li> <li>Check</li> <li>With GS</li> <li>Follow the</li> </ol>	e select lever in N range. The engine and warm up in idle () for more than 15 seconds. 1st trip DTC. ST procedure "With CONSULT" a	with the value of "COOLAN TEMP/S" be above.	etween 4°C (39°F) and 40°C
	DTC detected?		

YES >> Proceed to EC-332, "Diagnosis Procedure".

# EC-331

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# P050A, P050E COLD START CONTROL

< DTC/CIRCUIT DIAGNOSIS > NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000009651167

[VQ35DE]

**1.**PERFORM IDLE AIR VOLUME LEARNING

Perform <u>EC-137, "Work Procedure"</u>.

Is Idle Air Volume Learning carried out successfully?

YES >> GO TO 2.

NO >> Follow the instruction of Idle Air Volume Learning.

2. CHECK INTAKE SYSTEM

Check for the cause of intake air volume lacking. Refer to the following.

- Crushed intake air passage
- Intake air passage clogging
- Clogging of throttle body

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning part

**3.**CHECK FUEL INJECTION SYSTEM FUNCTION

Perform DTC Confirmation Procedure for DTC P0171, P0174. Refer to EC-241, "DTC Logic".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Proceed to <u>EC-242</u>, "Diagnosis Procedure" for DTC P0171, P0174.

**4.**PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Erase DTC.
- 3. Perform DTC Confirmation Procedure. See <u>EC-331, "DTC Logic"</u>.

Is the 1st trip DTC P050A, P050E displayed again?

- YES >> Replace ECM. Refer to EC-460, "Removal and Installation".
- NO >> INSPECTION END

# P0603 ECM POWER SUPPLY

### < DTC/CIRCUIT DIAGNOSIS >

# P0603 ECM POWER SUPPLY

# DTC Logic

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INFOID:000000009651168

[VQ35DE]

### DTC DETECTION LOGIC

	Trouble diagnosis na	ame	DTC detect	ing condition	Possible cause
P0603	ECM power supply of cuit		oack up RAM sy	stem does not function	<ul> <li>Harness or connectors [ECM power supply (back up) circuit is open or shorted.]</li> <li>ECM</li> </ul>
DTC CON	FIRMATION PR	OCEDUR	E		
1.PRECO	NDITIONING				
ing the nex 1. Turn ig 2. Turn ig	t test. nition switch OFF nition switch ON.	and wait a	it least 10 se	conds.	perform the following before conduct-
3. Turn ig	nition switch OFF	and wait a	t least 10 se	conds.	
~	• GO TO 2.				
~	RM DTC CONFIR	MATION F	ROCEDURE		
	nition switch ON a				
2. Turn ig	nition switch OFF	and wait a	it least 5 min	utes.	
	nition switch ON, t steps 2 and 3 for			5.	
5. Check	1st trip DTC.				
-	<u>TC detected?</u>	22 "Diago	onia Dragodu	ro"	
	<ul> <li>Proceed to <u>EC-3</u></li> <li>INSPECTION EI</li> </ul>			<u>ie</u> .	
Diagnosi	s Procedure				INFOID:000000009651169
	ECM POWER SL				
	nition switch OFF.				
2. Discon	nect ECM harnes	s connecto			
3. Check	the voltage betwe	en ECM ha	arness conne	ctor terminals.	
	ECM				_
			_	Voltage	
	+	-		0	
Connector	+	Connector	Terminal	<u> </u>	
F7	+ Terminal 26	E16	Terminal 128	Battery voltage	
F7 Is the inspe	+ Terminal 26 ection result norma	E16			
F7 Is the inspe YES >>	+ Terminal 26 ection result norma	E16 al?	128	Battery voltage	
F7 Is the inspe YES >> NO >>	+ Terminal 26 ection result norma	E16 al? ole diagnos	128 sis for power	Battery voltage	
F7 <u>Is the inspe</u> YES >> NO >> <b>2.</b> CHECK	+ Terminal 26 ection result norma > GO TO 2. > Perform the trout	E16 al? ole diagnos	128 sis for power	Battery voltage	
F7 <u>Is the inspe</u> YES >> NO >> <b>2.</b> CHECK Check inter	+ Terminal 26 ection result norma GO TO 2. Perform the trout INTERMITTENT	E16 al? ole diagnos INCIDENT Refer to <u>GI</u> -	128 sis for power	Battery voltage	
F7 YES >> NO >> 2.CHECK Check inter Is the inspe YES >>	+ Terminal 26 Cection result norma GO TO 2. Perform the troud INTERMITTENT rmittent incident. F ection result norma GO TO 3.	E16 al? ole diagnos INCIDENT Refer to <u>GI-</u> al?	128 sis for power -42. "Intermitt	Battery voltage	
F7 YES >> NO >> 2.CHECK Check inter Is the inspe YES >> NO >>	+ Terminal 26 ection result norma GO TO 2. Perform the troul INTERMITTENT rmittent incident. F ection result norma	E16 al? ole diagnos INCIDENT Refer to <u>GI</u> al? e error-dete	128 sis for power -42. "Intermitt ected parts.	Battery voltage supply circuit. ent Incident".	

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3. Perform DTC CONFIRMATION PROCEDURE. See <u>EC-333, "DTC Logic"</u>.

Is the 1st trip DTC P0603 displayed again?

YES >> Replace ECM. Refer to EC-460, "Removal and Installation".

NO >> INSPECTION END

# < DTC/CIRCUIT DIAGNOSIS > P0605 ECM

# DTC Logic

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INFOID:000000009651170

[VQ35DE]

# DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name		DTC detecting condition	Possible cause
		A)	ECM calculation function is malfunctioning.	
P0605	Engine control module	B)	ECM EEP-ROM system is malfunctioning.	• ECM
		C)	ECM self shut-off function is malfunctioning.	
1.PRECC If DTC Cor ing the nex 1. Turn ig 2. Turn ig		nas b d wait	een previously conducted, always perfor at least 10 seconds.	m the following before conduct-
2.PERFO		TION	PROCEDURE FOR MALFUNCTION A	
2. Check Is 1st trip [ YES >: NO >:	gnition switch ON. 1st trip DTC. <u>DTC detected?</u> > Proceed to <u>EC-335,</u> > GO TO 3.		pnosis Procedure". PROCEDURE FOR MALFUNCTION B	
1. Turn iç 2. Turn iç 3. Check <u>Is 1st trip [</u>	gnition switch ON and	wait a it at l	at least 1 second. east 10 seconds, and then turn it ON.	
NO >:	> GO TO 4.		PROCEDURE FOR MALFUNCTION C	
<ol> <li>Turn iç</li> <li>Repeat</li> <li>Check</li> </ol>	gnition switch ON and gnition switch OFF, wa at step 2 for 32 times. 1st trip DTC. DTC detected?		at least 1 second. east 10 seconds, and then turn it ON.	
YES >	<ul> <li>Proceed to <u>EC-335.</u></li> <li>INSPECTION END</li> </ul>	"Diag	nosis Procedure".	
Diagnos	is Procedure			INFOID:000000009651171
	CTION START			
<ol> <li>Erase</li> <li>Perfor</li> <li>See E</li> </ol>	gnition switch ON. DTC. m DTC CONFIRMATI <u>C-335. "DTC Logic"</u> . rip DTC P0605 display			
YES >:			C-460, "Removal and Installation".	

NO >> INSPECTION END

# P0607 ECM

# DTC Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0607	CAN communication bus	When detecting error during the initial diagno- sis of CAN controller of ECM.	• ECM

### DTC CONFIRMATION PROCEDURE

# 1.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Check DTC.

#### Is DTC detected?

- YES >> Proceed to EC-336, "Diagnosis Procedure".
- NO >> INSPECTION END

# Diagnosis Procedure

# **1.**INSPECTION START

- 1. Turn ignition switch ON.
- 2. Erase DTC.
- 3. Perform DTC CONFIRMATION PROCEDURE. See <u>EC-336, "DTC Logic"</u>.
- 4. Check DTC.

#### Is the DTC P0607 displayed again?

- Yes >> Replace ECM. Refer to EC-460, "Removal and Installation".
- No >> INSPECTION END

INFOID:000000009651172

# P0643 SENSOR POWER SUPPLY

#### < DTC/CIRCUIT DIAGNOSIS >

# P0643 SENSOR POWER SUPPLY

# DTC Logic

INFOID:000000009651174

[VQ35DE]

# DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detec	cting condition	Possible cause
P0643	Sensor power supply circuit short	ECM detects that th source for sensor is	e voltage of power excessively low or high	<ul> <li>Harness or connectors <ul> <li>(APP sensor 1 circuit is shorted.)</li> <li>(TP sensor circuit is shorted.)</li> <li>[CMP sensor (PHASE) circuit is shorted.)</li> <li>(Battery current sensor circuit is shorted.)</li> </ul> </li> <li>Accelerator pedal position sensor <ul> <li>Throttle position sensor</li> <li>Camshaft position sensor (PHASE)</li> <li>Battery current sensor</li> </ul> </li> </ul>
DTC CON	FIRMATION PROC	CEDURE		
1.PRECO	NDITIONING			
ing the next 1. Turn ig 2. Turn ig 3. Turn ig <b>TESTING (</b>	t test. Inition switch OFF ar Inition switch ON. Inition switch OFF ar <b>CONDITION:</b>	nd wait at least 10 nd wait at least 10	seconds.	vays perform the following before conduct- y voltage is more than 10 V at idle.
>>	> GO TO 2.			
2.PERFOR	RM DTC CONFIRM	TION PROCEDU	JRE	
	ngine and let it idle for	or 1 second.		_
2. Check				
Is DTC dete YES >>	ected? Proceed to <u>EC-337</u>	"Diagnosis Proc	edure"	
	INSPECTION END		<u>ouuro</u> .	
Diagnosi	s Procedure			INFOID:00000009651175
	ACCELERATOR PE			
	nect accelerator pec inition switch ON.	ai position (APP)	Sensor namess co	
	the voltage between	APP sensor harr	ness connector and	d ground.
	APP sensor			
Connecto		Ground	Voltage (V)	
E110	4	Ground	Approx. 5	
	ection result normal?			
YES >>	> GO TO 5.			
•	> GO TO 2.			
Z.CHECK	SENSOR POWER		Г	

Check harness for short to power and short to ground, between the following terminals.

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# P0643 SENSOR POWER SUPPLY

#### < DTC/CIRCUIT DIAGNOSIS >

EC	CM	Sensor			
Connector	Terminal	Name	Connector	Terminal	
F7	24	TP sensor	F29	1	
	75	Battery current sensor	F76	1	
F8	83	CMP sensor (PHASE) (bank 1)	F26	1	
	87	CMP sensor (PHASE) (bank 2)	F69	1	
E16	99	APP sensor	E110	4	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair short to ground or short to power in harness or connectors.

**3.**CHECK COMPONENTS

Check the following.

• Camshaft position sensor (PHASE) (Refer to EC-276, "Component Inspection".)

Battery current sensor (Refer to <u>EC-351, "Component Inspection"</u>.)

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace malfunctioning component.

**4.**CHECK TP SENSOR

Check TP sensor. Refer to EC-198, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace electric throttle control actuator. Refer to <u>EM-28, "Exploded View"</u>.

**5.**CHECK APP SENSOR

Check APP sensor. Refer to EC-405, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace accelerator pedal assembly. Refer to <u>ACC-3. "Exploded View"</u>.

# P0850 PNP SWITCH

# Description

When the selector lever position is P or N, park/neutral position (PNP) signal from the TCM is sent to ECM. DTC Logic

# DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0850	Park/neutral position switch	The signal of the park/neutral position (PNP) signal does not change during driving after the engine is started.	<ul> <li>Harness or connectors [The park/neutral position (PNP) signal circuit is open or shorted.]</li> <li>TCM</li> </ul>
DTC CON	FIRMATION PROCI	EDURE	
<b>1.</b> INSPEC	TION START		
Will CONS	ULT be used?		
	ULT be used?		
	> GO TO 2. > GO TO 5.		
<b>~</b>	NDITIONING		
f DTC Cor	firmation Procedure h	as been previously conducted, always	perform the following before conduct-
ing the nex	t test.	wait at least 10 seconds.	. 5
	inition switch OPP and	wait at least 10 seconds.	
3. Turn ig	nition switch OFF and	wait at least 10 seconds.	
~	> GO TO 3.		
-	PNP SIGNAL		
With CO			
1. Turn ig	nition switch ON.		
	"P/N POSI SW" in "D/ the following condition	ATA MONITOR" mode with CONSULT. T s.	hen check the "P/N POSI SW" signal
	ç		
	ition (Selector lever)	Known-good signal	
N or P positi		ON	
Except abov		OFF	
	ection result normal? > GO TO 4.		
		<u>"Diagnosis Procedure"</u> .	
4.PERFO	RM DTC CONFIRMAT	TION PROCEDURE	
	"DATA MONITOR" mo		
<ol> <li>Start er</li> <li>Mainta</li> </ol>	ngine and warm it up t in the following condit	o normal operating temperature. ions for at least 50 consecutive seconds	
CAUTI	ON:		-
Alway	s drive vehicle at a s	afe speed.	

ENG SPEED	1,100 - 6,375 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	3.0 - 31.8 msec

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# P0850 PNP SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

VHCL SPEED SE	More than 64 km/h (40 mph)
Selector lever	Suitable position

4. Check 1st trip DTC.

#### 4. Check 1st trip DTC. Is 1st trip DTC detected?

YES >> Proceed to EC-340, "Diagnosis Procedure".

NO >> INSPECTION END

**5.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to <u>EC-340, "Component Function Check"</u>.

# NOTE:

Use component function check to check the overall function of the park/neutral position (PNP) signal circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to <u>EC-340</u>, "Diagnosis Procedure".

#### Component Function Check

# **1.**PERFORM COMPONENT FUNCTION CHECK

- 1. Turn ignition switch ON.
- 2. Check the voltage between ECM harness connector terminals.

	ECM				
Connector	+	_	Con	Voltage	
Connector	Terminal	Terminal			
E16	118	128	Selector lever P or N		Battery voltage
LIU	110	120	position	Except above	Approx. 0 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EC-340, "Diagnosis Procedure".

# Diagnosis Procedure

# **1.**CHECK DTC WITH TCM

Check DTC with TCM. Refer to EC-96, "DTC Index".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace malfunctioning part.

2. CHECK STARTING SYSTEM

Turn ignition switch OFF, then turn it to START.

#### Does starter motor operate?

YES >> GO TO 3.

NO >> Refer to <u>BCS-16</u>, "COMMON ITEM : CONSULT Function (BCM - COMMON ITEM)".

 ${\it 3.}$  CHECK PNP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.

- 2. Disconnect TCM harness connector.
- 3. Disconnect IPDM E/R harness connector.
- 4. Check the continuity between TCM harness connector and IPDM E/R harness connector.

INFOID:000000009651178

# **P0850 PNP SWITCH**

### < DTC/CIRCUIT DIAGNOSIS >

1	СМ	IPDN	M E/R	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
F23	20	F12	72	Existed	
Also chec	k harness for s	short to ground	and short to p	ower.	
ne inspectio	on result norm	<u>al?</u>			
	О ТО 4.				
	· ·			power in harness or connectors.	
		RCUIT FOR OF		DR I-II	
	ct IPDM E/R ha ct ECM harnes	arness connect	ors.		
			ness connecto	r and IPDM E/R harness connector	
	-				
E	СМ	IPDN	M E/R	Continuity	
<b>^</b>	Tannainal	Connector	Terminal	Continuity	
Connector	Terminal	Connocion			
E16	118	E10	30	Existed	
E16 Also chec	118 k harness for s	E10 short to ground			
Also chec he inspectio	118 k harness for s on result norm	E10 short to ground al?	and short to p	ower.	
E16 Also chec he inspection ES >> C	118 k harness for s on result norm heck intermitte	E10 short to ground al? nt incident. Ret	and short to p fer to <u>GI-42, "I</u>	ower.	
E16 Also chec ne inspection ES >> C	118 k harness for s on result norm heck intermitte	E10 short to ground al? nt incident. Ret	and short to p fer to <u>GI-42, "I</u>	ower.	
E16 Also chec ne inspection ES >> C	118 k harness for s on result norm heck intermitte	E10 short to ground al? nt incident. Ret	and short to p fer to <u>GI-42, "I</u>	ower.	
E16 Also chec ne inspection ES >> C	118 k harness for s on result norm heck intermitte	E10 short to ground al? nt incident. Ret	and short to p fer to <u>GI-42, "I</u>	ower.	
E16 Also chec ne inspection ES >> C	118 k harness for s on result norm heck intermitte	E10 short to ground al? nt incident. Ret	and short to p fer to <u>GI-42, "I</u>	ower.	
E16 Also chec ne inspection ES >> C	118 k harness for s on result norm heck intermitte	E10 short to ground al? nt incident. Ret	and short to p fer to <u>GI-42, "I</u>	ower.	
E16 Also chec ne inspection ES >> C	118 k harness for s on result norm heck intermitte	E10 short to ground al? nt incident. Ret	and short to p fer to <u>GI-42, "I</u>	ower.	
E16 Also chec ne inspection ES >> C	118 k harness for s on result norm heck intermitte	E10 short to ground al? nt incident. Ret	and short to p fer to <u>GI-42, "I</u>	ower.	
E16 Also chec ne inspection ES >> C	118 k harness for s on result norm heck intermitte	E10 short to ground al? nt incident. Ret	and short to p fer to <u>GI-42, "I</u>	ower.	
E16 Also chec ne inspection ES >> C	118 k harness for s on result norm heck intermitte	E10 short to ground al? nt incident. Ret	and short to p fer to <u>GI-42, "I</u>	ower.	
E16 Also chec he inspection ES >> C	118 k harness for s on result norm heck intermitte	E10 short to ground al? nt incident. Ret	and short to p fer to <u>GI-42, "I</u>	ower.	

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# P1148, P1168 CLOSED LOOP CONTROL

# DTC Logic

INFOID:000000009651180

#### DTC DETECTION LOGIC NOTE: DTC P1148 or P1168 is displayed with another DTC for A/F sensor 1.

Perform the trouble diagnosis for the corresponding DTC.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1148	Closed loop control function (bank 1)	The closed loop control function for bank 1 does not operate even when vehicle is being driven in the specified condition.	Harness or connectors     (The A/F sensor 1 circuit is open or short- ed.)
P1168	Closed loop control function (bank 2)	The closed loop control function for bank 2 does not operate even when vehicle is being driven in the specified condition.	<ul> <li>A/F sensor 1</li> <li>A/F sensor 1 heater</li> </ul>

# P1212 TCS COMMUNICATION LINE

#### < DTC/CIRCUIT DIAGNOSIS >

# P1212 TCS COMMUNICATION LINE

### Description

This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and "ABS actuator and electric unit (control unit)". Be sure to erase the malfunction information such as DTC not only for "ABS actuator and electric unit (control unit)" but also for ECM after TCS related repair.

#### DTC Logic

#### DTC DETECTION LOGIC

#### NOTE:

- If DTC P1212 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1212 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-336, "DTC Logic"</u>.

Freeze frame data is not stored in the ECM for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	F
P1212	TCS communication line	ECM cannot receive the information from "ABS actuator and electric unit (control unit)" continuously.	<ul> <li>Harness or connectors (The CAN communication line is open or short- ed.)</li> <li>ABS actuator and electric unit (control unit)</li> <li>Dead (Weak) battery</li> </ul>	G

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

>> GO TO 2.

# 2.PERFORM DTC CONFIRMATION PROCEDURE

#### L Start engine and let it idle for at least 10 seconds. 1. Check 1st trip DTC. 2. Is 1st trip DTC detected? M YES >> Proceed to EC-343, "Diagnosis Procedure". NO >> INSPECTION END Ν **Diagnosis** Procedure INFOID:000000009651183 Perform the trouble diagnosis for TCS. Refer to BRC-45, "Work Flow". NOTE: If DTC P1212 is displayed with DTC UXXXX and/or P0607, perform the following trouble diagnosis. Trouble diagnosis for DTC UXXXX Refer to EC-96, "DTC Index".

• Trouble diagnosis for DTC P0607 Refer to EC-336, "DTC Logic".

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#### < DTC/CIRCUIT DIAGNOSIS >

# P1217 ENGINE OVER TEMPERATURE

### DTC Logic

#### DTC DETECTION LOGIC

#### NOTE:

- If DTC P1217 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1217 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-336, "DTC Logic"</u>.

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.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217	Engine over tempera- ture (Overheat)	<ul> <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> <li>Engine coolant is not within the specified range.</li> </ul>	<ul> <li>Harness or connectors (The cooling fan circuit is open or short- ed.)</li> <li>IPDM E/R (Cooling fan relays)</li> <li>Cooling fan motor</li> <li>Radiator hose</li> <li>Radiator</li> <li>Radiator cap</li> <li>Water pump</li> <li>Thermostat</li> </ul>

#### **CAUTION:**

When a malfunction is indicated, always replace the coolant. Refer to <u>CO-8, "Draining"</u>. Also, replace the engine oil. Refer to <u>MA-17, "ENGINE OIL : Draining"</u>.

- 1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Always use coolant with the proper mixture ratio. Refer to <u>MA-10, "Anti-Freeze Coolant Mixture Ratio"</u>.
- 2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

#### DTC CONFIRMATION PROCEDURE

**1.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-344, "Component Function Check".

#### NOTE:

Use component function check to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to EC-345, "Diagnosis Procedure".

#### Component Function Check

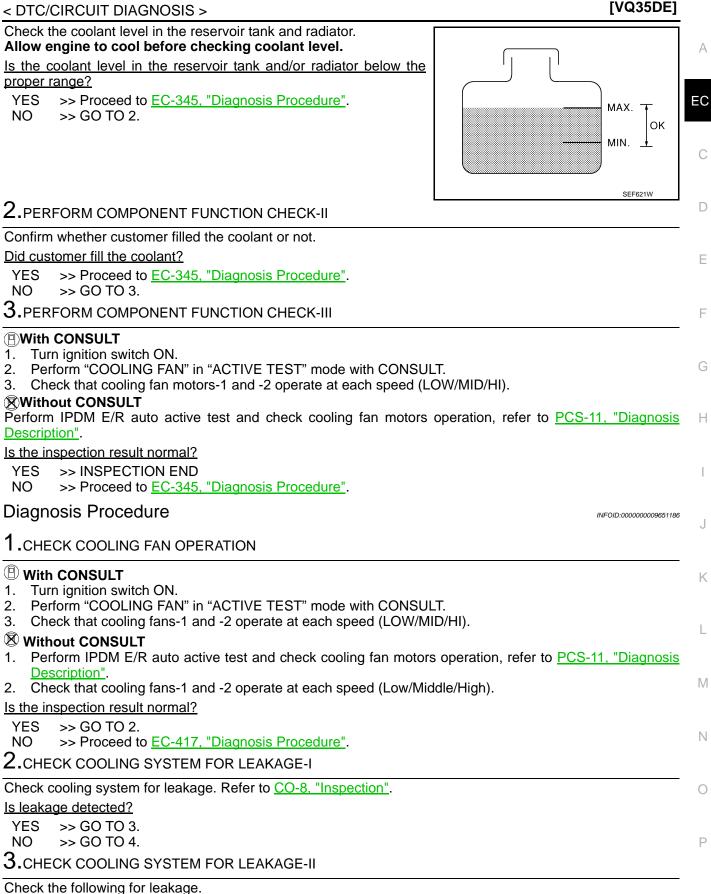
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**1.**PERFORM COMPONENT FUNCTION CHECK-I

#### 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.



- Hose
- Radiator
- Water pump

< DTC/CIRCUIT DIAGNOSIS >

>> Repair or replace malfunctioning part.

**4.**CHECK RADIATOR CAP

Check radiator cap. Refer to CO-12, "RADIATOR CAP : Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace radiator cap. Refer to <u>CO-13</u>, "Exploded View".

5. CHECK THERMOSTAT

Check thermostat. Refer to <u>CO-25, "Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace thermostat. Refer to <u>CO-24, "Exploded View"</u>.

**6.**CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine coolant temperature sensor. Refer to EC-194, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace engine coolant temperature sensor. Refer to <u>CO-26, "Exploded View"</u>.

**7.**CHECK MAIN 12 CAUSES

If the cause cannot be isolated, check the following.

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul> <li>Blocked radiator</li> <li>Blocked condenser</li> <li>Blocked radiator grille</li> <li>Blocked bumper</li> </ul>	Visual	No blocking	_
	2	Coolant mixture	Coolant tester	CO-8, "Inspection"	
	3	Coolant level	Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	CO-8, "Inspection"
	4	Radiator cap	Pressure tester	CO-12, "RADIATOR CAP :	Inspection"
ON* <sup>2</sup>	5	Coolant leakage	Visual	No leakage	CO-8, "Inspection"
ON* <sup>2</sup>	6	Thermostat	Touch the upper and lower radiator hoses	Both hoses should be hot	CO-25, "Inspection"
ON* <sup>1</sup>	7	Cooling fan	CONSULT	Operating	EC-417, "Component Function Check"
OFF	8	Combustion gas leak- age	Color checker chemical tester 4 Gas analyzer	Negative	—
ON* <sup>3</sup>	9	Coolant temperature     gauge	• Visual	Gauge less than 3/4 when driving	—
		Coolant overflow to res- ervoir tank	• Visual	No overflow during driving and idling	CO-8, "Inspection"
OFF* <sup>4</sup>	10	Coolant return from res- ervoir tank to radiator	Visual	Should be initial level in reservoir tank	CO-8, "Inspection"
OFF	11	Cylinder head	Straight gauge feeler gauge	0.1 mm (0.004 in) Maxi- mum distortion (warping)	EM-101, "Inspection"
	12	Cylinder block and pis- tons	• Visual	No scuffing on cylinder walls or piston	EM-113, "Inspection"

\*1: Turn the ignition switch ON.

\*2: Engine running at 3,000 rpm for 10 minutes.

\*3: Drive at 90 km/h (56 MPH) for 30 minutes and then let idle for 10 minutes.

\*4: After 60 minutes of cool down time.

For more information, refer to CO-3, "Troubleshooting Chart".

< DTC/CIRCUIT DIAGNOSIS >

>> INSPECTION END

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# P1225 TP SENSOR

# DTC Logic

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#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225	Closed throttle position learning performance	Closed throttle position learning value is excessively low.	<ul> <li>Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>

### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-348, "Diagnosis Procedure".
- NO >> INSPECTION END

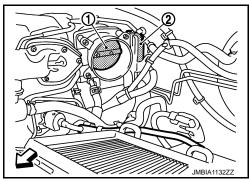
# Diagnosis Procedure

# **1.**CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 2. Remove the intake air duct. Refer to EM-26, "Exploded View".
- 3. Check if foreign matter is caught between the throttle valve (1) and the housing.
- Electric throttle control actuator (2)
- <>: Vehicle front

#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to <u>EC-136</u>, "<u>Description</u>".



# 2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

- 1. Replace electric throttle control actuator. Refer to EM-28, "Exploded View".
- 2. Go to EC-137, "Description".

>> INSPECTION END

<sup>1.</sup> Turn ignition switch OFF.

# P1226 TP SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# P1226 TP SENSOR

# DTC Logic

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#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226	Closed throttle position learning performance	Closed throttle position learning is not per- formed successfully, repeatedly.	Electric throttle control actuator (TP sensor 1 and 2)
DTC CON	FIRMATION PROC	EDURE	
1.preco	NDITIONING		
		as been previously conducted, always	s perform the following before conduct-
ng the nex 1. Turn ig		wait at least 10 seconds.	
	nition switch ON.	wait at least 10 seconds.	
TESTING	CONDITION:		
Before per	forming the followin	g procedure, confirm that battery v	oltage is more than 10 V at idle.
>:	> GO TO 2.		
2.perfo	RM DTC CONFIRMA	TION PROCEDURE	
	nition switch ON.		
	inition switch OFF and inition switch ON.	wait at least 10 seconds.	
	t steps 2 and 3 for 32 1st trip DTC.	times.	
	<u>TC detected?</u>		
		"Diagnosis Procedure".	
	> INSPECTION END		
-	s Procedure		INFOID:00000009651193
.CHECK	ELECTRIC THROTT	LE CONTROL ACTUATOR VISUALLY	1
	nition switch OFF.	Refer to EM-26, "Exploded View".	
3. Check	if foreign matter is ca	aught between the throttle valve (1) $[$	
	e housing. c throttle control actua	tor (2)	
	hicle front		
	ection result normal? GO TO 2.		
	Remove the foreign	matter and clean the electric throttle	
		de, and then perform throttle valve ing. Refer to <u>EC-136, "Description"</u> .	Marine and
	· · · · · · · · · · · · · · · · · · ·	<u> </u>	JMBIA1132ZZ
		L TTLE CONTROL ACTUATOR	••• ••••••••••••••••••••••••••••••••••

# **2.**REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

- 1. Replace electric throttle control actuator. Refer to EM-28. "Exploded View".
- 2. Go to EC-137, "Description".

>> INSPECTION END

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# P1550 BATTERY CURRENT SENSOR

# DTC Logic

DTC DETECTION LOGIC

#### NOTE:

If DTC P1550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-337, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1550	Battery current sensor circuit range/performance	The output voltage of the battery current sensor remains within the specified range while engine is running.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Battery current sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

TESTING CONDITION:

#### Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

>> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 10 seconds.

### 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Proceed to EC-350, "Diagnosis Procedure".

NO >> INSPECTION END

#### **Diagnosis** Procedure

#### **1.**CHECK BATTERY CURRENT SENSOR POWER SUPPLY

- 1. Disconnect battery current sensor harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between battery current sensor harness connector and ground.

Battery cur	rrent sensor	Ground	Voltage (V)	
Connector	Connector Terminal		voltage (v)	
F76	1	Ground	Approx. 5	

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

2.CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery current sensor		ECM		Continuity
Connector	Terminal	Connector Terminal		Continuity
F76	3	F8	68	Existed

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	harness for sho	rt to ground and	short to pov	ver.			
	n result normal?						А
YES >> GO NO >> Rej		short to around	l or short to i	ower in harne	ess or connectors.	-	
-		-			OR OPEN AND SHC	)RT	EC
T. Check the	continuity betwe	en ballery curre	nt sensor na	imess connec	tor and ECM harnes	ss connector.	
Battery curr	ent sensor	ECM			_		С
Connector	Terminal	Connector	Terminal	Continuity			
F76	4	F8	66	Existed			D
2. Also check	harness for sho	rt to ground and	short to pov	ver.			
	n result normal?	U					Е
YES >> GO	-						
		•	l or short to p	power in harne	ess or connectors.		
	TERY CURREN						F
•	urrent sensor. R	efer to <u>EC-351,</u>	"Componen	t Inspection".			
	n result normal?						G
	eck intermittent i place battery ne			ermittent Incid	<u>lent"</u> .		9
		gaille cable acc	ernory.				
Component	Inspection					INFOID:000000009651196	Н
1.CHECK BAT	TERY CURREN	IT SENSOR					
1. Turn ignitio	n switch OFF.						1
	harness connect		ed.				
	battery negative ber cable betwee		ve terminal a	and body	Th A		
ground.		, ,		,			J
	n switch ON. voltage betwee	n ECM harness	connector	terminals	AA		
	ollowing conditio					E)	К
	ECM				<i>)</i> // /		
Connector	+	_	Voltage (V	)			L
	Terminal	Terminal			"	JPBIA3287ZZ	
F8	66 (Battery current	68	Approx. 2.	5			M
	sensor signal)	(Sensor ground)		-			
Before measu	iring the terminal vo	tage, confirm that th	ne battery is ful	ly charged. Refer	to <u>PG-97, "How to Hand</u>	<u>dle Battery"</u> .	Ν
	n result normal?						IN
	SPECTION END place battery ne		ombly				
NO >> Ke	place ballery rie	yalive caple ass	embry.				0
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# P1551, P1552 BATTERY CURRENT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

# P1551, P1552 BATTERY CURRENT SENSOR

# DTC Logic

#### DTC DETECTION LOGIC

#### NOTE:

# If DTC P1551 or P1552 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-337, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1551	Battery current sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	Harness or connectors     (The sensor circuit is open or shorted.)
P1552	Battery current sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

#### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

# Before performing the following procedure, confirm that battery voltage is more than 8 V with ignition switch ON

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-352, "Diagnosis Procedure".
- NO >> INSPECTION END

#### **Diagnosis** Procedure

### **1.**CHECK BATTERY CURRENT SENSOR POWER SUPPLY

- 1. Disconnect battery current sensor harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between battery current sensor harness connector and ground.

Battery cur	rent sensor	Ground	Voltage (V)
Connector	Connector Terminal		voltage (v)
F76	1	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

# 2.check battery current sensor ground circuit for open and short

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between battery current sensor harness connector and ECM harness connector.

# EC-352

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# P1551, P1552 BATTERY CURRENT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

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Battery cur	rent sensor	EC	M	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	_
F76	3	F8	68	Existed	
Also check	harness for sho	ort to ground ar	nd short to pov	wer.	
	n result normal?	-			
	) TO 3.	abant ta ana	ad an abant ta		
					ss or connectors.
					R OPEN AND SHORT
Check the	continuity betwe	en battery cur	rent sensor ha	arness connect	or and ECM harness connector.
Battery cur	rent sensor	EC	M		-
Connector	Terminal	Connector	Terminal	Continuity	
F76	4	F8	66	Existed	_
-	harness for sho				-
	n result normal?	-			
	) TO 4.	-			
10 >> Re	pair open circuit	, short to grou	nd or short to	power in harne	ss or connectors.
	<b>TERY CURREI</b>	NT SENSOR			
			1, "Componer	nt Inspection".	
neck battery o	current sensor. F	Refer to <u>EC-35</u>	1. "Componer	nt Inspection".	
neck battery o the inspectio ′ES >> Ch	current sensor. F n result normal? eck intermittent	Refer to <u>EC-35</u> incident. Refer	<sup>-</sup> to <u>GI-42, "Int</u>		ent".
neck battery ( the inspectio (ES >> Ch IO >> Re	current sensor. F n result normal? eck intermittent place battery ne	Refer to <u>EC-35</u> incident. Refer	<sup>-</sup> to <u>GI-42, "Int</u>		ent".
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neck battery of the inspectio (ES >> Ch IO >> Re Omponent CHECK BA <sup>-</sup> Turn ignitic Reconnect Disconnec Install jump ground. Turn ignitic	current sensor. F n result normal? eck intermittent place battery ne Inspection TTERY CURREI on switch OFF. harness connect battery negative on switch ON.	Refer to <u>EC-35</u> incident. Refer gative cable a NT SENSOR ctors disconner e cable. en battery nega	r to <u>GI-42, "Int</u> ssembly. cted. ative terminal	and body	_
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neck battery of the inspectio (ES >> Ch IO >> Re Omponent CHECK BA <sup>-</sup> Turn ignitic Reconnect Disconnec Install jump ground. Turn ignitic Check the	current sensor. F n result normal? eck intermittent place battery ne Inspection TTERY CURREN on switch OFF. harness connect battery negativ ber cable betwee on switch ON. voltage betwee ollowing condition	Refer to <u>EC-35</u> incident. Refer gative cable a NT SENSOR ctors disconnet e cable. en battery nega n ECM harnes ons.	r to <u>GI-42, "Int</u> ssembly. cted. ative terminal	and body terminals	
neck battery of the inspectio (ES >> Ch IO >> Re OMPONENT .CHECK BA Turn ignitic Reconnect Disconnect Disconnect Install jump ground. Turn ignitic Check the under the f	current sensor. F n result normal? eck intermittent place battery ne Inspection TTERY CURREN on switch OFF. harness connect battery negative per cable betwee on switch ON. voltage betwee ollowing condition ECM	Refer to <u>EC-35</u> incident. Refer gative cable as NT SENSOR ctors disconner e cable. en battery nega n ECM harnes ons.	to <u>GI-42, "Int</u> ssembly. cted. ative terminal ss connector	and body terminals	
neck battery of the inspectio (ES >> Ch IO >> Re OMPONENT .CHECK BA Turn ignitic Reconnect Disconnect Disconnect Install jump ground. Turn ignitic Check the under the f	current sensor. F n result normal? eck intermittent place battery ne Inspection TTERY CURREN on switch OFF. harness connect battery negativ ber cable betwee on switch ON. voltage betwee ollowing condition ECM + Terminal	Refer to <u>EC-35</u> incident. Refer gative cable a NT SENSOR ctors disconnet e cable. en battery nega n ECM harnes ons.	to <u>GI-42, "Int</u> ssembly. cted. ative terminal ss connector Voltage (V	and body terminals	

# P1553 BATTERY CURRENT SENSOR

# DTC Logic

DTC DETECTION LOGIC

#### NOTE:

If DTC P1553 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-337, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1553	Battery current sensor perfor- mance	The signal voltage transmitted from the sensor to ECM is higher than the amount of the maximum power generation.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Battery current sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

# 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

3. Turn ignition switch OFF and wait at least 10 seconds.

TESTING CONDITION:

#### Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

>> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and wait at least 10 seconds.

### 2. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Proceed to EC-354, "Diagnosis Procedure".

NO >> INSPECTION END

#### **Diagnosis** Procedure

#### **1.**CHECK BATTERY CURRENT SENSOR POWER SUPPLY

- 1. Disconnect battery current sensor harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between battery current sensor harness connector and ground.

Battery cur	rrent sensor	Ground	Voltage (V)
Connector Terminal		Ground	voltage (v)
F76	1	Ground	Approx. 5

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

2.CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery cur	Battery current sensor		ECM		
Connector	Terminal	Connector Terminal		Continuity	
F76	3	F8	68	Existed	

Revision: 2014 May

INFOID:000000009651201

[VQ35DE]

	Р	1553 BATTE		RENT SENS		
< DTC/CIRCUI					[VQ35[	DEJ
		rt to ground and	short to pov	ver.		Δ
Is the inspection YES >> GC						A
		. short to around	or short to r	ower in harnes	s or connectors.	
- '		-			OPEN AND SHORT	EC
					r and ECM harness connector.	
T. Check the	continuity betwe	en ballery curre	ni sensoi na			
Battery curr	ent sensor	ECM				С
Connector	Terminal	Connector	Terminal	Continuity		
F76	4	F8	66	Existed	-	D
2. Also check	harness for sho	rt to ground and	short to pov	ver.		
	n result normal?	•				_
YES >> GO	TO 4.					E
	•	•	or short to p	ower in harnes	s or connectors.	
4.CHECK BAT	TERY CURREN	NT SENSOR				F
Check battery c	urrent sensor. F	efer to <u>EC-351,</u>	"Componen	t Inspection".		
Is the inspection	n result normal?					
		incident. Refer to		ermittent Incider	<u>nt"</u> .	G
		gative cable ass	embly.			
Component	Inspection				INFOID:00000000	9651202
						<u> </u>
	n switch OFF. harness conneo	ctors disconnecte	ed.			
3. Disconnect	battery negative	e cable.				
<ol> <li>Install jump ground.</li> </ol>	er cable betwee	en battery negati	ve terminal a	and body		J
	n switch ON.					
		n ECM harness	connector t	erminals		
under the fo	ollowing condition	ons.				K
	ECM			_		
	+	_	Voltage (V			L
Connector	Terminal	Terminal	Voltago (V	,		
	66				JPBIA3287	
F8	(Battery current	68 (Sensor ground)	Approx. 2.5	5		M
	sensor signal)					
	•	•	ne battery is full	y charged. Refer to	PG-97, "How to Handle Battery".	Ν
Is the inspection						
	SPECTION END	gative cable ass	embly			
	Slace ballery rie	gative cable ass	ernory.			0
						Р
						F

# P1554 BATTERY CURRENT SENSOR

# DTC Logic

#### NOTE:

If DTC P1554 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-337, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1554	Battery current sensor perfor- mance	The output voltage of the battery current sensor is lower than the specified value while the battery voltage is high enough.	<ul> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Battery current sensor</li> </ul>

#### DTC CONFIRMATION PROCEDURE

### **1.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-356. "Component Function Check".

#### NOTE:

Use component function check to check the overall function of the battery current sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EC-357, "Diagnosis Procedure".

#### Component Function Check

INFOID:000000009651204

# 1.PRECONDITIONING

#### **TESTING CONDITION:**

- Before performing the following procedure, confirm that battery voltage is more than 12.8 V at idle.
- Before performing the following procedure, confirm that all load switches and A/C switch are turned OFF.

>> GO TO 2.

2. PERFORM COMPONENT FUNCTION CHECK

#### With CONSULT

- 1. Start engine and let it idle.
- 2. Select "BAT CUR SEN" in "DATA MONITOR" mode with CONSULT.
- 3. Check "BAT CUR SEN" indication for 10 seconds.

# "BAT CUR SEN" should be above 2,300mV at least once.

#### Without CONSULT

- 1. Start engine and let it idle.
- 2. Check voltage between ECM harness connector terminals under the following conditions.

	ECM		
Connector	+ – Volt		Voltage (V)
Connector	Terminal	Terminal	
F8	66 (Battery current sensor signal)	68 (Sensor ground)	Above 2.3 at least once

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to <u>EC-357</u>, "Diagnosis Procedure"

# P1554 BATTERY CURRENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

# Diagnosis Procedure

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# 1.CHECK BATTERY CURRENT SENSOR POWER SUPPLY

- 1. Disconnect battery current sensor harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between battery current sensor harness connector and ground.

Battery cur	rent sensor	Ground	Voltago (V/)
Connector	Connector Terminal		Voltage (V)
F76	1	Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

2.CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery cur	Battery current sensor		ECM		
Connector	Terminal	Connector Terminal		- Continuity	
F76	3	F8	68	Existed	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

# ${f 3.}$ CHECK BATTERY CURRENT SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery cu	Battery current sensor		ECM		
Connector	Terminal	Connector	Terminal	Continuity	
F76	4	F8	66	Existed	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**4.**CHECK BATTERY CURRENT SENSOR

Check I	pattery current sensor. Refer to EC-357, "Component Inspection".	
Is the in	spection result normal?	
YES	>> Check intermittent incident. Refer to GI-42 "Intermittent Incident"	

NO >> Replace battery negative cable assembly.

#### Component Inspection

**1.**CHECK BATTERY CURRENT SENSOR

1. Turn ignition switch OFF.

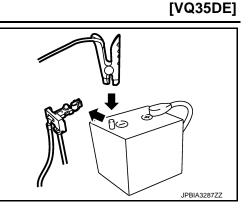
2. Reconnect harness connectors disconnected.

# P1554 BATTERY CURRENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

- 3. Disconnect battery negative cable.
- 4. Install jumper cable between battery negative terminal and body ground.
- 5. Turn ignition switch ON.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.

Connector	+	_	Voltage (V)	
Connector	Terminal	Terminal		
F8	66 (Battery current sensor signal)	68 (Sensor ground)	Approx. 2.5	



Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-97, "How to Handle Battery".

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace battery negative cable assembly.

# P1556, P1557 BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

# P1556, P1557 BATTERY TEMPERATURE SENSOR

# **DTC** Logic

INFOID:000000009651207

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#### DTC DETECTION LOGIC

DTC No.		diagnosis name iagnosis content)	DTC detecting condition	Possible cause
P1556	BAT TMP SE (Battery tem cuit low input	perature sensor cir-	Signal voltage from Battery temperature sensor remains 0.16V or less for 5 seconds or more.	Harness or connectors     [Battery current sensor (Battery tem- perature sensor) circuit is shorted.]
P1557	BAT TMP SI (Battery tem cuit high inp	perature sensor cir-	Signal voltage from Battery temperature sensor remains 4.84V or more for 5 sec- onds or more.	<ul> <li>[Camshaft position sensor (PHESE) circuit is open or shorted.]</li> <li>(Accelerator pedal position sensor 2 circuit is shorted.)</li> <li>(Throttle position sensor circuit is shorted.)</li> <li>Battery current sensor (Battery tem- perature sensor)</li> <li>Camshaft position sensor (PHESE)</li> <li>Accelerator pedal position sensor</li> <li>Throttle position sensor</li> </ul>
			E	
-	NDITIONING		at least 10 seconds.	
>>	GO TO 2.	following pro	cedure, confirm that battery volta	ge is 10 V or more at idle.
<ol> <li>Start th</li> <li>Check</li> </ol>	e engine and 1st trip DTC	d let it idle at lea	ast 10 seconds.	
YES >>	TC detected Proceed to INSPECTIC	EC-359, "Diagr	osis Procedure".	
Diagnosis	s Procedu	ire		INFOID:00000009651208
-				
	BATTERY T	EMPERATURE	SENSOR INPUT SIGNAL CIRCUI	T-I
1. Disconi 2. Turn igi	nect battery nition switch	current sensor ON.	SENSOR INPUT SIGNAL CIRCUI narness connector. current sensor harness connector a	
1. CHECK 1. Disconi 2. Turn igi 3. Check to Battery cu	nect battery nition switch the voltage t	current sensor ON. between battery	narness connector. current sensor harness connector a	
1. CHECK 1. Disconi 2. Turn igi 3. Check	nect battery nition switch the voltage b	Current sensor ON. Detween battery Ground Vo	narness connector.	

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 2.

# **2.**CHECK BATTERY TEMPERATURE SENSOR INPUT SIGNAL CIRCUIT-II

- 1. Turn ignition switch ON.
- 2. Disconnect ECM harness connector.

# P1556, P1557 BATTERY TEMPERATURE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery curr	ent sensor	EC	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F76	2	F8	67	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit.

 ${f 3.}$ CHECK SENSOR POWER SUPPLY CIRCUIT

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor			
Connector	Terminal	Name	Connector	Terminal	
	75	Battery current sensor	F76		
F8	83	CMP sensor (PHESE) bank 1	F26	1	
87		CMP sensor (PHESE) bank 2	F69		
F7	24	TP sensor	F29	1	
E16	99	APP sensor	E110	4	

Is the inspection result normal?

NO >> Repair short to ground or short to power in harness or connectors.

### **4.**CHECK COMPONENTS

#### Check the following.

- Camshaft position sensor (PHESE) (Refer to <u>EC-276, "Component Inspection"</u>.)
- Battery current sensor (Refer to <u>EC-351, "Component Inspection"</u>.)
- Throttle position sensor (Refer to <u>EC-198, "Component Inspection"</u>.)
- Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace malfunctioning component.

#### **5.**CHECK APP SENSOR

Check APP sensor. Refer to EC-405, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace accelerator pedal assembly. Refer to <u>ACC-3</u>, "Exploded View".

 ${f 6}.$ CHECK BATTERY TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

#### 1. Turn ignition switch OFF.

- 2. Disconnect ECM harness connector.
- 3. Check the continuity between battery current sensor harness connector and ECM harness connector.

Battery curr	ent sensor	EC	Continuity		
Connector	Terminal	Connector	Terminal	Continuity	
F76	3	F8	68	Existed	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

7.CHECK BATTERY TEMPERATURE SENSOR

Check battery temperature sensor. Refer to EC-361, "Component Inspection (Battery Temperature Sensor)".

# P1556, P1557 BATTERY TEMPERATURE SENSOR

<b>P</b> 1	1556, P1557 BAT	TERY TEMPERATURE SENS	OR	
< DTC/CIRCUIT DIAG	SNOSIS >		[VQ35DE]	
Is the inspection result	A			
	YES >> GO TO 8. NO >> Replace battery negative cable assembly.			
8.CHECK INTERMIT		ssembly.		
Check intermittent incid		atormittant Incident"	EC	
	denii. Keiel lo <u>01-42, 11</u>	<u>itermittent incident</u> .		
>> INSPECTI	ON END		С	
Component Inspe	ction (Battery Terr	perature Sensor)	INFOID:00000009651209	
<b>1.</b> CHECK BATTERY		SOR	D	
<ol> <li>Turn ignition switch</li> <li>Disconnect battery</li> </ol>				
		rent sensor connector terminals.	E	
	rent sensor		F	
+	-	Resistance		
lerr	ninal	continuity with the resis-		
2	3	tance value $100 \Omega$ or more	G	
Is the inspection result	normal?			
YES >> INSPECTI		a a small i	Н	
NO >> Replace ba	attery negative cable as	ssembly.		
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## P1564 ASCD STEERING SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

# P1564 ASCD STEERING SWITCH

## DTC Logic

DTC DETECTION LOGIC

#### NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-335, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1564	ASCD steering switch	<ul> <li>An excessively high voltage signal from the ASCD steering switch is sent to ECM.</li> <li>ECM detects that input signal from the ASCD steering switch is out of the specified range.</li> <li>ECM detects that the ASCD steering switch is stuck ON.</li> </ul>	<ul> <li>Harness or connectors (The switch circuit is open or shorted.)</li> <li>ASCD steering switch</li> <li>ECM</li> </ul>

### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 3. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 5. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 6. Check DTC.

#### Is DTC detected?

YES >> Proceed to EC-362, "Diagnosis Procedure".

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000009651211

### 1. CHECK ASCD STEERING SWITCH CIRCUIT

#### With CONSULT

- 1. Turn ignition switch ON.
- 2. Select "MAIN SW", "CANCEL SW", "RESUME/ACC SW" and "SET SW" in "DATA MONITOR" mode with CONSULT.
- 3. Check each item indication under the following conditions.

Monitor item	Condition		Indication
MAIN SW	MAIN switch	Pressed	ON
MAIN SW	MAIN SWICH	Released	OFF
CANCEL SW	CANCEL switch	Pressed	ON
CANCEL SW	CANCEL SWICH	Released	OFF

INFOID:000000009651210

# P1564 ASCD STEERING SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

Monitor item	Condition		Indication
RESUME/ACC SW	RESUME/ACCEL-	Pressed	ON
RESUME/ACC SW	ERATE switch	Released	OFF
SET SW	SET/COAST switch	Pressed	ON
SET SW	SE 1/COAST SWITCH	Released	OFF

#### **Without CONSULT**

1. Turn ignition switch ON.

2. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM			
Con-	+ –		Condition	Voltage (V)
nector	Terminal	Terminal		
101 E16 (ASCD steering signal)	101	SCD steering switch (ASCD steering switch	MAIN switch: Pressed	Approx. 0
			CANCEL switch: Pressed	Approx. 1
	(ASCD steering switch		SET/COAST switch: Pressed	Approx. 2
	signal)	ground)	RESUME/ACCELERATE switch: Pressed	Approx. 3
			All ASCD steering switches: Released	Approx. 4

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

NO >> GO TO 2.

2. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector M303.

3. Disconnect combination switch harness connector.

4. Check the continuity between combination switch and ECM harness connector.

Combination switch	EC	CM	Continuity
Terminal	Connector	Terminal	Continuity
16	E16	108	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

1. Check the continuity between combination switch and ECM harness connector.

Combination switch	EC	CM	Continuity
Terminal	Connector	Terminal	Continuity
13	E16	101	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

**4.**CHECK ASCD STEERING SWITCH

Check ASCD steering switch. Refer to EC-364, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42. "Intermittent Incident".

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# P1564 ASCD STEERING SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Replace ASCD steering switch. Refer to <u>EC-15. "ENGINE CONTROL SYSTEM : Component</u> <u>Parts Location"</u>.

# Component Inspection

INFOID:000000009651212

[VQ35DE]

# 1. CHECK ASCD STEERING SWITCH

- 1. Turn ignition switch OFF.
- 2. Disconnect combination switch (spiral cable) harness connector.
- 3. Check resistance between combination switch harness connector terminals as per the following.

Combination switch		Condition	Resistance ( $\Omega$ )	
Connector	Terminals	Condition	1(03)3(01)00 (22)	
		MAIN switch: Pressed	Approx. 0	
		CANCEL switch: Pressed	Approx. 250	
M33 13 and 16		SET/COAST switch: Pressed	Approx. 660	
		RESUME/ACCELERATE switch: Pressed	Approx. 1,480	
		All ASCD steering switches: Released	Approx. 4,000	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD steering switch

#### < DTC/CIRCUIT DIAGNOSIS >

## P1572 ASCD BRAKE SWITCH

### Description

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal). Refer to <u>EC-44, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description"</u> for the ASCD function.

DTC Logic

DTC DETECTION LOGIC

#### NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-335, "DTC Logic"</u>.
- This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
		A) When the vehicle speed is above 30 km/ (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are set to the ECM at the same time.	<ul> <li>(The stop lamp switch circuit is shorted.)</li> <li>Harness or connectors (The ASCD brake switch circuit is shorted.)</li> </ul>
P1572	ASCD brake switch	ASCD brake switch signal is not sent to B) ECM for extremely long time while the ve hicle is driving.	<ul> <li>Stop lamp switch</li> <li>ASCD brake switch</li> <li>Incorrect stop lamp switch installation</li> <li>Incorrect ASCD brake switch installation</li> <li>ECM</li> </ul>

#### DTC CONFIRMATION PROCEDURE

### **1.**INSPECTION START

Do you have CONSULT?

Do you have CONSULT?

YES >> GO TO 2. NO >> GO TO 5.

2. PRECONDITIONING

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

#### NOTE:

Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

#### >> GO TO 3.

# $\mathbf{3}.$ Perform dtc confirmation procedure for malfunction A-I

- 1. Start engine (VDC switch OFF).
- 2. Select "DATA MONITOR" mode with CONSULT.
- 3. Press MAIN switch and make sure that CRUISE lamp lights up.

4. Drive the vehicle for at least 5 consecutive seconds under the following conditions. CAUTION:

### Always drive vehicle at a safe speed.

NOTE:

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.

## EC-365

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VHCL SPEED SE More than 30 km/h (19 mph)	Colostor lover	Cuitable position
	VHCL SPEED SE	More than 30 km/h (19 mph)

Selector lever Suitable position

#### 5. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to <u>EC-367</u>, "Diagnosis Procedure". NO >> GO TO 4.

NO >> GO TO 4

**4.**PERFORM DTC CONFIRMATION PROCEDURE A-II

1. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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.

VHCL SPEED SE	More than 30 km/h (19 mph)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed.

2. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Go to EC-367, "Diagnosis Procedure".

NO >> INSPECTION END

**5.**PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EC-366, "Component Function Check".

#### NOTE:

Use component function check to check the overall function of ASCD brake switch. During this check, a DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to EC-367, "Diagnosis Procedure".

## **Component Function Check**

INFOID:000000009651215

# 1.PERFORM COMPONENT FUNCTION CHECK

1. Turn ignition switch ON.

2. Check the voltage between ECM harness connectors.

	ECM					
Con-	+	-	Condition		Voltage	
nector	Terminal	Terminal				
	126 (ASCD			Slightly depressed	Approx. 0 V	
E16	brake switch signal)	128	Brake pedal	Fully re- leased	Battery voltage	

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. PERFORM COMPONENT FUNCTION CHECK-II

Check the voltage between ECM harness connectors.

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	ECM								
Con-	+	-	Conditi	on	Volta	ige			
nector	Terminal	Terminal							
540	122 (Stop	100	5	Slightly depressed	Battery	/oltage			
E16	lamp switch signal)	128	Brake pedal	Fully re- leased	Approx	c. 0 V			
s the ir	nspection	result nor	mal?						
YES NO		PECTION to <u>EC-367</u>	END , "Diagnosis Proc	cedure".					
Diagn	osis Pr	ocedure	;					INFOID:00000000965121	6
.CHE	CK OVE	RALL FU	NCTION-I						_
	h CONSL								
		switch Ol	N. in "DATA MONIT	OR" mode v		ISUIT			
			indication under						
				·	-				
Maria			0			Indication	-		
wonit	or item		Condition		Slightly depressed OFF				
		Deales a sidel	Condition		pressed	OFF	_		
BRAKE <b>Witł</b> . Tui	SW1	switch O		Slightly dep Fully release	sed	OFF ON	- - -		
BRAKE	SW1 nout COI rn ignitior eck the v	NSULT	N.	Slightly dep Fully release	sed		- - •		
BRAKE	SW1 nout COI rn ignitior eck the v ECM	NSULT n switch Ol oltage bet	N. ween ECM harne	Slightly dep Fully releas	ors.	ON	-		
BRAKE With . Tu 2. Ch Con-	SW1 nout COI rn ignitior eck the v ECM +	NSULT o switch Ol oltage bet	N.	Slightly dep Fully releas	sed	ON	- - -		
BRAKE	ESW1 Frout COI rn ignitior eck the v ECM + Terminal	NSULT of switch Ol oltage bet	N. ween ECM harne	Slightly dep Fully releases connector	ors.	ON	-		
BRAKE With . Tu 2. Ch Con-	ESW1 Frout COI rn ignitior eck the v ECM + Terminal 126	NSULT o switch Ol oltage bet	N. ween ECM harne	Slightly dep Fully releases ess connector	ors.	ON ge	-		
BRAKE With . Tu 2. Ch Con-	ESW1 Frout COI rn ignition eck the v ECM + Terminal 126 (ASCD brake	NSULT o switch Ol oltage bet	N. ween ECM harne	Slightly dep Fully release ess connector on Slightly depressed	ors. Volta	ON ge	-		
BRAKE With . Tur 2. Ch Con- nector	ESW1 Frout COI rn ignition eck the v ECM + Terminal 126 (ASCD brake switch	NSULT o switch Ol oltage bet	N. ween ECM harne	Slightly dep Fully releases ess connector	ors. Volta	ON ge . 0 V	-		
BRAKE With . Tur 2. Ch Con- nector E16	ESW1 Frout COI rn ignition eck the v ECM + Terminal 126 (ASCD brake switch signal)	NSULT o switch Ol oltage bet Terminal 128	N. ween ECM harne Conditio Brake pedal	Slightly dep Fully releases connector Slightly depressed Fully re-	ors. Volta	ON ge . 0 V	-		
BRAKE With Unit Office Con- nector E16	ESW1 Frout COI rn ignition eck the v ECM + Terminal 126 (ASCD brake switch signal)	NSULT n switch Ol oltage bet Terminal 128 result nor	N. ween ECM harne Conditio Brake pedal	Slightly dep Fully releases connector Slightly depressed Fully re-	ors. Volta	ON ge . 0 V	-		
BRAKE With . Tur 2. Ch Con- nector E16	ESW1 Frout COI rn ignition eck the v ECM + Terminal 126 (ASCD brake switch signal)	NSULT n switch Ol oltage bet Terminal 128 result nor TO 2.	N. ween ECM harne Conditio Brake pedal	Slightly dep Fully releases connector Slightly depressed Fully re-	ors. Volta	ON ge . 0 V	-		
BRAKE With . Tur 2. Ch Con- nector E16 <u>Sthe ir</u> YES NO	ESW1 Frout COI rn ignition eck the v ECM + Terminal 126 (ASCD brake switch signal) DSpection >> GO >> GO	NSULT n switch Ol oltage bet Terminal 128 result nor TO 2. TO 3.	N. ween ECM harne Condition Brake pedal	Slightly dep Fully releases connector Slightly depressed Fully re-	ors. Volta	ON ge . 0 V	-		
BRAKE Witt . Tur 2. Ch Con- nector E16 Sthe ir YES NO 2.CHE	SW1 Frout COI rn ignition eck the v ECM + Terminal 126 (ASCD brake switch signal) DSpection >> GO >> GO ECK OVE	NSULT n switch Ol oltage bet Terminal 128 result nor TO 2. TO 3. RALL FUI	N. ween ECM harne Conditio Brake pedal	Slightly dep Fully releases connector Slightly depressed Fully re-	ors. Volta	ON ge . 0 V	-		
BRAKE With . Tur 2. Ch Con- nector E16 Sthe ir YES NO 2.CHE With	SW1 Frout COI rn ignition eck the v ECM + Terminal 126 (ASCD brake switch signal) DSpection >> GO >> GO ECK OVE n CONSL	NSULT n switch Ol oltage bet Terminal 128 result nor TO 2. TO 2. TO 3. RALL FUR JLT	N. ween ECM harne Condition Brake pedal	Slightly dep Fully released Slightly depressed Fully re- leased	Sed DrS. Volta Approx Battery v	ON ge . 0 V	-		
BRAKE With . Tur 2. Ch Con- nector E16 <u>Sthe ir</u> YES NO 2.CHE Direck	SW1 Frout COI rn ignition eck the v ECM + Terminal 126 (ASCD brake switch signal) DSpection >> GO >> GO ECK OVE m CONSL "BRAKE	NSULT n switch Ol oltage bet Terminal 128 result nor TO 2. TO 2. TO 3. RALL FUR JLT	N. ween ECM harne Condition Brake pedal mal? NCTION-II cation in "DATA N	Slightly dep Fully released Slightly depressed Fully re- leased	Sed DrS. Volta Approx Battery v	ON ge . 0 V oltage	- - -		
BRAKE With . Tur 2. Ch Con- nector E16 <u>Sthe ir</u> YES NO 2.CHE Direck	SW1 Frout COI rn ignition eck the v ECM + Terminal 126 (ASCD brake switch signal) DSpection >> GO >> GO ECK OVE n CONSL	NSULT n switch Ol oltage bet Terminal 128 result nor TO 2. TO 2. TO 3. RALL FUR JLT	N. ween ECM harne Condition Brake pedal <u>mal?</u>	Slightly dep Fully release ess connector on Slightly depressed Fully re- leased	ors. Volta Approx Battery v	ON ge . 0 V oltage Indication	- - - -		
BRAKE With . Tur 2. Ch Con- nector E16 <u>Sthe ir</u> YES NO 2.CHE Direck	SW1 Frout COI rn ignition eck the v ECM + Terminal 126 (ASCD brake switch signal) DSpection >> GO >> GO ECK OVE "BRAKE tor item	NSULT n switch Ol oltage bet Terminal 128 result nor TO 2. TO 2. TO 3. RALL FUR JLT	N. ween ECM harne Condition Brake pedal mal? NCTION-II cation in "DATA N Condition	Slightly dep Fully released Slightly depressed Fully re- leased	sed Ors. Volta Approx Battery v node.	ON ge . 0 V oltage			

#### < DTC/CIRCUIT DIAGNOSIS >

ECM					
Con-	+	_	Condition		Voltage
nector	Terminal	Terminal			
	122 (Stop			Slightly depressed	Battery voltage
E16	lamp switch signal)	128	Brake pedal	Fully re- leased	Approx. 0 V

Is the inspection result normal?

YES >> GO TO 16.

NO >> GO TO 7.

**3.**CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD bra	ake switch	Ground	Voltage
Connector	Terminal	Cround	voliage
E109	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

**4.**DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector E103
- 10 A fuse (No. 3)
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit, short to ground or short to power in harness or connectors.

# 5. Check ascd brake switch input signal circuit for open and short

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.

3. Check the continuity between ASCD brake switch harness connector and ECM harness connector.

ASCD br	ake switch	E	CM	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E109	2	E16	126	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**6.**CHECK ASCD BRAKE SWITCH

Refer to EC-370. "Component Inspection (ASCD Brake Switch)".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace ASCD brake switch. Refer to <u>BR-18</u>, "Exploded View".

7. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

#### < DTC/CIRCUIT DIAGNOSIS >

2.

Disconnect stop lamp switch harness connector. Check the voltage between stop lamp switch harness connector and ground. 3.

	p switch	h				
Connector	Te	rminal	– Grour		/oltage	EC
E115		1	Grour	nd Batte	ery voltage	
ls the inspection YES >> GO NO >> GO	TO 9. TO 8.					С
<b>8.</b> DETECT MA	LFUN	CTION	NG PART	-		D
Check the follov • Fuse block (J/ • 10 A fuse (No • Harness for op	B) cor 7)			op lamp switch	and battery	E
>> Rep 9.снеск stc	•			-	ort to power in harness or connectors.	F
	stop la	amp rela		s connector. lamp relay har	ness connector and ground.	G
Stop lamp rela	ıy	0		<u> </u>		Н
Connector Ter	minal	Ground	d Contin	uity		
E15	1	Ground	d Existe	ed		
10.CHECK ST 1. Connect sto 2. Turn ignition	OP L	AMP S\ p switch ch ON.	WITCH IN harness	PUT SIGNAL (	short to power in harness or connectors. CIRCUIT	J
Stop lamp rela				1 59 100 10		K
Connector Terr	v				T	K
		Ground	C	Condition	Voltage (V)	K
		Ground	Brake		Voltage (V) Battery voltage	L M
	ninal			Condition		L
	resul TO 12	Ground <u>t norma</u> 2. I.	Brake pedal	Condition Slightly de- pressed Fully released	Battery voltage	L M
E15 Is the inspection YES >> GO NO >> GO 11.DETECT M Check the follow	resuli resuli TO 12 TO 11 IALFU ving.	Ground <u>t norma</u> 2. I. JNCTIO	Brake pedal <u>I?</u> NING PAF etween st	Condition Slightly de- pressed Fully released	Battery voltage	L M N
E15 Is the inspection YES >> GO NO >> GO 11.DETECT M Check the follow Harness for op Is the inspection YES >> GO	result TO 12 TO 12 TO 11 IALFU ing. pen or result TO 12 air op	Ground <u>t norma</u> 2. INCTIO short b <u>t norma</u> 4. pen circu	Brake pedal <u>I?</u> NING PAF etween st <u>I?</u> uit or short	Condition Slightly de- pressed Fully released RT cop lamp switch	Battery voltage Approx. 0	L

А

#### < DTC/CIRCUIT DIAGNOSIS >

Stop lar	np relay	Ground	Voltage (V)
Connector	Terminal	Giouna	voltage (v)
E15	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

# 13. CHECK STOP LAMP RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp relay harness connector.
- 3. Check the continuity between stop lamp relay harness connector and ECM harness connector.

EC	М	Stop larr	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E16	122	E15	3	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 15.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

**14.**CHECK STOP LAMP SWITCH

Refer to EC-371. "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace stop lamp switch.

15. CHECK STOP LAMP RELAY

Refer to EC-371, "Component Inspection (Stop Lamp Relay)".

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace stop lamp relay.

16. CHECK INTERMITTENT INCIDENT

Refer to GI-42, "Intermittent Incident".

#### >> INSPECTION END

Component Inspection (ASCD Brake Switch)

## **1.**CHECK ASCD BRAKE SWITCH-I

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- 3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals		Condition	Continuity
1 and 2	Brake pedal	Fully released	Existed
	Diake pedal	Slightly depressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK ASCD BRAKE SWITCH-II

1. Adjust ASCD brake switch installation. Refer to BR-7, "Inspection and Adjustment".

#### EC-370

INFOID:000000009651217

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Terminals		Condition	Continuity	
		Fully released	Existed	
1 and 2	Brake pedal	Slightly depressed	Not existed	
the inspect	tion result norr	nal?		
-	NSPECTION I			
NO >> F	Replace ASCD	brake switch. Refer to B	R-18, "Explode	d View".
omponer	nt Inspectio	n (Stop Lamp Switc	h)	INFOID:00000000965121
.CHECK S	TOP LAMP S	WITCH-I		
Turn igni	tion switch OF	F.		
Disconne	ect stop lamp s	witch harness connector.		
Check ha	arness continu	ity between stop lamp sw	vitch terminals	under the following conditions.
Terminals		Condition	Continuity	_
		Fully released	Not existed	_
1 and 2	Brake pedal	Slightly depressed	Existed	
the inspect	ion result norr	nal?		_
	NSPECTION I	END		
NO >> (	GO TO 2.			
NO >> (				
NO >> 0 .CHECK S Adjust st	GO TO 2. TOP LAMP SV	NITCH-II n installation. Refer to <u>BR</u>		
NO >> 0 .CHECK S Adjust st	GO TO 2. TOP LAMP SV	NITCH-II n installation. Refer to <u>BR</u>		and Adjustment". under the following conditions.
NO >> ( .CHECK S Adjust st Check ha	GO TO 2. TOP LAMP SV	NITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw	ritch terminals	
NO >> ( CHECK S Adjust st Check ha Terminals	GO TO 2. TOP LAMP SN op lamp switch arness continu	WITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw Condition		
NO >> ( CHECK S Adjust st Check ha	GO TO 2. TOP LAMP SV	WITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw Condition Fully released	Continuity	
NO >> ( CHECK S Adjust st Check ha Terminals 1 and 2	GO TO 2. TOP LAMP SN op lamp switch arness continu Brake pedal	WITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw Condition Fully released Slightly depressed	Continuity	
NO >> ( CHECK S Adjust st Check ha Terminals 1 and 2 the inspect (ES >> I	GO TO 2. TOP LAMP SN op lamp switch arness continu Brake pedal ion result norr NSPECTION I	WITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw Condition Fully released Slightly depressed nal? END	Vitch terminals Continuity Not existed Existed	under the following conditions.
NO >> ( CHECK S Adjust st Check ha Terminals 1 and 2 the inspect (ES >> I	GO TO 2. TOP LAMP SN op lamp switch arness continu Brake pedal ion result norr NSPECTION I	WITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw Condition Fully released Slightly depressed nal?	Vitch terminals Continuity Not existed Existed	under the following conditions.
NO >> ( CHECK S Adjust st Check ha Terminals 1 and 2 the inspect (ES >> I NO >> F	GO TO 2. TOP LAMP S op lamp switch arness continu Brake pedal ion result norr NSPECTION I Replace stop la	WITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw Condition Fully released Slightly depressed nal? END	Continuity Not existed Existed	under the following conditions.
NO >> ( CHECK S Adjust st Check ha Terminals 1 and 2 the inspect (ES >> I NO >> F Omponer	GO TO 2. TOP LAMP SV op lamp switch arness continu Brake pedal ion result norr NSPECTION I Replace stop la nt Inspectio	WITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw <u>Condition</u> Fully released Slightly depressed nal? END amp switch. Refer to <u>BR-</u>	Continuity Not existed Existed	under the following conditions. 
NO >> ( CHECK S Adjust st Check ha Terminals 1 and 2 the inspect YES >> I NO >> F OMPONER . STOP LA	GO TO 2. TOP LAMP SN op lamp switch arness continu Brake pedal ion result norr NSPECTION I Replace stop la nt Inspectio MP RELAY	WITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw Condition Fully released Slightly depressed nal? END amp switch. Refer to <u>BR-1</u> n (Stop Lamp Relay	Continuity Not existed Existed	under the following conditions. 
NO >> ( CHECK S Adjust st Check ha Terminals 1 and 2 the inspect (ES >> I NO >> F OMPONER . STOP LA Turn igni	GO TO 2. TOP LAMP SV op lamp switch arness continu Brake pedal ion result norr NSPECTION I Replace stop la nt Inspectio MP RELAY tion switch OF	WITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw Condition Fully released Slightly depressed nal? END amp switch. Refer to <u>BR-1</u> n (Stop Lamp Relay F.	Continuity Not existed Existed	under the following conditions. 
NO >> ( CHECK S Adjust st Check ha Terminals 1 and 2 the inspect (ES >> I NO >> F OMPONER . STOP LA Turn igni Remove	GO TO 2. TOP LAMP SV op lamp switch arness continu Brake pedal ion result norr NSPECTION I Replace stop la nt Inspectio MP RELAY tion switch OF stop lamp rela	WITCH-II n installation. Refer to BR ity between stop lamp sw Condition Fully released Slightly depressed nal? END amp switch. Refer to BR n (Stop Lamp Relay F.	Continuity Not existed Existed	under the following conditions. 
NO >> ( CHECK S Adjust st Check ha Terminals 1 and 2 the inspect (ES >> I NO >> F OMPONER . STOP LA Turn igni Remove	GO TO 2. TOP LAMP SV op lamp switch arness continu Brake pedal ion result norr NSPECTION I Replace stop la nt Inspectio MP RELAY tion switch OF stop lamp rela	WITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw Condition Fully released Slightly depressed nal? END amp switch. Refer to <u>BR-1</u> n (Stop Lamp Relay F.	Continuity Not existed Existed	under the following conditions. 
NO >> ( .CHECK S Adjust st Check ha Terminals 1 and 2 the inspect YES >> I NO >> F OMPONER . STOP LA Turn igni Remove Check co	GO TO 2. TOP LAMP SV op lamp switch arness continu Brake pedal ion result norr NSPECTION I Replace stop la nt Inspectio MP RELAY tion switch OF stop lamp rela	WITCH-II n installation. Refer to <u>BR</u> ity between stop lamp sw Condition Fully released Slightly depressed nal? END amp switch. Refer to <u>BR-1</u> n (Stop Lamp Relay F. by een stop lamp relay termin	Continuity Not existed Existed	under the following conditions. 
NO >> ( .CHECK S Adjust st Check ha Terminals 1 and 2 the inspect (ES >> I NO >> F OMPONER . STOP LA Turn igni Remove Check co Stop	GO TO 2. TOP LAMP SV op lamp switch arness continu Brake pedal ion result norr NSPECTION I Replace stop la nt Inspectio MP RELAY tion switch OF stop lamp rela	WITCH-II n installation. Refer to BR ity between stop lamp sw Condition Fully released Slightly depressed nal? END amp switch. Refer to BR n (Stop Lamp Relay F.	Continuity Not existed Existed	under the following conditions. 
NO >> ( .CHECK S Adjust st Check ha Terminals 1 and 2 the inspect (ES >> I NO >> F OMPONER . STOP LA Turn igni Remove Check co Stop	GO TO 2. TOP LAMP SN op lamp switch arness continu Brake pedal ion result norr NSPECTION I Replace stop la nt Inspectio MP RELAY tion switch OF stop lamp relay	VITCH-II  n installation. Refer to BR ity between stop lamp sw Condition Fully released Slightly depressed nal? END amp switch. Refer to BR n (Stop Lamp Relay F. been stop lamp relay termin Conditions 12 V direct current supply	Continuity Not existed Existed 18, "Exploded V () nals under the Continuity	under the following conditions. 
NO >> ( .CHECK S Adjust st Check ha Terminals 1 and 2 the inspect (ES >> I NO >> F OMPONER . STOP LA Turn igni Remove Check co Stop	GO TO 2. TOP LAMP SN op lamp switch arness continu Brake pedal ion result norr NSPECTION I Replace stop la nt Inspectio MP RELAY tion switch OF stop lamp relay	VITCH-II  n installation. Refer to BR ity between stop lamp sw Condition Fully released Slightly depressed nal? END amp switch. Refer to BR n (Stop Lamp Relay F. been stop lamp relay termin Conditions	Continuity Not existed Existed	under the following conditions. 

# P1574 ASCD VEHICLE SPEED SENSOR

## Description

The ECM receives two vehicle speed signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to <u>EC-44, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description"</u> for ASCD functions.

## DTC Logic

INFOID:000000009651221

### DTC DETECTION LOGIC

NOTE:

- If DTC P1574 is displayed with DTC UXXXX, first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to <u>EC-325, "DTC Logic"</u>.
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-335, "DTC Logic"</u>.
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-336, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1574	ASCD vehicle speed sensor	The difference the between two vehicle speed signals is out of the specified range.	<ul> <li>Harness or connectors (The CAN communication line is open or shorted.)</li> <li>Combination meter</li> <li>ABS actuator and electric unit (control unit)</li> <li>Wheel sensor</li> <li>TCM</li> <li>ECM</li> </ul>

## DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine (VDC switch OFF).
- 2. Drive the vehicle at more than 40 km/h (25 MPH). CAUTION:

#### Always drive vehicle at a safe speed. NOTE:

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.

3. Check DTC.

#### Is DTC detected?

YES >> Proceed to <u>EC-372, "Diagnosis Procedure"</u>. NO >> INSPECTION END

## **Diagnosis** Procedure

**1.**CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-35, "CONSULT Function".

INFOID:000000009651222

INFOID:000000009651220

# P1574 ASCD VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
Is the inspection result normal?	A
YES >> GO TO 2. NO >> Perform trouble shooting relevant to DTC indicated.	~
2. CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	
Check DTC with ABS actuator and electric unit (control unit). Refer to <u>BRC-30</u> , "CONSULT Fund	EC
Is the inspection result normal?	<u></u>
YES >> GO TO 3.	С
NO >> Repair or replace malfunctioning part.	0
<b>3.</b> CHECK COMBINATION METER FUNCTION	
Check combination meter function. Refer to MWI-35, "CONSULT Function".	D
>> INSPECTION END	E
	-
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## P1650 STARTER MOTOR RELAY 2

< DTC/CIRCUIT DIAGNOSIS >

# P1650 STARTER MOTOR RELAY 2

## Description

INFOID:000000009651223

ECM controls ON/OFF state of the starter relay, according to the engine and vehicle condition. Models with no Intelligent Key System transmit a control signal directly to IPDM E/R. On the other hand, models with the Intelligent Key System transmit a control signal to IPDM E/R by way of BCM via CAN communication.

Under normal conditions, ECM controls and maintains the starter relay in OFF state during engine running or "D" position.

When detecting a decrease in engine speed due to rapid deceleration or heavy load condition, ECM controls and reactivates the starter relay.

IPDM E/R detects a control state of starter relay and starter control relay and transmits a feedback signal to ECM via CAN communication.

## **DTC Logic**

INFOID:000000009651224

#### DTC DETECTION LOGIC

#### NOTE:

- If DTC P1650 is displayed with DTC U1001, perform the trouble diagnosis for DTC U1001. Refer to <u>EC-168</u>, <u>"DTC Logic"</u>.
- If DTC P1650 is displayed with DTC P0607, perform the trouble diagnosis for DTC P0607. Refer to <u>EC-335</u>, <u>"DTC Logic"</u>.
- If DTC P1650 is displayed with B209F or B20A0 of IPDM E/R, perform the trouble diagnosis for B209F or B20A0. Refer to <u>SEC-104, "DTC Logic"</u> or <u>SEC-106, "DTC Logic"</u>.
- If DTC P1650 is displayed with B26F9 or B26FA of BCM, perform the trouble diagnosis for B209F or B20A0. Refer to <u>SEC-104, "DTC Logic"</u> or <u>SEC-106, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition		Possible cause
		A	Starter relay is stuck ON.	<ul> <li>Harness and connectors         <ul> <li>(Between IPDM E/R harness connector and ECM harness connector is shorted to ground.)</li> <li>(Between IPDM E/R harness connector and BCM harness connector is shorted to ground.)</li> </ul> </li> <li>IPDM E/R</li> </ul>
P1650	STR MTR RELAY 2 (Starter relay circuit)	В	Starter relay power supply circuit is excessively high voltage.	<ul> <li>Harness and connectors (Between IPDM E/R harness connector and ECM harness is open or shorted to power.) (Between IPDM E/R harness connector and BCM harness is open or shorted to power.) (Between IPDM E/R harness connector and battery is open.)</li> <li>IPDM E/R</li> </ul>
		С	Starter relay circuit is excessively low voltage	<ul> <li>Harness and connectors (Starter relay circuit is open or shorted.)</li> <li>IPDM E/R</li> </ul>

### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following procedure before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A AND C

1. Turn ignition switch OFF and wait at least 10 seconds.

2. Turn ignition switch ON.

## EC-374

# P1650 STARTER MOTOR RELAY 2

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
3. Turn ignition switch OFF and wait at least 10 seconds.		
4. Check 1st trip DTC.		А
Is 1st trip DTC detected?		
YES >> Proceed to <u>EC-375, "Diagnosis Procedure"</u> .		
NO $>>$ GO TO 3.		EC
3. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION B		
With CONSULT		С
CAUTION: Always drive at a safe speed.		
1. Start the engine.		
2. Turn ignition switch OFF and wait at least 10 seconds.		D
3. Turn ignition switch ON.		
4. Start the engine and warm it up to normal operating temperature.		
5. Turn ignition switch OFF.		E
<ol> <li>6. Lift up drive wheels.</li> <li>7. Turn ignition switch ON.</li> </ol>		
<ol> <li>Select "POWER BALANCE" in "ACTIVE TEST" mode of "ENGINE" using CONSULT.</li> </ol>		
9. Restart the engine and let it idle at least 10 seconds.		F
10. Shift the selector lever to D position while depressing fully the brake pedal.		
11. Select 1 - 4 cylinders in "POWER BALANCE" and cut the fuel of all cylinders.		
12. Check 1st trip DTC.		G
Without CONSULT		
CAUTION: Always drive at a safe speed.		
1. Start the engine.		Н
2. Turn ignition switch OFF and wait at least 10 seconds.		
3. Turn ignition switch ON.		
<ol><li>Start the engine and warm it up to normal operating temperature.</li></ol>		
5. Turn ignition switch OFF.		
<ol> <li>6. Lift up drive wheels.</li> <li>7. Restart the engine and let it idle at least 10 seconds.</li> </ol>		
<ol> <li>Restart the engine and let it idle at least 10 seconds.</li> <li>Shift the selector lever to D position while depressing fully the brake pedal.</li> </ol>		J
<ol> <li>Remove vacuum hoses from intake manifold. Refer to <u>EM-28</u>, "<u>Exploded View</u>".</li> </ol>		
10. Check 1st trip DTC.		
Is 1st trip DTC detected?		Κ
YES >> Proceed to EC-375, "Diagnosis Procedure".		
NO >> INSPECTION END		
Diagnosis Procedure		L
Diagnosis Flocedule	INFOID:000000009651225	
1.CHECK STARTER RELAY POWER SUPPLY CIRCUIT		Μ
Check the starter motor relay power supply circuit. Refer to PCS-35. "Diagnosis Procedure".		1 V I
Is the inspection result normal?		
YES $>>$ GO TO 2.		Ν
NO >> Repair or replace error-detected parts.		1.4
2.CHECK STARTER RELAY CONTROL SIGNAL CIRCUIT		0
1. Turn ignition switch OFF.		
<ol> <li>Disconnect IPDM E/R harness connector.</li> <li>Disconnect PCM harness connector.</li> </ol>		
<ol> <li>Disconnect BCM harness connector.</li> <li>Check the continuity between IPDM E/R harness connector and BCM harness connector.</li> </ol>		Ρ

+				
IPDM E/R		BCM		Continuity
Connector	Terminal	Connector	Terminal	
E13	30	M69	64	Existed

# P1650 STARTER MOTOR RELAY 2

< DTC/CIRCUIT DIAGNOSIS >

- Refer to SEC-40, "Wiring Diagram".
- 5. Also check harness for short to ground to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. CHECK INTERMITTENT INCIDENT

Perform GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to <u>PCS-36, "Removal and Installation"</u>.

NO >> Repair or replace error-detected parts.

# **P1651 STARTER MOTOR RELAY**

#### < DTC/CIRCUIT DIAGNOSIS >

# P1651 STARTER MOTOR RELAY

## Description

ECM controls ON/OFF state of the starter relay, according to the engine and vehicle condition. Models with no Intelligent Key System transmit a control signal directly to IPDM E/R. On the other hand, models with the Intelligent Key System transmit a control signal to IPDM E/R by way of BCM via CAN communication. Under normal conditions, ECM controls and maintains the starter relay in OFF state during engine running or "D" position.

When detecting a decrease in engine speed due to rapid deceleration or heavy load condition, ECM controls and reactivates the starter relay.

IPDM E/R detects a control state of starter relay and starter control relay and transmits a feedback signal to ECM via CAN communication.

## **DTC** Logic

#### DTC DETECTION LOGIC

#### NOTE:

- If DTC P1651 is displayed with DTC U1001, perform the trouble diagnosis for DTC U1001. Refer to <u>EC-168</u>, F <u>"DTC Logic"</u>.
- If DTC P1651 is displayed with DTC P0607, perform the trouble diagnosis for DTC P0607. Refer to <u>EC-336</u>.
   <u>"DTC Logic"</u>.
- If DTC P1651 is displayed with B209F or B20A0 of IPDM E/R, perform the trouble diagnosis for B209F or B20A0. Refer to <u>SEC-104, "DTC Logic"</u> or <u>SEC-106, "DTC Logic"</u>.
- If DTC P1651 is displayed with B26F9 or B26FA of BCM, perform the trouble diagnosis for B209F or B20A0. Refer to <u>SEC-104, "DTC Logic"</u> or <u>SEC-106, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC	detecting condition	I
P1651	STR MTR RELAY (Starter control relay circuit)	A correlated error is detected for 2 seconds or more between a control signal transmitted from ECM and a feedback signal transmitted from IPDM E/R via CAN communication line.	<ul> <li>Harness or connectors (Between ECM harness connector and IPDM E/R harness connector is shorted to power.) (Between ECM harness connector and BCM harness connector is shorted to power.)</li> <li>IPDM E/R</li> <li>BCM</li> </ul>	J

### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following procedure before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

**2.** PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Start the engine and let it idle at least 30 seconds.
- 3. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-377, "Diagnosis Procedure".
- NO >> INSPECTION END

### **Diagnosis Procedure**

## **1.**INSPECTION START

Check the starter motor operation.

INFOID:000000009651228

INFOID:000000009651226

INFOID:000000009651227

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# P1651 STARTER MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

Is the starter motor operated?

YES >> GO TO 3.

NO >> GO TO 2.

2.CHECK DTC WITH IPDM E/R

Check DTC with IPDM E/R. Refer to PCS-13, "CONSULT Function (IPDM E/R)".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for DTC indicated.

**3.**CHECK DTC WITH BCM

Check DTC with BCM. Refer to <u>BCS-34, "BCM : CONSULT Function (BCM - BCM)"</u>.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for DTC indicated.

**4.**CHECK CRANKING REQUEST SIGNAL CIRCUIT-I

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Disconnect IPDM E/R harness connector.

4. Check the continuity between ECM harness connector and IPDM E/R harness connector.

+			_	
ECM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F7	8	F12	71	Existed

5. Also check harness for short to ground to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

**5.**CHECK CRANKING REQUEST SIGNAL CIRCUIT-II

1. Disconnect BCM harness connector.

2. Check the continuity between ECM harness connector and BCM harness connector.

	+		_	
ECM		BCM		Continuity
Connector	Terminal	Connector	Terminal	
F7	8	M69	64	Existed

Refer to SEC-40, "Wiring Diagram".

3. Also check harness for short to ground to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

**6.**CHECK INTERMITTENT INCIDENT

Perform GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-36, "Removal and Installation".

NO >> Repair or replace error-detected parts.

## P1652 STARTER MOTOR SYSTEM COMM

#### < DTC/CIRCUIT DIAGNOSIS >

# P1652 STARTER MOTOR SYSTEM COMM

### Description

ECM controls ON/OFF state of the starter relay, according to the engine and vehicle condition. Models with no Intelligent Key System transmit a control signal directly to IPDM E/R. On the other hand, models with the Intelligent Key System transmit a control signal to IPDM E/R by way of BCM via CAN communication. Under normal conditions, ECM controls and maintains the starter relay in OFF state during engine running or "D" position.

When detecting a decrease in engine speed due to rapid deceleration or heavy load condition, ECM controls and reactivates the starter relay.

IPDM E/R detects a control state of starter relay and starter control relay and transmits a feedback signal to ECM via CAN communication.

## **DTC** Logic

#### DTC DETECTION LOGIC

#### NOTE:

- If DTC P1652 is displayed with DTC U1001, perform the trouble diagnosis for DTC U1001. Refer to <u>EC-168</u>, F <u>"DTC Logic"</u>.
- If DTC P1652 is displayed with DTC P0607, perform the trouble diagnosis for DTC P0607. Refer to <u>EC-336</u>, <u>"DTC Logic"</u>.
- If DTC P1652 is displayed with B209F or B20A0 of IPDM E/R, perform the trouble diagnosis for B209F or B20A0. Refer to <u>SEC-104, "DTC Logic"</u> or <u>SEC-106, "DTC Logic"</u>.
- If DTC P1652 is displayed with B26F9 or B26FA of BCM, perform the trouble diagnosis for B209F or B20A0.
   Refer to <u>SEC-104</u>, "DTC Logic" or <u>SEC-106</u>, "DTC Logic".

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition		
P1652	STR MTR SYS COMM (Starter motor communication line)	ECM detects malfunction in starter motor drive circuit of the IPDM E/R.	IPDM E/R	

### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following procedure kefore conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION	IVI
<ol> <li>Turn ignition switch OFF and wait at least 10 seconds.</li> <li>Turn ignition switch ON and wait at least 5 minutes.</li> <li>Check DTC.</li> </ol>	N
Is DTC detected?	
YES >> Proceed to EC-379, "Diagnosis Procedure".	0

NO >> INSPECTION END

## Diagnosis Procedure

## **1.**INSPECTION START

1. Erase DTC.

2. Perform DTC confirmation procedure. Refer to EC-379, "DTC Logic".

Check DTC.

#### Is the P1652 displayed again?

YES >> GO TO 2.

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INFOID:000000009651229

INFOID:000000009651230

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# **P1652 STARTER MOTOR SYSTEM COMM**

< DTC/CIRCUIT DIAGNOSIS >

NO >> INSPECTION END

2. CHECK INTERMITTENT INCIDENT

Perform GI-42, "Intermittent Incident".

Is the inspection result normal?

>> Replace IPDM E/R. Refer to <u>PCS-36. "Removal and Installation"</u>. >> Repair or replace error-detected parts. YES

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< DTC/CIRCUIT DIAGNOSIS >

# P1700 CVT CONTROL SYSTEM

### Description

This DTC is displayed with other DTC regarding TCM. Perform the trouble diagnosis for corresponding DTC. Refer to <u>EC-96</u>, "<u>DTC Index</u>". When this DTC is detected, the ASCD control is canceled.

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INFOID:000000009651232

## P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

#### < DTC/CIRCUIT DIAGNOSIS >

# P1715 INPUT SPEED SENSOR (PRIMARY SPEED SENSOR)

### Description

ECM receives input speed sensor signal from TCM via the CAN communication line. ECM uses this signal for engine control.

## DTC Logic

INFOID:000000009651234

INFOID:000000009651233

[VQ35DE]

## DTC DETECTION LOGIC

NOTE:

- If DTC P1715 is displayed with DTC UXXXX first perform the trouble diagnosis for DTC UXXXX.
- If DTC P1715 is displayed with DTC P0335, first perform the trouble diagnosis for DTC P0335. Refer to <u>EC-271, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0340, P0345, first perform the trouble diagnosis for DTC P0340, P0345. Refer to <u>EC-274, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to <u>EC-335, "DTC Logic"</u>.
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to <u>EC-336, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1715	Input speed sensor (TCM output)	Input speed sensor signal is different from the theoretical value calculated by ECM from output speed sensor signal and en- gine rpm signal.	<ul> <li>Harness or connectors (The CAN communication line is open or short- ed)</li> <li>Harness or connectors (Input speed sensor circuit is open or shorted)</li> <li>TCM</li> </ul>

### DTC CONFIRMATION PROCEDURE

## 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

### >> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine.
- 2. Drive vehicle at a speed of more than 50 km/h (31 MPH) for at least 5 seconds.
- 3. Check 1st trip DTC.

#### Is 1st trip DTC detected?

YES >> Proceed to EC-382, "Diagnosis Procedure".

NO >> INSPECTION END

### Diagnosis Procedure

## **1.**CHECK DTC WITH TCM

Check DTC with TCM. Refer to TM-48, "DTC Index".

Is the inspection result normal?

YES >> Replace TCM. Refer to <u>TM-158. "Exploded View"</u>.

NO >> Perform trouble shooting relevant to DTC indicated.

INFOID:000000009651235

# P1800 VIAS CONTROL SOLENOID VALVE 1

### < DTC/CIRCUIT DIAGNOSIS >

# P1800 VIAS CONTROL SOLENOID VALVE 1

# DTC Logic

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#### INFOID:000000009651236

[VQ35DE]

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis nam	ne DT	C detecting condition	Possible cause
P1800	VIAS control solenoid valv circuit		ely low or high voltage signal CM through the VIAS control ve 1.	<ul> <li>Harness or connectors (The solenoid valve 1 circuit is open or shorted.)</li> <li>VIAS control solenoid valve 1</li> </ul>
DTC CON	FIRMATION PROCE	EDURE		
1.condi	TIONING			
If DTC Co	nfirmation Procedure h	as been previou	sly conducted, always	perform the following before conduct-
ing the nex	kt test. gnition switch OFF and	wait at least 10	seconds	
2. Turn i	gnition switch ON.			
	gnition switch OFF and CONDITION:	wait at least 10	seconds.	
		g procedure, co	onfirm battery voltage	is more than 11 V at idle.
•	> GO TO 2.			
	RM DTC CONFIRMAT			
	engine and let it idle for t 1st trip DTC.	at least 5 secon	ds.	
	DTC detected?			
	> Proceed to EC-383,	<u>"Diagnosis Proce</u>	edure".	
	> INSPECTION END			
Diagnos	is Procedure			INFOID:000000009651237
<b>1.</b> CHECK	VIAS CONTROL SOL		1 POWER SUPPLY	
	gnition switch OFF.			
	nnect VIAS control sole gnition switch ON.	enoid valve 1 har	ness connector.	
		/IAS control sole	noid valve 1 harness co	onnector and ground.
) // • •				
-	control solenoid valve 1	Ground	Voltage	
		Ground	Battery voltage	
Connec F74	1			
F74				
F74 Is the insp	1 ection result normal? > GO TO 2.			
F74 Is the insp YES > NO >	ection result normal? > GO TO 2. > Repair open circuit, s	short to ground o	r short to power in harn	
F74 Is the insp YES > NO >	ection result normal? > GO TO 2. > Repair open circuit, s	short to ground o	•	ess or connectors. RCUIT FOR OPEN AND SHORT
F74 <u>Is the insp</u> YES > NO > 2.CHECK 1. Turn ig	<u>ection result normal?</u> > GO TO 2. > Repair open circuit, s < VIAS CONTROL SOL gnition switch OFF.	short to ground o	•	
F74 <u>Is the insp</u> YES > NO > <b>2.</b> CHECk 1. Turn iq 2. Discor	ection result normal? > GO TO 2. > Repair open circuit, s < VIAS CONTROL SOL gnition switch OFF. nnect ECM harness co	short to ground o _ENOID VALVE	1 OUTPUT SIGNAL CII	

VIAS control solenoid valve 1		E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F74	2	F7	39	Existed

# P1800 VIAS CONTROL SOLENOID VALVE 1

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair open circuit, short to ground or short to power in harness or connectors.

 ${f 3.}$ CHECK VIAS CONTROL SOLENOID VALVE 1

Check VIAS control solenoid valve 1. Refer to EC-384, "Component Inspection".

#### Is the inspection result normal?

- YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.
- NO >> Replace VIAS control solenoid valve 1. Refer to EM-28, "Exploded View".

## **Component Inspection**

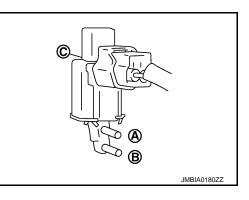
INFOID:000000009651238

## 1.CHECK VIAS CONTROL SOLENOID VALVE 1

#### With CONSULT

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Disconnect vacuum hoses connected to VIAS control solenoid valve 1.
- 4. Turn ignition switch ON.
- 5. Select "VIAS S/V-1" in "ACTIVE TEST" mode with CONSULT.
- 6. Check air passage continuity and operation delay time under the following conditions.

Condition (VIAS S/V-1)	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
ON	Existed	Not existed
OFF	Not existed	Existed



### **Without CONSULT**

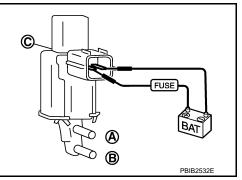
- 1. Turn ignition switch OFF.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Disconnect vacuum hoses connected to VIAS volume control solenoid valve 1.
- 4. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
12 V direct current supply be- tween terminals 1 and 2	Existed	Not existed
No supply	Not existed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VIAS control solenoid valve 1. Refer to <u>EM-28</u>, <u>"Exploded View"</u>.



# P1801 VIAS CONTROL SOLENOID VALVE 2

### < DTC/CIRCUIT DIAGNOSIS >

# P1801 VIAS CONTROL SOLENOID VALVE 2

# DTC Logic

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INFOID:000000009651239

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## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis nar	me D	TC detecting condition	Possible cause
P1801	VIAS control solenoid val- circuit		vely low or high voltage signal CM through the VIAS control alve 2.	<ul> <li>Harness or connectors (The solenoid valve 2 circuit is open or shorted.)</li> <li>VIAS control solenoid valve 2</li> </ul>
	FIRMATION PROC	EDURE		
1.condi	TIONING			
		nas been previo	usly conducted, always p	erform the following before conduct
ing the nex	kt test. gnition switch OFF and	d wait at least 10	) seconds.	
2. Turn i	gnition switch ON.			
	gnition switch OFF and CONDITION:	d wait at least 10	) seconds.	
		ng procedure, o	onfirm battery voltage	s more than 11 V at idle.
~	> GO TO 2.			
	RM DTC CONFIRMA			
	engine and let it idle for a 1st trip DTC.	r at least 5 seco	nds.	
	DTC detected?			
	> Proceed to EC-385,	"Diagnosis Prod	cedure".	
	> INSPECTION END			
Diagnos	is Procedure			INFOID:0000000096512
<b>1.</b> CHECK	VIAS CONTROL SO	LENOID VALVE	2 POWER SUPPLY	
1. Turn ig	gnition switch OFF.			
	nect VIAS control sol	enoid valve 2 ha	rness connector.	
	gnition switch ON. the voltage between '	VIAS control sol	enoid valve 2 harness co	nnector and ground.
	-			
	ontrol solenoid valve 2	Ground	Voltage	
Connor				
Connec	1	Ground	Battery voltage	
F75				
F75 Is the insp	ection result normal?			
F75 Is the insp YES >	> GO TO 2.	short to around	or short to power in harne	ess or connectors.
F75 Is the insp YES > NO >	> GO TO 2. > Repair open circuit, :	•	or short to power in harn 2 OUTPUT SIGNAL CIR	
F75 I <u>s the insp</u> YES > NO > 2.CHECK	> GO TO 2. > Repair open circuit, < VIAS CONTROL SO	•	•	ess or connectors. CUIT FOR OPEN AND SHORT
F75 <u>Is the insp</u> YES > NO > <b>2.</b> CHECK 1. Turn ig 2. Discor	<ul> <li>&gt; GO TO 2.</li> <li>&gt; Repair open circuit,</li> <li>&lt; VIAS CONTROL SO</li> <li>gnition switch OFF.</li> <li>nnect ECM harness compared</li> </ul>	LENOID VALVE	2 OUTPUT SIGNAL CIR	

VIAS control solenoid valve 2		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F75	2	F7	40	Existed

nector.

# P1801 VIAS CONTROL SOLENOID VALVE 2

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

 $\mathbf{3.}$ CHECK VIAS CONTROL SOLENOID VALVE 2

Check VIAS control solenoid valve 2. Refer to EC-386, "Component Inspection".

#### Is the inspection result normal?

- YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.
- NO >> Replace VIAS control solenoid valve 2. Refer to EM-28, "Exploded View".

## **Component Inspection**

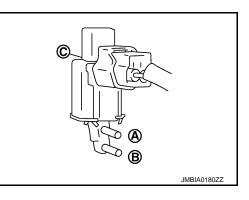
INFOID:000000009651241

## 1.CHECK VIAS CONTROL SOLENOID VALVE 2

#### With CONSULT

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Disconnect vacuum hoses connected to VIAS control solenoid valve 2.
- 4. Turn ignition switch ON.
- 5. Select "VIAS S/V-2" in "ACTIVE TEST" mode with CONSULT.
- 6. Check air passage continuity and operation delay time under the following conditions.

Condition (VIAS S/V-2)	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
ON	Existed	Not existed
OFF	Not existed	Existed



### **Without CONSULT**

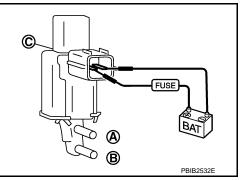
- 1. Turn ignition switch OFF.
- 2. Disconnect VIAS control solenoid valve 2 harness connector.
- 3. Disconnect vacuum hoses connected to VIAS volume control solenoid valve 2.
- 4. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
12 V direct current supply be- tween terminals 1 and 2	Existed	Not existed
No supply	Not existed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VIAS control solenoid valve 2. Refer to <u>EM-28</u>, <u>"Exploded View"</u>.



## Description

Brake switch signal is applied to the ECM via the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driven.

# DTC Logic

INFOID:000000009651243

INFOID:000000009651242

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DT	C detecting condition	Possible cause
P1805			n signal is not sent to ECM for e me while the vehicle is driving.	<ul> <li>Harness or connectors (Stop lamp switch circuit is open or short- ed.)</li> <li>Stop lamp switch</li> </ul>
DTC CON	FIRMATION PROC	EDURE		
1.PERFO	RM DTC CONFIRMA	TION PROCE	DURE	
<ol> <li>Fully d</li> <li>Erase</li> <li>Check</li> </ol>	nition switch ON. epress the brake ped the DTC with CONSL 1st trip DTC.		5 seconds.	
YES >>	<u>DTC detected?</u> > Go to <u>EC-387, "Diac</u> > INSPECTION END	nosis Procec	lure".	
Diagnosi	s Procedure			INFOID:00000009651244
	STOP LAMP SWITC			
	Inition switch OFF.			
		depressing an	d releasing the brake pe	dal.
Brake	e pedal Si	op lamp		
Fully r	released Not	illuminated		
Slightly o	depressed Illu	iminated		
	ection result normal?			
	> GO TO 11. > GO TO 2.			
•	STOP LAMP SWITC			
	nect stop lamp switcl the voltage between		inector. itch harness connector ai	nd ground.
	0			-
Sto	op lamp switch	Cround	Voltage	
Connecto	or Terminal	Ground	vollage	
E115	1	Ground	Battery voltage	
	ection result normal?			
-	> GO TO 4. > GO TO 3.			
•				
	T MALFUNCTIONING	PARI		
Check the f		02		
	ck (J/B) connector E1	03		

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#### < DTC/CIRCUIT DIAGNOSIS >

· Harness for open or short between battery and stop lamp switch

>> Repair open circuit, short to ground or short to power in harness or connectors.

### **4.**CHECK STOP LAMP RELAY GROUND CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect stop lamp relay harness connector.

3. Check the continuity between stop lamp relay harness connector and ground.

Stop larr	np relay	Ground	Continuity
Connector	Terminal	Orbuna	Continuity
E15	1	Ground	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

1. Connect stop lamp switch harness connector.

2. Turn ignition switch ON.

3. Check the voltage between stop lamp relay harness connector and ground.

Stop lar	np relay	Ground	Condition		Voltage (V)
Connector	Terminal	Ciouna		onation	voltage (v)
E15	2	Ground	Brake pedal	Slightly de- pressed	Battery voltage
			pedai	Fully released	Approx. 0

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

• Harness for open or short between stop lamp switch and stop lamp relay

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK STOP LAMP RELAY POWER SUPPLY CIRCUIT

Check the voltage between stop lamp relay harness connector and ground.

Stop lar	Stop lamp relay		Voltage (V)
Connector	Terminal	Ground	voltage (v)
E15	5	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair open circuit or short to ground or short to power in harness or connectors.

8.CHECK STOP LAMP RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect stop lamp relay harness connector.

3. Check the continuity between stop lamp relay harness connector and ECM harness connector.

#### < DTC/CIRCUIT DIAGNOSIS >

ECI	4	Stop larr	n relav		А
Connector	Terminal	Connector	Terminal	Continuity	
E16	122	E15	3	Existed	
-		-		and short to power.	EC
Is the inspec			to ground		
•	GO TO 10				С
•			-	round or short to power in harness or connectors.	
9.CHECK	STOP LAN	IP SWITCH	4		
Refer to EC	-389, "Corr	nponent Ins	spection (S	Stop Lamp Switch)".	D
Is the inspec					
	GO TO 11		vitab		Е
10.CHECK	•	top lamp sv			
					_
			spection (S	Stop Lamp Relay)".	F
Is the inspect YES >>	GO TO 11				
-		top lamp re	elay.		G
11.CHECK		TTENT IN	CIDENT		
Refer to GI-					Н
>>	INSPECTI	ON END			
Compone	nt Inspe	ction (St	op Lam	o Switch)	
				· · · · · · · · · · · · · · · · · · ·	
<b>1.</b> CHECK \$	STOP LAN	IP SWITCH	1-1		
	ition switcl				J
			harnoss of	onnoctor	J
		ntinuity bet	harness co ween stop	onnector. I lamp switch terminals under the following conditions.	J
		ntinuity bet			J K
Terminals		Condi	ween stop		J
Terminals	Brake peo	Condi	ween stop	lamp switch terminals under the following conditions.	J K L
Terminals 1 and 2	Brake peo	Condi dal Full Slig	ween stop	Iamp switch terminals under the following conditions.         Continuity         Not existed	J K L
Terminals 1 and 2 Is the inspec	tion result	Condi dal Full Slig normal?	ween stop tion y released	Iamp switch terminals under the following conditions.         Continuity         Not existed	L
Terminals 1 and 2 Is the inspec YES >>	tion result	Condi dal Full Slig normal?	ween stop tion y released	Iamp switch terminals under the following conditions.         Continuity         Not existed	J K L
Terminals 1 and 2 Is the inspec YES >> NO >>	tion result INSPECTI GO TO 2.	Condi dal Full Slig normal? ON END	ween stop ition y released htly depresse	Iamp switch terminals under the following conditions.         Continuity         Not existed	L
Terminals 1 and 2 Is the inspect YES >> NO >> 2.CHECK S	ction result INSPECTI GO TO 2. STOP LAN	Condi dal Full Slig normal? ON END	ween stop tion y released htly depresse	Imp switch terminals under the following conditions.         Continuity         Not existed         ed       Existed	L
Terminals 1 and 2 Is the inspect YES >> NO >> 2.CHECK S 1. Adjust s	ction result INSPECTI GO TO 2. STOP LAN top lamp s	Condi dal Full Slig <u>normal?</u> ON END IP SWITCH	tion y released htly depressed	Image switch terminals under the following conditions.         Continuity         Not existed         ed       Existed         fer to <u>BR-7, "Inspection and Adjustment"</u> .	L
Terminals 1 and 2 Is the inspect YES >> NO >> 2.CHECK S 1. Adjust s	ction result INSPECTI GO TO 2. STOP LAN top lamp s	Condi dal Full Slig <u>normal?</u> ON END IP SWITCH	tion y released htly depressed	Imp switch terminals under the following conditions.         Continuity         Not existed         ed       Existed	M
Terminals 1 and 2 Is the inspect YES >> NO >> 2.CHECK S 1. Adjust s	ction result INSPECTI GO TO 2. STOP LAN top lamp s	Condi dal Full Slig <u>normal?</u> ON END IP SWITCH	tion y released htly depressed I-II llation. Ref ween stop	Image switch terminals under the following conditions.         Continuity         Not existed         ed       Existed         fer to <u>BR-7, "Inspection and Adjustment"</u> .	L
Terminals 1 and 2 Is the inspect YES >> NO >> 2.CHECK S 1. Adjust s 2. Check h Terminals	tion result INSPECTI GO TO 2. STOP LAM top lamp s parness co	Condi dal Full slig <u>normal?</u> ON END IP SWITCH switch insta ntinuity bet Condi	tion y released htly depressed I-II llation. Ref ween stop	Image of lamp switch terminals under the following conditions.         Continuity         Not existed         ed       Existed         Existed         Image of the following conditions.	M
Terminals 1 and 2 Is the inspect YES >> NO >> 2.CHECK S 1. Adjust s 2. Check h	ction result INSPECTI GO TO 2. STOP LAN top lamp s	Condi Jal Full Slig <u>normal?</u> ON END IP SWITCH Switch insta ntinuity bet Condi	tion y released htly depressed I-II Ilation. Ref ween stop	Image of lamp switch terminals under the following conditions.         Continuity         Not existed         ed       Existed         Image for to BR-7. "Inspection and Adjustment".         Image of lamp switch terminals under the following conditions.         Continuity         Not existed         Image of lamp switch terminals under the following conditions.	M
Terminals 1 and 2 Is the inspect YES >> NO >> 2.CHECK S 1. Adjust s 2. Check h Terminals	tion result INSPECTI GO TO 2. STOP LAM top lamp s arness co Brake pec	Condi dal Full slig <u>normal?</u> ON END IP SWITCH witch insta ntinuity bet Condi dal Full Slig	tion y released htly depressed I-II Ilation. Ref ween stop tion y released	Image of lamp switch terminals under the following conditions.         Continuity         Not existed         ed       Existed         Image for to BR-7. "Inspection and Adjustment".         Image of lamp switch terminals under the following conditions.         Continuity         Not existed         Image of lamp switch terminals under the following conditions.	L M N
Terminals 1 and 2 1 and 2 1 sthe inspec YES >> NO >> 2.CHECK S 1. Adjust s 2. Check h Terminals 1 and 2 1 and 2 1 sthe inspec YES >>	tion result INSPECTI GO TO 2. STOP LAM top lamp s arness co Brake peo	Condi Tell dal Full Slig <u>normal?</u> ON END IP SWITCH Switch insta ntinuity bet Condi dal Full Slig <u>normal?</u> ON END	tion y released htly depressed I-II Ilation. Ref ween stop tion y released htly depressed	Image of lamp switch terminals under the following conditions.         Continuity         Not existed         ed       Existed         Image for to BR-7. "Inspection and Adjustment".         Image of lamp switch terminals under the following conditions.         Continuity         Not existed         Image of lamp switch terminals under the following conditions.	L M N

#### < DTC/CIRCUIT DIAGNOSIS >

# Component Inspection (Stop Lamp Relay)

INFOID:000000009651246

[VQ35DE]

# **1.** STOP LAMP RELAY

- 1. Turn ignition switch OFF.
- 2. Remove stop lamp relay.

3. Check continuity between stop lamp relay terminals under the following conditions.

Stop la	mp relay	Conditions	Continuity	
Terr	minal	Conditions	Continuity	
3	5	12 V direct current supply between terminals 1 and 2	Existed	
		No current supply	Not existed	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp relay.

#### < DTC/CIRCUIT DIAGNOSIS >

# P2096, P2097, P2098, P2099 A/F SENSOR 1

## **DTC** Logic

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EC

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INFOID:000000009651247

[VQ35DE]

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible Cause
P2096	POST CAT FUEL TRIM SYS B1 (Post catalyst fuel trim system too lean bank 1)	The output voltage computed by ECM from the A/ F sensor 1 signal is shifts to the lean side for a specified period.	<ul> <li>A/F sensor 1 (bank 1)</li> <li>A/F sensor 1 heater</li> <li>Heated oxygen sensor 2 (bank 1)</li> <li>Fuel pressure</li> </ul>
P2097	POST CAT FUEL TRIM SYS B1 (Post catalyst fuel trim system too rich bank 1)	The A/F signal computed by ECM from the A/F sensor 1 signal is shifts to the rich side for a spec- ified period.	<ul> <li>Fuel injector</li> <li>Intake air leaks</li> <li>Exhaust gas leaks</li> </ul>
P2098	POST CAT FUEL TRIM SYS B2 (Post catalyst fuel trim system too lean bank 2)	The output voltage computed by ECM from the A/ F sensor 1 signal is shifts to the lean side for a specified period.	<ul> <li>A/F sensor 1 (bank 2)</li> <li>A/F sensor 1 heater</li> <li>Heated oxygen sensor 2 (bank 2)</li> </ul>
P2099	POST CAT FUEL TRIM SYS B2 (Post catalyst fuel trim system too rich bank 2)	The A/F signal computed by ECM from the A/F sensor 1 signal is shifts to the rich side for a spec- ified period.	<ul> <li>Fuel pressure</li> <li>Fuel injector</li> <li>Intake air leaks</li> <li>Exhaust gas leaks</li> </ul>

## DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

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

### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Clear the mixture ratio self-learning value. Refer to <u>EC-139, "Work Procedure"</u>.
- 2. Turn ignition switch OFF and wait at least 10 seconds.
- 3. Turn ignition switch ON.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
- 6. Let engine idle for 1 minute.
- 7. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
- 8. Check 1st trip DTC.

#### Is 1st trip DTC detected?

- YES >> Proceed to EC-391, "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

## **1.**RETIGHTEN A/F SENSOR 1 AND HEATED OXYGEN SENSOR 2

Loosen and retighten the A/F sensor 1 and heated oxygen senosr 2. Refer to EM-33. "Exploded View".

#### >> GO TO 2.

2.CHECK FOR EXHAUST GAS LEAK

INFOID:000000009651248

## P2096, P2097, P2098, P2099 A/F SENSOR 1

< DTC/CIRCUIT DIAGNOSIS >

- 1. Start engine and run it at idle.
- 2. Listen for an exhaust gas leak before the three way catalyst 2.

#### Is exhaust gas leak detected?

YES >> Repair or replace.

NO >> GO TO 3.

**3.**CHECK FOR INTAKE AIR LEAKAGE

- 1. Start engine and run it at idle.
- 2. Listen for an intake air leakage after the mass air flow sensor.

Is intake air leakage detected?

YES >> GO TO 4.

NO >> Repair or replace malfunctioning part.

4.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

1. Clear the mixture ratio self-learning value. Refer to EC-139, "Work Procedure".

2. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?

YES >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to <u>EC-241, "DTC Logic"</u> or <u>EC-245, "DTC Logic"</u>.

NO >> GO TO 5.

5. CHECK HARNESS CONNECTOR

#### 1. Turn ignition switch OFF.

- 2. Disconnect A/F sensor 1 harness connector.
- 3. Check harness connector for water.

#### Water should not exit.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness connector.

**6.**CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY

- 1. Disconnect A/F sensor 1 harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between A/F sensor 1 harness connector and ground.

DTC		A/F sensor		Ground	Voltage (V)	
DIC	Bank	Connector	Terminal	Ground	voltage (v)	
P2096 P2097	1	F27	4	Ground	Battery voltage	
P2098 P2099	2	F64	4	Ground	Ballery Vollage	

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

# **7.**CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect IPDM E/R harness connector.

3. Check the continuity between A/F sensor 1 harness connector and IPDM E/R harness connector.

# P2096, P2097, P2098, P2099 A/F SENSOR 1

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	0	A/F sensor 1				IPDM E/R			Continuity			A
DT		Bank (	Connector	Terminal	Co	onnector	Term	ninal	Continuity			
P209 P209		1	F27	4		F12	5	7	Existed			EC
P209 P209		2	F64	4		1 12		,	LAISteu			0
Is the ins	spection r	esult norm	al?									С
YES		rm the trou				supply c	circuit.					
NO <b>8.</b> CHE	•	ir or replac ENSOR 1 I		•		FOR C	PEN /	AND S	SHORT			D
2. Disc	connect E	switch OFF CM harnes ntinuity bet	s connect		harne	ess con	nector	and E	ECM harness	connector.		E
		A/F senso	- 1			СМ						
DTC	Bank	Connecto		al Conn		Term	inal	Conti	nuity			F
	Dalik	Connecio	1		ecioi	69						
P2096 P2097	1	F27	2			73		Exis	tod			G
P2098			1	— F	8	77		EXIS	lieu			
P2098 P2099	2	F64	2			81						Н
4. Che	ck the co	ntinuity be	tween A/F	sensor 1	l harr	ness co	nnecto	or and	ground, or E	CM harnes	s connector	
	ground.	, , , , , , , , , , , , , , , , , , ,							5 , -			
				1								
DTC		A/F sensor 1		Groun	d	Continu	uity					
	Bank	Connector	Terminal				<u> </u>					J
P2096 P2097	1	F27	1	-								
			2	Groun	d	Not exis	sted					
P2098 P2099	2	F64	1	-								K
1 2000			2									
		CM										L
DTC	Connector	Terminal	Groun	d Co	ntinuit	у						
Doooo	Connector	69										
P2096 P2097		73										M
P2098	F8	77	Groun	d Not	t existe	ed						
P2098 P2099		81	_									Ν
5. Also	check ha	arness for s	short to po	wer.								
		esult norm	•	-								~
YES	>> GO T	O 9.										0
NO	•	•		o ground	or sh	ort to p	ower ir	n harr	less or conne	ctors.		
<b>9.</b> CHE	CK A/F SE	ENSOR 1 H	IEATER									Р
Check A	/F sensor	1 heater. I	Refer to E	C-173, "C	ompo	onent In	spection	<u>on"</u> .				-
	•	esult norm	<u>al?</u>									
YES NO	>> GO T >> GO T											
		ATED OXY		SUD 3								
					5 10		ntless		<b>n</b> "			-
Uneck h	ealed oxy	gen senso	ı∠. Keter	10 = 0.173			<u>ant msp</u>	Jectio	<u>11 </u> .			
Revision:	2014 May	ý			EC	-393					2014 QUEST	Г

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace malfunctioning heated oxygen sensor 2.

11.CHECK INTERMITTENT INCIDENT

Perform GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace malfunctioning part.

**12.**REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to EM-33, "Exploded View".

CAUTION:

- Discard any A/F 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 A/F sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

Do you have CONSULT?

YES >> GO TO 13.

NO >> GO TO 14.

**13.**CONFIRM A/F ADJUSTMENT DATA

#### (B) With CONSULT

- 1. Turn ignition switch ON.
- 2. Select "A/F ADJ-B1" and "A/F ADJ-B2" in "DATA MONITOR" mode with CONSULT.
- 3. Make sure that "0.000" is displayed on CONSULT screen.

Is "0.000" displayed?

YES >> INSPECTION END

NO >> GO TO 14.

14.CLEAR THE MIXTURE RATIO SELF-LEARNING VALUE

Clear the mixture ratio self-learning value. Refer to EC-139, "Work Procedure".

Do you have CONSULT?

YES >> GO TO 15.

NO >> INSPECTION END

**15.**CONFIRM A/F ADJUSTMENT DATA

#### With CONSULT

- Turn ignition switch ON.
- 2. Select "A/F ADJ-B1" and "A/F ADJ-B2" in "DATA MONITOR" mode with CONSULT.
- 3. Make sure that "0.000" is displayed on CONSULT screen.

>> INSPECTION END

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

# **DTC** Logic

INFOID:000000009651249

[VQ35DE]

# EC

## DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause		
P2100	D0Throttle control motor relay circuit openECM detects that the voltage of power source for throttle control motor is excessively low.• Harness or connectors (Throttle control motor re open) • Throttle control motor re				
P2103	Throttle control motor relay circuit short	ECM detects that the throttle control motor relay is stuck ON.	<ul> <li>Harness or connectors (Throttle control motor relay circuit is shorted)</li> <li>Throttle control motor relay</li> </ul>		
	FIRMATION PROC	EDURE			
1.PRECO	NDITIONING				
ng the nex 1. Turn ig 2. Turn ig 3. Turn ig <b>TESTING</b> (	t test. Inition switch OFF and Inition switch ON. Inition switch OFF and CONDITION:	has been previously conducted, always p d wait at least 10 seconds. d wait at least 10 seconds. <b>Ing procedure, confirm that battery vol</b>			
-	is detected?	ig procedure, commin that battery vor	tage is more than o v.		
	> GO TO 2.				
	> GO TO 3.				
2.perfo	RM DTC CONFIRMAT	TION PROCEDURE FOR DTC P2100			
	ngine and let it idle for	wait at least 2 seconds. 5 seconds.			
Is DTC det	ected?				
		"Diagnosis Procedure".			
~	> INSPECTION END				
<b>J.</b> PERFO	RM DTC CONFIRMA	TION PROCEDURE FOR DTC P2103			
1. Turn ig 2. Check		wait at least 1 second.			
Is DTC det					
		"Diagnosis Procedure".			
	> INSPECTION END				
Diagnosi	s Procedure		INFOID:00000009651250		
<b>1.</b> снеск	THROTTLE CONTRO	OL MOTOR RELAY POWER SUPPLY C	CIRCUIT		
1. Turn ig	nition switch OFF.				
	nect ECM harness co				
	nect IPDM E/R harne	ss connector.	M harness connector		

4. Check the continuity between IPDM E/R harness connector and ECM harness connector.

IPDN	/I E/R	E	Continuity		
Connector	Terminal	Connector Terminal		Continuity	
F12	70	F7	34	Existed	

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# P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

2.check throttle control motor relay input signal circuit

1. Check the continuity between IPDM E/R harness connector and ECM harness connector.

IPDN	/I E/R	E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F12	54	F7	1	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< DTC/CIRCUIT DIAGNOSIS >

## P2101 ELECTRIC THROTTLE CONTROL FUNCTION

### **DTC Logic**

#### DTC DETECTION LOGIC

#### NOTE:

If DTC P2101 is displayed with DTC P2100, first perform the trouble diagnosis for DTC P2100. Refer to <u>EC-395, "DTC Logic"</u>.

If DTC P2101 is displayed with DTC 2119, first perform the trouble diagnosis for DTC P2119. Refer to <u>EC-402, "DTC Logic"</u>.

				D
DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause	D
P2101	Electric throttle control performance	Electric throttle control function does not oper- ate properly.	<ul> <li>Harness or connectors (Throttle control motor circuit is open or shorted)</li> <li>Electric throttle control actuator</li> </ul>	Е

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11 V when engine is running.

>>	GO	TO 2.	

## 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 2 seconds.
- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.

#### Is DTC detected?

## YES >> Proceed to <u>EC-397, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

### Diagnosis Procedure

#### **1.**CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL

1. Check the voltage between ECM harness connector terminals.

ECM					
	+	_		Condition	Voltage
Connector	Terminal	Condition	Terminal		
F7	1	E16	128	Ignition switch OFF	Approx. 0 V
17	I	L 10	120	Ignition switch ON	Battery voltage

#### Is the inspection result normal?

YES >> GO TO 4.

### 2.CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

### EC-397

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## P2101 ELECTRIC THROTTLE CONTROL FUNCTION

#### < DTC/CIRCUIT DIAGNOSIS >

#### 3. Disconnect IPDM E/R harness connector.

4. Check the continuity between IPDM E/R harness connector and ECM harness connector.

IPDN	/I E/R	E	Continuity	
Connector	Terminal	Connector Terminal		Continuity
F12	70	F7	34	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

 ${\it 3.}$  check throttle control motor relay input signal circuit

1. Check the continuity between IPDM E/R harness connector and ECM harness connector.

IPDM E/R		E	Continuity	
Connector	Terminal	Connector Terminal		Continuity
F12	54	F7	1	Existed

2. Also check harness for short to ground and short to power.

#### Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

4.CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect electric throttle control actuator harness connector.
- 3. Disconnect ECM harness connector.
- 4. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F29	5 	F7	5	Not existed
			2	Existed
			5	Existed
	6		2	Not existed

5. Also check harness for short to ground and short to power.

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace malfunctioning part.

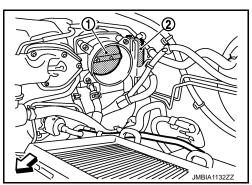
5.CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct. Refer to <u>EM-26, "Exploded View"</u>.

- 2. Check if foreign matter is caught between the throttle valve (1) and the housing.
- Electric throttle control actuator (2)
- <>: Vehicle front

#### Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, refer to <u>EM-28</u>, "<u>Exploded View</u>", and then perform throttle valve closed position learning. Refer to <u>EC-136</u>, "<u>Description</u>".



[VQ35DE]

## P2101 ELECTRIC THROTTLE CONTROL FUNCTION

<pre>P2' &lt; DTC/CIRCUIT DIAG</pre>	101 ELECTRIC THROTTLE CONTROL FUNCTION GNOSIS >	[VQ35DE]
6.CHECK THROTTLE		
Check throttle control n	notor. Refer to EC-399, "Component Inspection".	/
Is the inspection result	normal?	
YES >> GO TO 7. NO >> Replace el	lectric throttle control actuator. Refer to <u>EM-28, "Exploded View"</u> .	E
7.CHECK INTERMIT		
Check intermittent incid	dent. Refer to GI-42, "Intermittent Incident".	(
Is the inspection result	normal?	
	lectric throttle control actuator. Refer to <u>EM-28, "Exploded View"</u> . eplace error-detected parts.	[
Component Inspe	ction	INFOID:000000009651253
1.CHECK THROTTLE	E CONTROL MOTOR	E
	n OFF. c throttle control actuator harness connector. petween electric throttle control actuator terminals as per the following.	F
Terminals	Resistance	(
5 and 6	Approx. 1 - 15 Ω [at 25°C (77°F)]	
Is the inspection resultYES>> INSPECTIONNO>> Replace el		ł
		ŀ
		I
		Ν
		1
		(
		F

### P2118 THROTTLE CONTROL MOTOR

#### < DTC/CIRCUIT DIAGNOSIS >

## P2118 THROTTLE CONTROL MOTOR

### DTC Logic

INFOID:000000009651254

[VQ35DE]

#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2118	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	<ul> <li>Harness or connectors (Throttle control motor circuit is shorted.)</li> <li>Electric throttle control actuator (Throttle control motor)</li> </ul>

#### DTC CONFIRMATION PROCEDURE

#### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

>> GO TO 2.

## 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn ignition switch ON and wait at least 2 seconds.
- 2. Start engine and let it idle for 5 seconds.
- 3. Check DTC.

#### Is DTC detected?

YES >> Proceed to EC-400, "Diagnosis Procedure".

NO >> INSPECTION END

#### **Diagnosis** Procedure

INFOID:000000009651255

### 1. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Disconnect electric throttle control actuator harness connector.
- 2. Disconnect ECM harness connector.
- Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle control actuator		ECM		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F29	5	F7	5	Not existed
			2	Existed
			5	Existed
			2	Not existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace malfunctioning part.

2. CHECK THROTTLE CONTROL MOTOR

Check throttle control motor. Refer to EC-401, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace electric throttle control actuator. Refer to EM-28, "Exploded View".

### EC-400

## **P2118 THROTTLE CONTROL MOTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

## **Component Inspection**

INFOID:000000009651256

[VQ35DE]

# 1. CHECK THROTTLE CONTROL MOTOR

- 1. Turn ignition switch OFF.
- Disconnect electric throttle control actuator harness connector. 2.
- 3. Check resistance between electric throttle control actuator terminals as per the following.

Terminals	Resistance
5 and 6	Approx. 1 - 15 Ω [at 25°C (77°F)]
Is the inspection result	normal?

ls	the	ins	pection	result	normal?	

YES	>> INSPECTION END
-----	-------------------

NO >> Replace electric throttle control actuator. Refer to EM-28, "Exploded View".

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### P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< DTC/CIRCUIT DIAGNOSIS >

## P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

### **DTC Logic**

INFOID:000000009651257

[VQ35DE]

### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name		DTC detecting condition	Possible cause
		A)	Electric throttle control actuator does not func- tion properly due to the return spring malfunc- tion.	
P2119	Electric throttle control actuator	B)	Throttle valve opening angle in fail-safe mode is not in specified range.	Electric throttle control actuator
		C)	ECM detects that the throttle valve is stuck open.	

### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### >> GO TO 2.

# **2.** PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION A AND B

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Shift selector lever to the D position and wait at least 3 seconds.
- 3. Shift selector lever to the P position.
- 4. Turn ignition switch OFF and wait at least 10 seconds.
- 5. Turn ignition switch ON and wait at least 1 second.
- 6. Shift selector lever to the D position and wait at least 3 seconds.
- 7. Shift selector lever to the P position.
- 8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
- 9. Check DTC.

#### Is DTC detected?

- YES >> Proceed to EC-402, "Diagnosis Procedure".
- NO >> GO TO 3.

# **3.** PERFORM DTC CONFIRMATION PROCEDURE FOR MALFUNCTION C

- 1. Turn ignition switch ON and wait at least 1 second.
- 2. Shift selector lever to the D position and wait at least 3 seconds.
- 3. Shift selector lever to the N or P position.
- 4. Start engine and let it idle for 3 seconds.
- 5. Check DTC.

#### Is DTC detected?

- YES >> Proceed to EC-402, "Diagnosis Procedure".
- NO >> INSPECTION END

#### Diagnosis Procedure

## 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

- 1. Turn ignition switch OFF.
- 2. Remove the intake air duct. Refer to EM-26, "Exploded View".

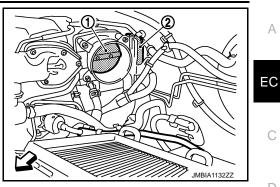
## P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

#### < DTC/CIRCUIT DIAGNOSIS >

- 3. Check if foreign matter is caught between the throttle valve (1) and the housing.
- Electric throttle control actuator (2)
- <>: Vehicle front

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to <u>EC-136. "Description"</u>.



# $2. {\tt Replace electric throttle control actuator}$

- 1. Replace electric throttle control actuator. Refer to EM-28, "Exploded View".
- 2. Go to EC-137, "Description".

>> INSPECTION END

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### P2122, P2123 APP SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

### P2122, P2123 APP SENSOR

### DTC Logic

#### NOTE:

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-337, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122	Accelerator pedal posi- tion sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	<ul> <li>Harness or connectors (APP sensor 1 circuit is open or shorted.)</li> </ul>
P2123	Accelerator pedal posi- tion sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	<ul> <li>Accelerator pedal position sensor (APP sensor 1)</li> </ul>

#### DTC CONFIRMATION PROCEDURE

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

#### >> GO TO 2.

### 2. PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine and let it idle for 1 second.

2. Check DTC.

#### Is DTC detected?

YES >> Proceed to EC-404, "Diagnosis Procedure".

NO >> INSPECTION END

#### Diagnosis Procedure

### **1.**CHECK APP SENSOR 1 POWER SUPPLY

1. Disconnect accelerator pedal position (APP) sensor harness connector.

- 2. Turn ignition switch ON.
- 3. Check the voltage between APP sensor harness connector and ground.

APP	sensor	Ground	Voltage (V)
Connector	Terminal	Ground	voltage (v)
E110	4	Ground	Approx. 5

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

#### 2.CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.

3. Check the continuity between APP sensor harness connector and ECM harness connector.

### EC-404

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## P2122, P2123 APP SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

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INFOID:000000009651261

APP sensor		E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E110	2	E16	100	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

 ${f 3}.$ CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector.

-	APP :	sensor	E	ECM		
-	Connector	Terminal	Connector	Terminal	Continuity	
-	E110	3	E16	97	Existed	

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**4.**CHECK APP SENSOR

Check APP sensor. Refer to EC-405, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace accelerator pedal assembly. Refer to <u>ACC-3, "Exploded View"</u>.

#### Component Inspection

#### 1.CHECK ACCELERATOR PEDAL POSITION SENSOR

- 1. Reconnect all harness connectors disconnected.
- 2. Turn ignition switch ON.

3. Check the voltage between ECM harness connector terminals under the following conditions.

	EC	М				
	+ –			Condition		Voltage (V)
Connector	Terminal	Connector	Terminal			
	97		100	Fully	Fully released	0.5 - 1.0
510	(APP sensor 1 sig- nal) E16	(Sensor ground)	Accelerator pedal	Fully depressed	4.2 - 4.8	
E16	98	LIU	116		Fully released	0.25 - 0.50
	(APP sensor 2 sig- nal)		(Sensor ground)		Fully depressed	2.0 - 2.5

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal assembly. Refer to <u>ACC-3, "Exploded View"</u>.

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< DTC/CIRCUIT DIAGNOSIS >

## P2127, P2128 APP SENSOR

### DTC Logic

INFOID:000000009651262

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#### DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127	Accelerator pedal posi- tion sensor 2 circuit low input	An excessively low voltage from the APP sen- sor 2 is sent to ECM.	Harness or connectors     (APP sensor 2 circuit is open or shorted.)     [CKP sensor (POS) circuit is shorted.]
P2128	Accelerator pedal posi- tion sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	<ul> <li>(Refrigerant pressure sensor circuit is shorted.)</li> <li>(EVAP control system pressure sensor circuit is shorted.)</li> <li>Accelerator pedal position sensor (APP sensor 2)</li> <li>Crankshaft position sensor (POS)</li> <li>EVAP control system pressure sensor</li> <li>Refrigerant pressure sensor</li> </ul>

### DTC CONFIRMATION PROCEDURE

### 1.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

#### >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and let it idle for 1 second.
- 2. Check DTC.

#### Is DTC detected?

- YES >> Proceed to EC-406, "Diagnosis Procedure".
- NO >> INSPECTION END

### Diagnosis Procedure

**1.**CHECK APP SENSOR 2 POWER SUPPLY

1. Disconnect accelerator pedal position (APP) sensor harness connector.

- 2. Turn ignition switch ON.
- 3. Check the voltage between APP sensor harness connector and ground.

APP :	sensor	Ground	Voltage (V)	
Connector	Terminal	Ground	voltage (v)	
E110	5	Ground	Approx. 5	

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 2.

**2.**CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

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## P2127, P2128 APP SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

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3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP	APP sensor		ECM		
Connector	Terminal	Connector	Terminal	Continuity	
E110	5	E16	103	Existed	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit.

 $\mathbf{3}.$ check sensor power supply circuit

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor			
Connector	Terminal	Name	Connector	Terminal	
F8 -	96	Refrigerant pressure sensor	E300	300         1           20         1           110         5	
ГО	54	CKP sensor (POS)	F20		
E16	103	APP sensor	E110	5	
E10	107	EVAP control system pressure sensor	B22	3	

is the inspection result normal?

YES	>>	GO .	ТΟ	4.
		_		

NO >> Repair short to ground or short to power in harness or connectors.

<b>4.</b> CHECK C	4.CHECK COMPONENTS						
<ul> <li>EVAP cont</li> </ul>	position sens	essure senso	r (Refer to <u>E</u>		nt Inspection".) ponent Inspection".) edure".)	I	
Is the inspec	tion result no	rmal?				J	
YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u> . NO >> Replace malfunctioning components.							
_	5. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT						
	<b>D.</b> CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT						
2. Disconne	2. Disconnect ECM harness connector.						
APP	sensor	EC	CM	Continuity		р. Л	
Connector	Terminal	Connector	Terminal	Continuity		Μ	
E110	1	E16	116	Existed			
4. Also che	ck harness fo	or short to gro	und and sho	rt to power.		Ν	
Is the inspec	<u>tion result no</u>	rmal?					
-	GO TO 6.			•			
NO >> F	Repair open c	circuit, short to	o ground or s	short to power	in harness or connectors.	0	

### 6.CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between APP sensor harness connector and ECM harness connector.

_	APP sensor		ECM		Continuity
	Connector	Terminal	Connector	Terminal	Continuity
	E110	6	E16	98	Existed

2. Also check harness for short to ground and short to power. Is the inspection result normal?

## P2127, P2128 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 7.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

## 7.CHECK APP SENSOR

Check APP sensor. Refer to EC-408. "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace accelerator pedal assembly. Refer to <u>ACC-3, "Exploded View"</u>.

### Component Inspection

INFOID:000000009651264

[VQ35DE]

## 1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.

2. Turn ignition switch ON.

3. Check the voltage between ECM harness connector terminals under the following conditions.

	EC	Μ					
+ –			Condition		Voltage (V)		
Connector Terminal		Connector	Terminal				
	97 (APP sensor 1 sig- nal) 98		100 (Sensor ground) 16 (Sensor ground)	Accelerator pedal	Fully released	0.5 - 1.0	
E16		E16			Fully depressed	4.2 - 4.8	
ETO		EIO			Fully released	0.25 - 0.50	
	(APP sensor 2 sig- nal)				Fully depressed	2.0 - 2.5	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal assembly. Refer to <u>ACC-3. "Exploded View"</u>.

### P2135 TP SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

## P2135 TP SENSOR

## **DTC** Logic

### DTC DETECTION LOGIC

#### NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EC-337, "DTC Logic"

DTC No.	Trouble diagnosis name	DTC de	etecting condition	Possible cause
P2135	Throttle position sensor circuit range/perfor- mance		t voltage is sent to ECM signals from TP sensor 1	<ul> <li>Harness or connector (TP sensor 1 or 2 circuit is open or short- ed.)</li> <li>Electric throttle control actuator (TP sensor 1 or 2)</li> </ul>
DTC CON	FIRMATION PROCI	EDURE		
1.PRECO	NDITIONING			
ing the next 1. Turn ig 2. Turn ig 3. Turn ig <b>TESTING (</b>	t test. nition switch OFF and nition switch ON. nition switch OFF and CONDITION:	wait at least 10 wait at least 10	seconds.	s perform the following before conduct- oltage is more than 8 V at idle.
>>	GO TO 2.			
2.PERFOR	RM DTC CONFIRMAT	TION PROCEDU	IRE	
<ol> <li>Start er</li> <li>Check</li> </ol>	ngine and let it idle for DTC.	1 second.		
	ected? Proceed to <u>EC-409,</u> INSPECTION END	"Diagnosis Proc	edure".	
Diagnosi	s Procedure			INF0ID:000000009651266
1.снеск	THROTTLE POSITIC	N SENSOR PO	WER SUPPLY	
1. Discon 2. Turn ig	nect electric throttle contract nition switch ON.	ontrol actuator h	arness connector.	s connector and ground.
Electric t	hrottle control actuator	Ground	Voltage (V/)	
Connect	or Terminal	Ground	Voltage (V)	
F29	1	Ground	Approx. 5	
YES >> NO >>		•	or short to power in ha	

3. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

### **EC-409**

<b>2.</b> PERFORM DTC CONF	IRMATION PROCEDU	RE		
<ol> <li>Start engine and let it in 2. Check DTC.</li> </ol>	dle for 1 second.			
s DTC detected?				
YES >> Proceed to EC NO >> INSPECTION	-409, "Diagnosis Proce END	edure".		
Diagnosis Procedure			INF0ID:000000009651266	;
1.CHECK THROTTLE PC	SITION SENSOR PO	WER SUPPLY		
<ol> <li>Disconnect electric thro</li> <li>Turn ignition switch ON</li> <li>Check the voltage betw</li> </ol>	N. ween electric throttle co		s connector and ground.	
Connector Termin	Ground	Voltage (V)		
F29 1	Ground	Approx. 5		
s the inspection result norr YES >> GO TO 2.		<u> </u>		
NO $\rightarrow$ Repair open ci 2.CHECK THROTTLE PC	rcuit, short to ground o	•		
<ol> <li>Turn ignition switch OF</li> <li>Disconnect ECM harne</li> </ol>				

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## P2135 TP SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

Electric throttle	Electric throttle control actuator		ECM		
Connector	Terminal	Connector Terminal		Continuity	
F29	4	F7	19	Existed	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

 $\mathbf{3}$ . CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check the continuity between electric throttle control actuator harness connector and ECM harness connector.

Electric throttle	control actuator	E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
F29	2	F7	22	Existed
129	3	1-1	23	LAISIEU

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

#### **4.**CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to EC-410. "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace electric throttle control actuator. Refer to <u>EM-28, "Exploded View"</u>.

#### Component Inspection

INFOID:000000009651267

## 1.CHECK THROTTLE POSITION SENSOR

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Perform <u>EC-136, "Description"</u>.
- 4. Turn ignition switch ON.
- 5. Shift selector lever position to D.
- 6. Check the voltage between ECM harness connector terminals under the following conditions.

	EC	М				
+		-		Condition		Voltage
Connector	Terminal	Connector	Terminal			
	22 (TP sensor 1 signal) 23			Fully released	More than 0.36 V	
F7		<b>F7</b>	19	Accelerator pedal	Fully depressed	Less than 4.75 V
17		(Sensor ground)	Accelerator pedar	Fully released	Less than 4.75 V	
	(TP sensor 2 signal)				Fully depressed	More than 0.36 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electric throttle control actuator. Refer to EM-28, "Exploded View".

### P2138 APP SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

## P2138 APP SENSOR

### **DTC Logic**

### DTC DETECTION LOGIC

#### NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to <u>EC-337, "DTC Logic"</u>.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138	Accelerator pedal posi- tion sensor circuit range/ performance	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	<ul> <li>Harness or connector (APP sensor 1 or 2 circuit is open or shorted.) [CKP sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.)</li> <li>Accelerator pedal position sensor (APP sensor 1 or 2)</li> <li>Crankshaft position sensor (POS)</li> <li>EVAP control system pressure sensor</li> <li>Refrigerant pressure sensor</li> </ul>

### **1.**PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following before conducting the next test.

- 1. Turn ignition switch OFF and wait at least 10 seconds.
- 2. Turn ignition switch ON.
- 3. Turn ignition switch OFF and wait at least 10 seconds.

#### **TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

>> GO TO 2.

# 2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Start engine and let it idle for 1 second.
- 2. Check DTC.

#### Is DTC detected?

YES >> Proceed to <u>EC-411. "Diagnosis Procedure"</u>. NO >> INSPECTION END

#### **Diagnosis Procedure**

### 1.CHECK APP SENSOR 1 POWER SUPPLY

1. Disconnect accelerator pedal position (APP) sensor harness connector.

2. Turn ignition switch ON.

3. Check the voltage between APP sensor harness connector and ground.

APP	sensor	Ground	Voltage (V)	
Connector	Connector Terminal		voltage (v)	
E110	4	Ground	Approx. 5	

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

### EC-411

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#### < DTC/CIRCUIT DIAGNOSIS >

# 2. CHECK APP SENSOR 2 POWER SUPPLY

#### 1. Turn ignition switch ON.

2. Check the voltage between APP sensor harness connector and ground.

APP	sensor	Ground	Voltage (V)
Connector	Terminal	Ground	voltage (v)
E110 5		Ground	Approx. 5

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 3.

**3.**CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between APP sensor harness connector and ECM harness connector.

APP	APP sensor		CM	Continuity	
Connector	Terminal	Connector Terminal			
E110	5	E16	103	Existed	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair open circuit.

4.CHECK SENSOR POWER SUPPLY CIRCUIT

Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor				
Connector	Terminal	Name	Connector	Terminal		
96		Refrigerant pressure sensor	E300	1		
F8	54	CKP sensor (POS)	F20	1		
E16	103	APP sensor	E110	5		
L10	107	EVAP control system pressure sensor	B22	3		

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair short to ground or short to power in harness or connectors.

#### **5.**CHECK COMPONENTS

Check the following.

• Crankshaft position sensor (POS) (Refer to <u>EC-273, "Component Inspection"</u>.)

• EVAP control system pressure sensor (Refer to EC-305, "Component Inspection".)

• Refrigerant pressure sensor (Refer to EC-442, "Diagnosis Procedure".)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to <u>GI-42, "Intermittent Incident"</u>.

NO >> Replace malfunctioning components.

#### **O**.CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check the continuity between APP sensor harness connector and ECM harness connector.

## P2138 APP SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

	sensor	ECM		Continuity		
Connector	Terminal	Connector	Terminal	Jontinuity		
E110	2	E16	100	Existed		
E110	1	E16	116	Existed		
I. Also che	eck harness fo	r short to grou	und and short to	power.		
the inspec	<u>ction result nor</u>	<u>mal?</u>				
	GO TO 7.					
-	• •		•	t to power in harn		S.
CHECK A	APP SENSOR	INPUT SIGN	AL CIRCUIT FC	OR OPEN AND SI	HORT	
. Check t	he continuity b	etween APP	sensor harness	connector and EC	CM harness conr	nector.
	sensor	EC	(	Continuity		
Connector	Terminal	Connector	Terminal			
E110	3	E16		Existed		
	6		98			
		•	und and short to	power.		
	ction result nor	mal?				
	GO TO 8.			te neuronia herro		_
•		ircuit, short to	ground or shore	t to power in harn	ess or connector	S.
	<b>APP SENSOR</b>					
		to <u>EC-413, "C</u>	component Inspe	ection".		
Check APP			component Inspe	ection".		
Check APP s the inspec YES >>	sensor. Refer ction result nor Check intermit	mal? tent incident.	Refer to <u>GI-42.</u>	"Intermittent Incic		
Check APP s the inspect YES >>	sensor. Refer ction result nor Check intermit	mal? tent incident.	Refer to <u>GI-42.</u>			
Check APP s the inspec YES >> NO >>	sensor. Refer ction result nor Check intermit	mal? tent incident. erator pedal a	Refer to <u>GI-42.</u>	"Intermittent Incic		INF0ID:0000000
Check APP <u>s the inspec</u> YES >> NO >> Compone	sensor. Refer <u>ction result nor</u> Check intermit Replace accel nt Inspectio	<u>mal?</u> tent incident. erator pedal a D <b>N</b>	Refer to <u>GI-42.</u> assembly. Refer	"Intermittent Incic to ACC-3, "Explo		INFOID:0000000
Check APP <u>s the inspec</u> YES >> NO >> Compone	sensor. Refer <u>ction result nor</u> Check intermit Replace accel nt Inspectio	<u>mal?</u> tent incident. erator pedal a D <b>N</b> R PEDAL PC	Refer to <u>GI-42.</u> assembly. Refer OSITION SENSC	"Intermittent Incic to ACC-3, "Explo		INF0ID:0000000
Check APP <u>s the inspec</u> YES >> NO >> Compone 1.CHECK A	sensor. Refer <u>ction result nor</u> Check intermit Replace accel nt Inspectio ACCELERATO ect all harness	mal? tent incident. erator pedal a DN R PEDAL PC connectors c	Refer to <u>GI-42.</u> assembly. Refer OSITION SENSC	"Intermittent Incic to ACC-3, "Explo		INFOID:0000000
Check APP <u>s the inspec</u> YES >> NO >> Compone .CHECK A . Reconne 2. Turn ign	sensor. Refer ction result nor Check intermit Replace accel nt Inspectio ACCELERATO ect all harness ition switch Of	mal? tent incident. erator pedal a DN R PEDAL PC connectors c N.	Refer to <u>GI-42.</u> assembly. Refer OSITION SENSC	<u>"Intermittent Incic</u> to <u>ACC-3, "Explo</u> DR	<u>ded View"</u> .	
Check APP <u>s the inspec</u> YES >> NO >> Compone I.CHECK A I. Reconne 2. Turn ign	sensor. Refer ction result nor Check intermit Replace accel nt Inspectio ACCELERATO ect all harness ition switch Of	mal? tent incident. erator pedal a DN R PEDAL PC connectors c N.	Refer to <u>GI-42.</u> assembly. Refer OSITION SENSC	"Intermittent Incic to ACC-3, "Explo	<u>ded View"</u> .	
Check APP <u>s the inspec</u> YES >> NO >> Compone I.CHECK A I. Reconne 2. Turn ign	sensor. Refer <u>ction result nor</u> Check intermit Replace accel <b>nt Inspection</b> ACCELERATO ect all harness ition switch Of he voltage betw	mal? tent incident. erator pedal a DN R PEDAL PC connectors c N.	Refer to <u>GI-42.</u> assembly. Refer OSITION SENSC	<u>"Intermittent Incic</u> to <u>ACC-3, "Explo</u> DR	<u>ded View"</u> .	
Check APP <u>s the inspec</u> YES >> NO >> Compone I.CHECK A I. Reconne 2. Turn ign	sensor. Refer <u>ction result nor</u> Check intermit Replace accel <b>nt Inspection</b> ACCELERATO ect all harness ition switch Of he voltage betw	mal? tent incident. erator pedal a DN R PEDAL PC connectors o N. ween ECM ha	Refer to <u>GI-42.</u> assembly. Refer OSITION SENSC	<u>"Intermittent Incic</u> to <u>ACC-3, "Explo</u> DR	ded View". the following cor	nditions.
Check APP <u>s the inspec</u> YES >> NO >> Compone I.CHECK A I. Reconne 2. Turn ign	sensor. Refer <u>ction result nor</u> Check intermit Replace accel <b>int Inspection</b> ACCELERATO ect all harness ition switch Of he voltage betw	mal? tent incident. erator pedal a DN R PEDAL PC connectors o N. ween ECM ha	Refer to <u>GI-42.</u> assembly. Refer OSITION SENSC	"Intermittent Incic to <u>ACC-3, "Explo</u> DR r terminals under	ded View". the following cor	
Check APP <u>s the inspec</u> YES >> NO >> Compone 1.CHECK A 1. Reconne 2. Turn ign 3. Check the second	sensor. Refer <u>ction result nor</u> Check intermit Replace accel <b>nt Inspection</b> ACCELERATO ect all harness ition switch Of he voltage betw +	mal? tent incident. erator pedal a DN R PEDAL PC connectors o N. ween ECM ha	Refer to <u>GI-42.</u> assembly. Refer DSITION SENSC disconnected. arness connecto	"Intermittent Incic to <u>ACC-3, "Explo</u> DR r terminals under	ded View". the following con	nditions. Voltage (V)
Check APP <u>s the inspec</u> YES >> NO >> Compone .CHECK / . Reconn 2. Turn ign 3. Check the second	sensor. Refer <u>ction result nor</u> Check intermit Replace accel <b>nt Inspection</b> ACCELERATO ect all harness ition switch Of he voltage betw + Terminal 97 (APP sensor 1 s	mal? tent incident. erator pedal a ON R PEDAL PC connectors on ween ECM ha ECM	Refer to <u>GI-42.</u> assembly. Refer DSITION SENSC disconnected. arness connecto – – Terminal 100	"Intermittent Incic to <u>ACC-3, "Explo</u> DR r terminals under	ded View". the following cor lition	Noltage (V)
Check APP <u>s the inspec</u> YES >> NO >> Compone .CHECK A . Reconne . Turn ign 3. Check the second	sensor. Refer <u>ction result nor</u> Check intermit Replace accel <b>nt Inspection</b> ACCELERATO ect all harness ition switch Of he voltage betw + Terminal 97 (APP sensor 1 s nal)	mal? tent incident. erator pedal a ON R PEDAL PC connectors on ween ECM ha ECM	Refer to <u>GI-42.</u> assembly. Refer DSITION SENSC disconnected. arness connecto	"Intermittent Incic to <u>ACC-3, "Explo</u> DR r terminals under	ded View". the following con lition Fully released Fully depressed	Noltage (V) 0.5 - 1.0 4.2 - 4.8
Check APP <u>s the inspec</u> YES >> NO >> Compone I.CHECK A I. Reconne 2. Turn ign 3. Check the Connector	sensor. Refer <u>ction result nor</u> Check intermit Replace accel <b>INT INSPECTIO</b> ACCELERATO ect all harness ition switch OI he voltage betw + Terminal 97 (APP sensor 1 s nal) 98	mal? ttent incident. erator pedal a DN R PEDAL PC connectors o N. ween ECM ha ECM Connector ig- E16	Refer to <u>GI-42.</u> assembly. Refer DSITION SENSO disconnected. arness connecto – Terminal 100 (Sensor ground) 116	"Intermittent Incic to ACC-3, "Explo DR r terminals under	ded View". the following con lition	Noltage (V)
Check APP <u>s the inspec</u> YES >> NO >> Compone I.CHECK A I. Reconne 2. Turn ign 3. Check the Connector	sensor. Refer <u>ction result nor</u> Check intermit Replace accel <b>nt Inspection</b> ACCELERATO ect all harness ition switch Of he voltage betw + Terminal 97 (APP sensor 1 s nal)	mal? ttent incident. erator pedal a DN R PEDAL PC connectors o N. ween ECM ha ECM Connector ig- E16	Refer to <u>GI-42.</u> assembly. Refer DSITION SENSO disconnected. arness connecto – Terminal 100 (Sensor ground)	"Intermittent Incic to ACC-3, "Explo DR r terminals under	ded View". the following con lition Fully released Fully depressed	Noltage (V) 0.5 - 1.0 4.2 - 4.8

## ASCD BRAKE SWITCH

## Component Function Check

## 1.CHECK ASCD BRAKE SWITCH FUNCTION

#### With CONSULT

- 1. Turn ignition switch ON.
- 2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT.
- 3. Check "BRAKE SW1" indication under the following conditions.

Monitor item	Co	Indication	
BRAKE SW1	Brake pedal	Slightly depressed	OFF
	biake pedai	Fully released	ON

#### **Without CONSULT**

1. Turn ignition switch ON.

2. Check the voltage between ECM harness connector terminals.

	ECM				
Connector	+	-	Condition		Voltage
Connector	Terminal	Terminal			
= + =	126			Slightly depressed	Approx. 0 V
E16	(ASCD brake switch signal)	128	Brake pedal	Fully released	Battery voltage

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EC-414. "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:000000009651272

## 1. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ASCD brake switch harness connector and ground.

ASCD bra	ake switch	Ground	Voltage	
Connector	Terminal	Ground	vollage	
E109	1	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

## 2. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect fuse block (J/B) harness connector.
- Check the continuity between ASCD brake switch harness connector and fuse block (J/B) harness connector.

ASCD brake switch		Fuse bl	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
 E109	1	E103	4F	Existed

Is the inspection result normal?

INFOID:000000009651271

## ASCD BRAKE SWITCH

< DTC/CIR		SNOSIS >		[VQ35DE]	
				r power supply circuit.	
•	Repair or r	•		•	А
			CH INPUT S	SIGNAL CIRCUIT FOR OPEN AND SHORT	
	nition switch nect ECM h		noctor		EC
				ke switch harness connector and ECM harness connector.	
		,			
ASCD bra	ke switch	EC	CM	Continuity	С
Connector	Terminal	Connector	Terminal	Continuity	
E109	2	E16	126	Existed	D
4. Also ch	eck harnes	s for short	to ground a	and short to power.	
Is the inspe	ction result	normal?			
-	GO TO 4.				E
	• •		-	and or short to power in harness or connectors.	
4.СНЕСК					F
			to <u>EC-415</u>	, "Component Inspection (ASCD Brake Switch)".	-
Is the inspe					
				er to <u>GI-42, "Intermittent Incident"</u> . efer to <u>BR-18, "Exploded View"</u> .	G
-	•				
Compone	ent Inspe	ction (AS	SCD Bra	ke Switch)	Н
<b>1.</b> CHECK	ASCD BRA	KE SWITC	CH-I		
	nition switch				
	nect ASCD		ch harness	connector.	
3. Check	the continui	ty between	ASCD bra	ke switch terminals under the following conditions.	
					J
Terminals		Conditio		Continuity	0
1 and 2	Brake pe	edal	eleased	Existed	
		Ű,	y depressed	Not existed	Κ
Is the inspe					
	INSPECTI GO TO 2.	ON END			1
2.снеск			` <b>Ы_</b> Ш		
				Refer to <u>BR-7, "Inspection and Adjustment"</u> . The switch terminals under the following conditions.	M
		ly settleen			
Terminals		Conditio	'n	Continuity	
		Fully r	eleased	Existed	Ν
1 and 2	Brake pe	edal Slightl	y depressed	Not existed	
Is the inspe	ction result		-		0
	INSPECTI				-
NO >>	Replace A	SCD brake	switch. Re	efer to <u>BR-18, "Exploded View"</u> .	
					Ρ

### < DTC/CIRCUIT DIAGNOSIS >

## ASCD INDICATOR

## **Component Function Check**

INFOID:000000009651274

INFOID:000000009651275

[VQ35DE]

#### **1.**CHECK ASCD INDICATOR FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION		
CRUISE	Ignition switch: ON	<ul> <li>MAIN switch: Pressed at the 1st time →at the 2nd time</li> </ul>	$ON\toOFF$		
s the inspection result normal?					

YES >> INSPECTION END

NO >> Proceed to EC-416, "Diagnosis Procedure".

### Diagnosis Procedure

**1**.CHECK DTC

Check that DTC UXXXX is not displayed.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Perform trouble diagnosis for DTC UXXXX.

2. CHECK COMBINATION METER FUNCTION

Check combination meter function. Refer to <u>MWI-35, "CONSULT Function"</u>.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning part.

**3.**CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace combination meter. Refer to <u>MWI-93</u>, "Exploded View".

NO >> Repair or replace error-detected parts.

<	DT	°C/0	CIRC	UIT	DIA	GN	SIS	>

						А
Component Function	on Check				INFOID:00000009651276	7.
1. CHECK COOLING F.	AN FUNCTIO	N				EC
<ul> <li>With CONSULT</li> <li>Turn ignition switch</li> <li>Perform "COOLING</li> <li>Check that cooling f</li> <li>Without CONSULT</li> </ul>	FAN" in "ACT			NSULT.		С
			-	otors operation,	refer to PCS-11, "Diagnosis	D
Is the inspection result r YES >> INSPECTIC NO >> Proceed to	ormal? N END	·				Ε
Diagnosis Procedu	re				INFOID:00000009651277	F
1. CHECK COOLING F. 1. Turn ignition switch 2. Disconnect cooling	OFF.		LY			G
<ol> <li>Turn ignition switch</li> <li>Check the voltage b</li> </ol>	ON.		2, -3 harness o	connectors and (	ground.	Η
Cooling fan r	elay	Groun	d \/alt/			
Connector	Terminal	Glouin	d Volta			I
E57 (cooling fan relay-2)	2 5	Ground	d Battery	voltage		J
E59 (cooling fan relay-3)	2 5		Dattery	voltage		
Is the inspection result r	ormal?		l			K
YES >> GO TO 2. NO >> Perform the <b>2.</b> CHECK COOLING F.	-	•		it.		L
<ol> <li>Turn ignition switch</li> <li>Disconnect IPDM E.</li> <li>Check the continuity tor.</li> </ol>	/R harness co		7-2, -3 harness	s connectors and	I IPDM E/R harness connec-	M
Cooling fan rel	ay	IPD	M E/R			Ν
Connector	Terminal	Connector	Terminal	Continuity		
E57 (cooling fan relay-2)	1	E11	42	Existed		0
E59 (cooling fan relay-3)	1	E10	34	EXISTOR		Ρ
<ol><li>Also check harness</li></ol>	for short to a	ound and sho	ort to power.			

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**3.**CHECK COOLING FAN MOTOR POWER SUPPLY

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Disconnect cooling fan motor-1 harness connector.
- 2. Check the voltage between cooling fan motor-1 harness connector and ground.

Cooling fan n	notor-1	Ground	Voltage	
Connector	Connector Terminal		voltage	
E301	1	Ground	Battery voltage	
2301	2	Glodina	Ballery Vollage	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform the trouble diagnosis for power supply circuit.

### 4. CHECK COOLING FAN MOTOR CIRCUIT-I

- 1. Disconnect cooling fan motor-2 harness connector.
- 2. Check the continuity between cooling fan relay-2, -3 harness connectors and cooling fan motor-1, -2 harness connectors.

Cooling fan re	əlay	Cooling far	Cooling fan motor		
Connector	Connector Terminal		Terminal	Continuity	
E57	3	E302 (Cooling fan motor-2)	2		
(cooling fan relay-2)	7	E301 (Cooling fan motor-1)	3	Existed	
E59	3	E302 (Cooling fan motor-2)	1	Existed	
(cooling fan relay-3)	7	E301 (Cooling fan motor-1)	4		

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Perform the trouble diagnosis for power supply circuit.

#### **5.**CHECK COOLING FAN MOTOR CIRCUIT-II

 Check the continuity between IPDM E/R harness connector and cooling fan motor-1, -2 harness connector.

IPDI	/I E/R	Cooling fan motor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E10	35	E301 (Cooling fan motor-1)	4	Existed
LIU	38	E302 (Cooling fan motor-2)	1	

2. Also check harness for short to ground and short to power.

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Perform the trouble diagnosis for power supply circuit.

**6.**CHECK COOLING FAN MOTOR CIRCUIT-III

1. Check the continuity between cooling fan relay-2, -3 harness connectors and ground.

#### < DTC/CIRCUIT DIAGNOSIS >

Cooling far	n motor			A
Connector	Terminal	Ground	Continuity	
E57 (cooling fan relay-2)	6	Ground	Existed	EC
E59 (cooling fan relay-3)	6			
2. Also check harnes	s for short to grou	ind and short to po	ower.	С
Is the inspection result	normal?			
_ · ·		•	power in harness or c	onnectors.
7.CHECK COOLING				
1. Check the continu	ity between coolin	g fan motor-2 harı	ness connector and gro	ound. E
Cooling fan n	notor-2			
Connector	Terminal	Ground	Continuity	F
	3			
E302	4	Ground	Existed	G
Is the inspection result YES >> GO TO 8. NO >> Repair ope 8.CHECK COOLING Check cooling fan rela	en circuit, short to FAN RELAYS-2 A	ND -3	power in harness or c	
Is the inspection result YES >> GO TO 9. NO >> Replace m	normal?	ling fan relay.		J
9.CHECK COOLING				V
Check cooling fan mot		er to <u>EC-419, "Con</u>	nponent Inspection (Co	boling Fan Motor)".
Is the inspection result YES >> GO TO 10 NO >> Replace m 10.CHECK INTERM	nalfunctioning coo	•	fer to <u>CO-17, "Explode</u>	<mark>d View"</mark> . ∟
Check intermittent inci	dent. Refer to <u>GI-</u>	12, "Intermittent In	<u>cident"</u> .	M
		PCS-36, "Explod cted parts.	<u>ed View"</u> .	Ν
Component Inspe	•	•		INFOID:00000009651278
1. CHECK COOLING	FAN MOTOR			0
<ol> <li>Turn ignition switc</li> <li>Disconnect cooling</li> <li>Supply cooling fan</li> </ol>	g fan motor harne:		e and check operation.	P

#### < DTC/CIRCUIT DIAGNOSIS >

	Condition	Term	Terminals		
		(+)	(-)		
Cooling fan motor	A	1	3 and 4		
		2	3 and 4		
		1 and 2	3		
		1 and 2	4		
		1, 2	3, 4		

Check that cooling fan speed of condition B is higher than that of A. <u>Is the inspection result normal?</u>

YES >> INSPECTION END

NO >> Replace cooling fan motor. Refer to CO-17, "Exploded View".

Component Inspection (Cooling Fan Relay)

# 1. CHECK COOLING FAN RELAY

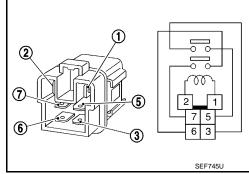
- 1. Disconnect cooling fan relays -2, -3 harness connectors.
- 2. Check continuity between cooling fan relay -2, -3 terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5 6 and 7	12 V direct current supply between terminals 1 and 2	Existed
	No current supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace cooling fan relay.



[VQ35DE]

INFOID:000000009651279

## ELECTRICAL LOAD SIGNAL

### < DTC/CIRCUIT DIAGNOSIS >

## ELECTRICAL LOAD SIGNAL

## Description

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred via the CAN communication.

### Component Function Check

## 1.CHECK REAR WINDOW DEFOGGER SWITCH FUNCTION

- Turn ignition switch ON. 1.
- 2. Connect CONSULT and select "DATA MONITOR" mode.
- Select "LOAD SIGNAL" and check indication under the following conditions. 3.

Monitor item	r item Condition		Indication			
LOAD SIGNAL	Rear window defogger switch	ON	ON			
LUAD SIGNAL	Real window delogger switch	OFF	OFF			
Is the inspection result normal?						

YES	>> GO TO 2.
NO	>> Proceed to EC-421, "Diagnosis Procedure".

## 2.check lighting switch function

Check "LOAD SIGNAL" indication under the following conditions.

Monitor item	Co	Indication	
LOAD SIGNAL	Lighting switch	ON at 2nd position	ON
LOAD SIGNAL	Lighting switch	OFF	OFF

Is the inspection result normal?

YES	>> GO TO 3.
NO	>> Proceed to EC-421, "Diagnosis Procedure".

# **3.**CHECK HEATER FAN CONTROL SWITCH FUNCTION

Select "HEATER FAN SW" and check indication under the following conditions.

Monitor item Condition			Indication
HEATER FAN SW	Heater fan control switch	ON	ON
HEATERTANOW	rieater fan control switch	OFF	OFF

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EC-421, "Diagnosis Procedure".

### Diagnosis Procedure

### **1.**INSPECTION START

Confirm the malfunctioning circuit (rear window defogger, headlamp or heater fan). Refer to EC-421, "Component Function Check".

Which circuit is related to the incident?

Rear window defogger>>GO TO 2.

Headlamp>>GO TO 3.

Heater fan>>GO TO 4.

2.CHECK REAR WINDOW DEFOGGER SYSTEM

Check rear window defogger system. Refer to DEF-19, "Work Flow".

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INFOID:000000009651280

INFOID:000000009651281

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## ELECTRICAL LOAD SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

 $>> {\sf INSPECTION \ END} \\ \textbf{3.check headlamp system}$ 

Check headlamp system. Refer to <u>EXL-59</u>, "Work Flow" (XENON TYPE) or <u>EXL-171</u>, "Work Flow" (HALO-GEN TYPE).

>> INSPECTION END

**4.**CHECK HEATER FAN CONTROL SYSTEM

Check heater fan control system. Refer to <u>VTL-6. "VENTILATION SYSTEM (FRONT AIR CONDITIONING) :</u> System Description".

>> INSPECTION END

### **ELECTRONIC CONTROLLED ENGINE MOUNT**

< DTC/CIRCUIT DIAGNOSIS >

## ELECTRONIC CONTROLLED ENGINE MOUNT

[VQ35DE]

ELECTRONIC CONTR	OLLED EN	GINE MOUI		А		
Component Function Che	ck		INFOID:00000009651283	Π		
1. CHECK OVERALL FUNCTION	N		E	EC		
Is the inspection result normal?	nile depressing the test of te	ne brake pedal ar		С		
YES >> INSPECTION END NO >> <u>EC-423, "Diagnosis F</u>	Procedure".			D		
Diagnosis Procedure			INFOID:00000009651284	Е		
<b>1.</b> CHECK VACUUM SOURCE						
<ol> <li>Turn ignition switch OFF.</li> <li>Reconnect electronic controll</li> <li>Disconnect vacuum hose cor</li> <li>Start engine and let it idle.</li> </ol>	nnected to electro		ngine mount.	F		
5. Check vacuum hose for vacu	um existence.		(	G		
Vacuum should exist.Is the inspection result normal?YES>> GO TO 7.YES>> GO TO 7.			ł	Η		
-	NO >> GO TO 2. 2.CHECK VACUUM HOSES AND VACUUM GALLERY					
<ol> <li>Turn ignition switch OFF.</li> <li>Check vacuum hoses and va "ELECTRONIC CONTROLLE"</li> </ol>			s or improper connection. Refer to <u>EC-46.</u>	J		
Is the inspection result normal?         YES       >> GO TO 3.         NO       >> Repair or replace vac         3       CHECKEL FOTDONIC CONTINUES		• •		K		
1. Disconnect electronic control			TROL SOLENOID VALVE POWER SUPPLY	L		
2. Turn ignition switch ON.	-		nount harness connector and ground.	M		
Electronic controlled engine mount control solenoid valve	Ground	Voltage				
Connector Terminal	Onerrial	Detten	<u> </u>	Ν		
F111Is the inspection result normal?YESYESNO>> GO TO 5.NO>> GO TO 4.	Ground	Battery voltage	-	0		
	ROLLED ENGIN	E MOUNT CONT	TROL SOLENOID VALVE POWER SUPPLY	Ρ		
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect fuse block (J/B) h</li> <li>Check the continuity between harness connector.</li> </ol>			unt harness connector and fuse block (J/B)			

## ELECTRONIC CONTROLLED ENGINE MOUNT

#### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

	Electronic controlled engine mount control solenoid valve		Fuse block (J/B)		
Connector	Terminal	Connector	Terminal		
F11	1	E103	4F	Existed	

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

**5.**CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- 1. Disconnect ECM harness connector.
- 2. Check the continuity between ECM harness connector and electronic controlled engine mount control solenoid valve harness connector.

ECM		Electronic controlled engine mount control solenoid valve		Continuity
Connector	Terminal	Connector	Terminal	
F7	38	F11	2	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair open circuit, short to ground or short to power in harness connectors.

 $\mathbf{6}$ . CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE

Check electronic controlled engine mount control solenoid valve. Refer to <u>EC-424</u>, "<u>Component Inspection</u>". <u>Is the inspection result normal?</u>

YES >> GO TO 7.

NO >> Replace electronic controlled engine mount control solenoid valve. Refer to <u>EM-28</u>, "<u>Exploded</u> <u>View</u>".

7. CHECK ELECTRONIC CONTROLLED ENGINE MOUNT

- 1. Turn ignition switch OFF.
- Install vacuum pump (A) to electronic controlled engine mount (1).
- Check that a vacuum is maintained when applying the vacuum of -40 kPa (-0.41 kg/cm<sup>2</sup>, -5.8 psi) to electronic controlled engine mount.
- 4. Also visually check electronic controlled engine mount.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace electronic controlled engine mount.

## 8. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace intake manifold collector. Refer to <u>EM-28, "Exploded View"</u>.
- NO >> Repair or replace error-detected parts.

#### **Component Inspection**

INFOID:000000009651285

#### **1.**CHECK ELECTRONIC CONTROLLED ENGINE MOUNT CONTROL SOLENOID VALVE

#### (I) With CONSULT

1. Turn ignition switch OFF.

Revision: 2014 May

### EC-424

MBIB1237E

## ELECTRONIC CONTROLLED ENGINE MOUNT

#### < DTC/CIRCUIT DIAGNOSIS >

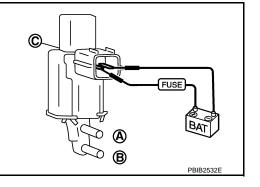
- 2. Reconnect electronic controlled engine mount control solenoid valve harness connector.
- 3. Disconnect vacuum hoses connected to electronic controlled engine mount control solenoid valve.
- 4. Turn ignition switch ON.
- 5. Select "ENGINE MOUNTING" in "ACTIVE TEST" mode with CONSULT.
- Check air passage continuity and operation delay time under the following conditions.

Condition (ENGINE MOUNTING)	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
TRVL	Existed	Not existed
IDLE	Not existed	Existed

#### **Without CONSULT**

- 1. Turn ignition switch OFF.
- 2. Disconnect electronic controlled engine mount control solenoid valve harness connector.
- 3. Disconnect vacuum hoses connected to electronic controlled engine mount control solenoid valve.
- Check air passage continuity and operation delay time under the following conditions.

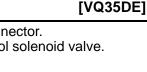
Condition	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
12 V direct current supply be- tween terminals 1 and 2	Existed	Not existed
No supply	Not existed	Existed



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace electronic controlled engine mount control solenoid valve. Refer to <u>EM-28, "Exploded View"</u>.



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## FUEL INJECTOR

### **Component Function Check**

### **1.**INSPECTION START

Turn ignition switch to START.

Are any cylinders ignited?

YES >> GO TO 2.

NO >> Proceed to EC-426, "Diagnosis Procedure".

2. CHECK FUEL INJECTOR FUNCTION

#### With CONSULT

- 1. Start engine.
- 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that each circuit produces a momentary engine speed drop.

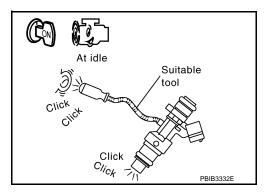
#### Without CONSULT

- 1. Start engine.
- 2. Listen to each fuel injector operating sound.

#### Clicking sound should be heard.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to EC-426, "Diagnosis Procedure".



### **Diagnosis Procedure**

INFOID:000000009651287

## 1.CHECK FUEL INJECTOR POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect fuel injector harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between fuel injector harness connector and ground.

	Fuel injector			Voltage
Cylinder	Connector Terminal		Ground	vollage
1	F37	1		
2	F38	1		
3	F39	1	Ground	Battery voltage
4	F40	1	Giouna	Ballery Vollage
5	F41	1	1	
6	F42	1		

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect IPDM E/R harness connector.

3. Check the continuity between fuel injector harness connector and IPDM E/R harness connector.

### EC-426

INFOID:000000009651286

## **FUEL INJECTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

	Fuel injector		IPDN	1 E/R		-
Cylinder	Connector	Terminal	Connector	Terminal	Continuity	
1	F37	1		51		-
2	F38	1	-	52		
3	F39	1	51			
4	F40	1	F12	52	Existed	
5	F41	1	-	51		
6	F42	1		52		
-	ction result no					-
	Perform the t Repair or rep				uit.	
	• •		•		OPEN AND S	
			I SIGNAL C		OF LIN AIND 3	
	nition switch C nect ECM har		ctor.			
				ness connect	or and ECM ha	rness connector.
			1			_
	Fuel injector			CM	Continuity	
Cylinder	Connector	Terminal	Connector	Terminal	,	_
1	F37	2	-	33		
2	F38	2	- F7	44		
3	F39	2		48	Existed	
4	F40	2		47	Existed	
5	F41	2		46		
6	F42	2		45		_
	eck harness f	-	round and sh	ort to power.		
	ction result no	ormal?				
	GO TO 4. Repair open	circuit short	to around or	short to now	er in harness o	r connectors
•	UEL INJECT				0111110111033 0	
			"Compositors"	Inon official		
	njector. Refer	-	Component	inspection".		
	GO TO 5.					
		functioning f	uel injector. R	Refer to <u>EM-4</u>	7, "Exploded V	iew".
-	NTERMITTE	•	-			
	nittent incide	_		nittent Incider	ıt"	
	ction result no				<u></u> .	
•	Replace IPD		r to PCS-36	"Exploded Vi	ew".	
	Repair or rep				<u></u> .	
	ent Inspect					INFOID:000000009651:
	-					
.CHECK F	-UEL INJEC	IOR				

2. Disconnect fuel injector harness connector.

## **FUEL INJECTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

### [VQ35DE]

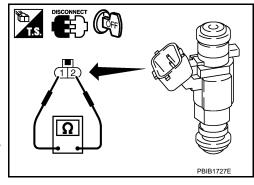
3. Check resistance between fuel injector terminals as per the following.

Terminals	Resistance		
1 and 2	11.1 - 14.5 Ω [at 10 - 60°C (50 - 140°F)]		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning fuel injector. Refer to <u>EM-47</u>, <u>"Exploded View"</u>.



## < DTC/CIRCUIT DIAGNOSIS >

## FUEL PUMP

### **Component Function Check**

#### **1.**CHECK FUEL PUMP FUNCTION

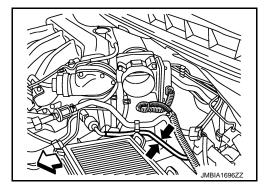
- 1. Turn ignition switch ON.
- 2. Pinch fuel feed hose (+) with two fingers.

Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> EC-429, "Diagnosis Procedure".



INFOID:000000009651290

### Diagnosis Procedure

**1.**CHECK FUEL PUMP RELAY POWER SUPPLY-I

1.	Turn	ignition	switch	OFF.
----	------	----------	--------	------

- 2. Disconnect ECM harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ECM harness connector terminals.

+		-		Voltage
Connector	Terminal	Connector	Terminal	
F7	43	E16	128	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

2.CHECK FUEL PUMP RELAY POWER SUPPLY-II

Check the voltage between IPDM E/R harness connector and ground.

IPD	M E/R		Mallana
Connector	Terminal	Ground	Voltage
F12	77	Ground	Battery voltage
Is the inspection	result normal?		
YES >> GO			
YES >> GO			

NO >> GO TO 7.

3.CHECK FUEL PUMP RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect IPDM E/R harness connector.

3. Check the continuity between ECM harness connector and IPDM E/R harness connector.

ECM		IPDN	Continuity		
Connector	Terminal	Connector Terminal		Continuity	
F7	43	F12	77	Existed	

## EC-429

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#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

### **4.**CHECK FUEL PUMP POWER SUPPLY CIRCUIT

- 1. Disconnect "fuel level sensor unit and fuel pump" harness connector.
- 2. Check harness continuity between IPDM E/R harness connector and "fuel level sensor unit and fuel pump" harness connector.

IPDM E/R		Fuel level sens	Continuity	
Connector	Terminal	Connector	Terminal	*
E10	13	B40	1	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit or short to power in harness or connectors.

#### 5.CHECK FUEL PUMP GROUND CIRCUIT

- 1. Disconnect "fuel level sensor unit and fuel pump" harness connector.
- 2. Check the continuity between "fuel level sensor unit and fuel pump" harness connector and ground.

Fuel level sensor unit and fuel pump		Ground	Continuity
Connector	Terminal		
B40	3	Ground	Existed

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair open circuit or short to power in harness or connectors.

#### **6.**CHECK FUEL PUMP

Check fuel pump. Refer to EC-430, "Component Inspection (Fuel Pump)".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace fuel filter and fuel pump assembly. Refer to FL-5, "Removal and Installation".

**7.**CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-42, "Intermittent Incident".

#### Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to <u>PCS-36, "Removal and Installation"</u>.
- NO >> Repair or replace error-detected parts.

### Component Inspection (Fuel Pump)

1.CHECK FUEL PUMP

- 1. Turn ignition switch OFF.
- 2. Disconnect "fuel level sensor unit (fuel pump)" harness connector.
- 3. Check resistance between "fuel level sensor unit (fuel pump)" terminals as follows.

Terminals	Resistance [at 25°C (77°F)]	
1 and 3	0.2 - 5.0 Ω	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace fuel level sensor unit, fuel filter and fuel pump assembly. Refer to <u>FL-5, "Exploded View"</u>.

### EC-430

INFOID:000000009651291

< DTC/CIRCUIT DIAGNOSIS >	
IGNITION SIGNAL	

IGNITIO	N SIGNA	L				٨
Component Function Check				A		
	1.INSPECTION START Turn ignition switch OFF, and restart engine.					EC
Does the en YES-1 >> YES-2 >>		ilt: go to Isult: go '	2. TO 3.	<u>cedure"</u> .		С
2.снеск і	GNITION SIG	GNAL FUNG	CTION			D
2. Check the	<b>"POWER BA</b>	uit produces		EST" mode with CONSULT. ary engine speed drop.		E
YES >> NO >>	INSPECTION Proceed to E	N END C-431, "Dia	-	<u>cedure"</u> .		F
🛞 Without	CONSULT					G
<ol> <li>Let engi</li> <li>Read th</li> </ol>		nal betweer	n ECM harn	ess connector terminals with an oscilloscope.		Н
	EC	Μ				
Connector	+ Terminal	Connector	- Terminal	Voltage signal		
F7	9 10 11	E16	128	50mSec/div		J
	13 14 15			2V/div JMBIA0035GB		K
NOTE:				<u> </u>		L
<u>Is the inspec</u> YES >>	cycle changes <u>ction result no</u> INSPECTION Proceed to <u>E</u>	ormal? N END		<u>cedure"</u> .		Μ
Diagnosis	Procedur	е			INFOID:000000009651294	Ν
<b>1.</b> CHECK E	ECM POWEF	R SUPPLY				
				conds and then turn it ON. onnector terminals.		0
	ECM					Ρ
Connector	+ Termin	al Te	- rminal	Voltage		
E16	121		128	Battery voltage		
Is the inspec	tion result no	ormal?				

NO >> Refer to <u>EC-163, "Diagnosis Procedure"</u>.

YES >> GO TO 2.

## **IGNITION SIGNAL**

#### < DTC/CIRCUIT DIAGNOSIS >

# 2. CHECK CONDENSER POWER SUPPLY

- 1. Turn ignition switch OFF.
- 2. Disconnect condenser harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between condenser harness connector and ground.

Conc	lenser	Ground	Voltage
Connector	Connector Terminal		voltage
F13	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

**3.**CHECK CONDENSER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.

2. Disconnect IPDM E/R harness connector.

3. Check the continuity between IPDM E/R harness connector and condenser harness connector.

IPDM E/R		Conc	Continuity		
Connector	Terminal	Connector	Terminal	Continuity	
F12	49	F13	1	Existed	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Refer to EC-163, "Diagnosis Procedure".

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

#### **4.**CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Check the continuity between condenser harness connector and ground.

Conc	lenser	Ground	Continuity	
Connector	Terminal	Ground	Continuity	
F13	2	Ground	Existed	

3. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair open circuit or short to power in harness or connectors.

**5.**CHECK CONDENSER

Check condenser. Refer to EC-435, "Component Inspection (Condenser)"

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace condenser.

6.CHECK IGNITION COIL POWER SUPPLY

- 1. Reconnect all harness connectors disconnected.
- 2. Disconnect ignition coil harness connector.
- 3. Turn ignition switch ON.
- 4. Check the voltage between ignition coil harness connector and ground.

### **IGNITION SIGNAL**

### < DTC/CIRCUIT DIAGNOSIS >

	Ignition coil		Ground	Voltage			
ylinder	Connector	Terminal	Giouna	vollage			
	F31	3					
2	F32	3	-				
3	F33	3	Ground	Pattony volta			
4	F34	3	Giouna	Battery volta	ige		
5	F35	3	-				
6	F36	3	-				
<u>e inspe</u>	ction result no	ormal?					
	GO TO 7.						
	Repair or rep						
HECK	GNITION CC	IL GROUN		FOR OPEN	AND SHORT		
	ition switch C						
Check t	he continuity	between igr	nition coil ha	rness conne	ctor and ground.		
	Institut						
Outlineder	Ignition of		un in al	Ground	Continuity		
Cylinder	Connec	tor le	minal				
1	F31		2				
2	F32		2				
3	F33		2	Ground Ex	Ground	Existed	
4	F34						
5	F35		2				
6	F36		2				
	eck harness f		ower.				
-	ction result no	ormal?					
	GO TO 8. Repair open	circuit or sh	ort to nower	in harness c	r connectors.		
) \>					OPEN AND SH		
			SIGNAL C	RCOILI OR	OF LIN AND SH		
CHECK I							
CHECK I Disconr	ect ECM har	ness conne	ctor.	rness conne	ctor and ECM ba	rness connect	
CHECK I Disconr	ect ECM har	ness conne	ctor.	rness conne	ctor and ECM ha	rness connect	
CHECK I Disconr	ect ECM har he continuity	ness conne	ctor. hition coil ha			rness connect	
CHECK I Disconr Check t	ect ECM har he continuity Ignition coil	ness conne between igr	ctor. hition coil ha	CM	ctor and ECM ha	rness connec	
CHECK I Disconr Check t	lect ECM har he continuity Ignition coil Connector	ness conne between igr Terminal	ctor. hition coil ha	CM Terminal		rness connec	
CHECK I Disconr Check t Cylinder 1	lect ECM har he continuity Ignition coil Connector F31	ness conne between igr Terminal 1	ctor. hition coil ha	CM Terminal 11		rness connect	
CHECK I Disconr Check t Cylinder 1 2	Ignition coil Connector F31 F32	ness conner between igr Terminal 1 1	ctor. hition coil ha	CM Terminal 11 10		rness connect	
CHECK I Disconr Check t Cylinder 1 2 3	Ignition coil Connector F31 F32 F33	ness conner between igr Terminal 1 1 1	ctor. hition coil ha	CM Terminal 11 10 9		rness connect	
CHECK I Disconr Check t Cylinder 1 2 3 4	Ignition coil Connector F31 F32 F33 F34	ness conner between igr Terminal 1 1 1 1 1	ctor. hition coil ha E	CM Terminal 11 10 9 15	Continuity	rness connecto	
CHECK I Disconr Check t Cylinder 1 2 3	Ignition coil Connector F31 F32 F33	ness conner between igr Terminal 1 1 1	ctor. hition coil ha E	CM Terminal 11 10 9	Continuity	rness connecto	

NO >> Repair open circuit, short to ground or short to power in harness or connectors.

**9.**CHECK IGNITION COIL WITH POWER TRANSISTOR

Check ignition coil with power transistor. Refer to <u>EC-434</u>, "Component Inspection (Ignition Coil with Power <u>Transistor</u>)".

### **IGNITION SIGNAL**

### < DTC/CIRCUIT DIAGNOSIS >

### Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42, "Intermittent Incident".

NO >> Replace malfunctioning ignition coil with power transistor. Refer to EM-52, "Exploded View".

### Component Inspection (Ignition Coil with Power Transistor)

INFOID:000000009651295

[VQ35DE]

**1.**CHECK IGNITION COIL WITH POWER TRANSISTOR-I

1. Turn ignition switch OFF.

2. Disconnect ignition coil harness connector.

3. Check resistance between ignition coil terminals as per the following.

Terminal No. (Polarity)	Resistance $\Omega$ [at 25°C (77°F)]
1 and 2	Except 0 or ∞
1 and 3	Except 0
2 and 3	Except 0

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace malfunctioning ignition coil with power transistor. Refer to EM-52, "Exploded View".

2.CHECK IGNITION COIL WITH POWER TRANSISTOR-II

### CAUTION:

### Perform the following procedure in a place with no combustible objects and good ventilation.

- 1. Turn ignition switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Remove fuel pump fuse in IPDM E/R to release fuel pressure. **NOTE:**

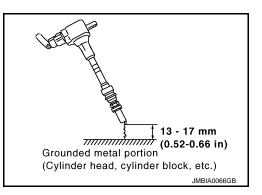
Do not use CONSULT to release fuel pressure, or fuel pressure applies again during the following procedure.

- 4. Start engine.
- 5. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
- 6. Turn ignition switch OFF.
- 7. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
- 8. Remove ignition coil and spark plug of the cylinder to be checked.
- 9. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
- 10. Connect spark plug and harness connector to ignition coil.
- 11. Fix ignition coil using a rope etc. with gap of 13 17 mm (0.52 0.66 in) between the edge of the spark plug and grounded metal portion as shown in the figure.
- 12. Crank engine for approximately 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

### Spark should be generated.

### **CAUTION:**

• During the operation, always stay 0.5 m (19.7 in) or more away from the spark plug and the ignition coil. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20 kV or more.



• It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken. NOTE:

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace malfunctioning ignition coil with power transistor. Refer to EM-52, "Exploded View".

### **IGNITION SIGNAL**

### < DTC/CIRCUIT DIAGNOSIS >

# Component Inspection (Condenser)

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# 1.CHECK CONDENSER

- 1. Turn ignition switch OFF.
- 2. Disconnect condenser harness connector.
- 3. Check resistance between condenser terminals as per the following.

Terminals	Resistance
1 and 2	Above 1 MΩ [at 25C° (77C°)]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace condenser.

< DTC/CIRCUIT DIAGNOSIS >

### INFORMATION DISPLAY (ASCD)

**Component Function Check** 

**1.**CHECK INFORMATION DISPLAY

### 1. Start engine.

- 2. Press MAIN switch on ASCD steering switch.
- 3. Drive the vehicle at more than 40 km/h (25 MPH). CAUTION:

### Always drive vehicle at a safe speed.

- 4. Press SET/COAST switch.
- 5. Check that the reading of the speedometer shows the same value as the set speed indicated in the information display while driving the vehicle on a flat road.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to <u>EC-436, "Diagnosis Procedure"</u>.

### Diagnosis Procedure

### **1.**CHECK DTC

Check that DTC UXXXX, P0500 or P1574 is not displayed.

Is the inspection result normal?

- YES >> GO TO 2.
- NO-1 >> Perform trouble diagnosis for DTC UXXXX.
- NO-2 >> Perform trouble diagnosis for DTC P0500. Refer to EC-325, "DTC Logic".
- NO-3 >> Perform trouble diagnosis for DTC P1574. Refer to EC-372, "DTC Logic".

### **2.**CHECK DTC WITH COMBINATION METER

Check combination meter function. Refer to <u>MWI-35, "CONSULT Function"</u>.

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Perform trouble diagnosis for DTC indicated.

**3.**CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-42, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace combination meter. Refer to <u>MWI-93, "Removal and Installation"</u>.
- NO >> Repair or replace.

INFOID:000000009888613

### MALFUNCTION INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]	
MALFUNCTION INDICATOR LAMP	[: 4002 ]	
Component Function Check	INFOID:000000009651297	A
1. CHECK MIL FUNCTION	E	ΞC
<ol> <li>Turn ignition switch ON.</li> <li>Check that MIL illuminates.</li> <li><u>Is the inspection result normal?</u></li> <li>YES &gt;&gt; INSPECTION END</li> </ol>		С
NO >> Proceed to <u>EC-437, "Diagnosis Procedure"</u> .		
Diagnosis Procedure	INFOID:000000009651298	D
1.снеск дтс		F
Check that DTC UXXXX is not displayed.		
Is the inspection result normal?		
YES >> GO TO 2. NO >> Perform trouble diagnosis for DTC UXXXX.		F
2. CHECK COMBINATION METER FUNCTION		
Check combination meter function. Refer to MWI-35, "CONSULT Function".		G
Is the inspection result normal?		
YES >> GO TO 3. NO >> Repair or replace.		H
<b>3.</b> CHECK INTERMITTENT INCIDENT		
Check intermittent incident. Refer to GI-42, "Intermittent Incident".		I
Is the inspection result normal?		
<ul> <li>YES &gt;&gt; Replace combination meter. Refer to <u>MWI-93, "Exploded View"</u>.</li> <li>NO &gt;&gt; Repair or replace error-detected parts.</li> </ul>		J
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### ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< DTC/CIRCUIT DIAGNOSIS >

### ON BOARD REFUELING VAPOR RECOVERY (ORVR)

### **Component Function Check**

### **1.**CHECK ORVR FUNCTION

Check whether the following symptoms are present.

- Fuel odor from EVAP canister is strong.
- Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

### Are any symptoms present?

YES >> Proceed to EC-438, "Diagnosis Procedure".

NO >> INSPECTION END

### **Diagnosis Procedure**

### **1.**INSPECTION START

Check whether the following symptoms are present.

A: Fuel odor from EVAP canister is strong.

B: Cannot refuel/Fuel odor from the fuel filler opening is strong while refueling.

### <u>A or B</u>

A >> GO TO 2.

B >> GO TO 7.

2. CHECK EVAP CANISTER

- 1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-16. "Exploded View"</u>.
- 2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.1 kg (4.6 lb).

Is the inspection result normal?

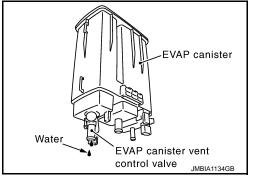
YES >> GO TO 3. NO >> GO TO 4.

3.CHECK IF EVAP CANISTER IS SATURATED WITH WATER

Check if water will drain from EVAP canister

Does water drain from the EVAP canister?

YES >> GO TO 4. NO >> GO TO 6.



### **4.**REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to FL-16, "Exploded View".

### >> GO TO 5.

### 5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose. Refer to EM-28, "Exploded View".

### **6.**CHECK REFUELING EVAP VAPOR CUT VALVE

Check refueling EVAP vapor cut valve. Refer to EC-440, "Component Inspection".

### EC-438

[VQ35DE]

INFOID:000000009651299

### ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Is the inspection result normal?	
YES >> INSPECTION END	А
NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to <u>FL-12, "Exploded View"</u> .	
7.CHECK EVAP CANISTER	EC
<ol> <li>Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to <u>FL-16</u>, "Exploded View".</li> </ol>	
<ol> <li>Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor</li> </ol>	
attached.	С
The weight should be less than 2.1 kg (4.6 lb). <u>Is the inspection result normal?</u>	
YES >> GO TO 8.	D
NO $>>$ GO TO 9.	
8. CHECK IF EVAP CANISTER IS SATURATED WITH WATER	Е
Check if water will drain from EVAP canister.	
Does water drain from the EVAP canister?	
YES >> GO TO 6. NO >> GO TO 11.	F
	G
Water Water	
EVAP canister vent control valve JMBIA1134GB	Н
9. REPLACE EVAP CANISTER	
Replace EVAP canister with a new one. Refer to <u>FL-16, "Exploded View"</u> .	1
>> GO TO 10.	.1
10. DETECT MALFUNCTIONING PART	0
Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.	
	K
>> Repair or replace EVAP hose. Refer to <u>EM-28, "Exploded View"</u> .	
11.CHECK VENT HOSES AND VENT TUBES	L
Check hoses and tubes between EVAP canister and refueling control valve for clogging, kinks, looseness and	
improper connection. <u>Is the inspection result normal?</u>	Μ
YES >> GO TO 12.	IVI
NO >> Repair or replace hoses and tubes.	
12.CHECK FILLER NECK TUBE	Ν
Check recirculation line for clogging, dents and cracks.	
Is the inspection result normal?	0
YES >> GO TO 13.	
NO >> Replace filler neck tube.	
13. CHECK REFUELING EVAP VAPOR CUT VALVE	Ρ
Check refueling EVAP vapor cut valve. Refer to <u>EC-440, "Component Inspection"</u> .	
Is the inspection result normal? YES >> GO TO 14.	
NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to <u>FL-12, "Exploded View"</u> .	
14.CHECK FUEL FILLER TUBE	

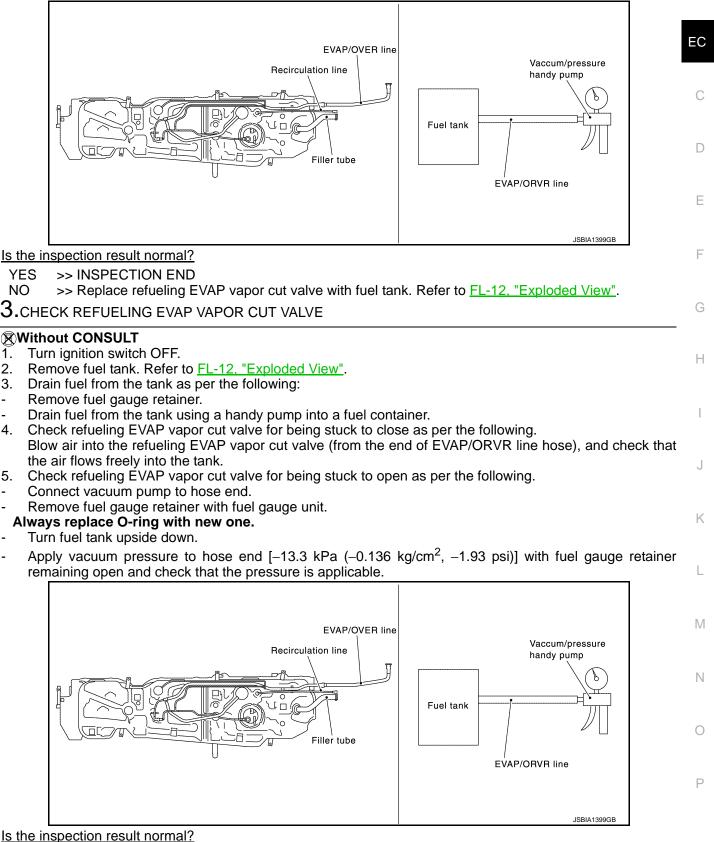
Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

ON BOARD REFUELING VAPOR REC	OVERY (ORVR)
< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
Is the inspection result normal?	
YES >> GO TO 15. NO >> Replace fuel filler tube. Refer to FL-12. "Exploded View".	
15.check one-way fuel valve-i	
Check one-way valve for clogging.	
<u>Is the inspection result normal?</u> YES >> GO TO 16.	
NO >> Repair or replace one-way fuel valve with fuel tank. Refer	to <u>FL-12, "Exploded View"</u> .
16. CHECK ONE-WAY FUEL VALVE-II	
1. Check that fuel is drained from the tank.	
2. Remove fuel filler tube and hose. Refer to FL-12. "Exploded View	<u>"</u>
3. Check one-way fuel valve for operation as per the following. When a stick is inserted, the valve should open, when removing	After removing filler tube
stick it should close.	
Do not drop any material into the tank.	One-way fuel valve
Is the inspection result normal?	
YES >> INSPECTION END NO >> Replace fuel filler tube or replace one-way fuel valve	
with fuel tank. Refer to FL-12, "Exploded View".	
	Fuel tank SEF665U
Component Inspection	INFOID:000000009651301
1.INSPECTION START	
Will CONSULT be used?	
Will CONSULT be used?	
YES >> GO TO 2.	
NO >> GO TO 3.	
2.CHECK REFUELING EVAP VAPOR CUT VALVE	
With CONSULT	
<ol> <li>Turn ignition switch OFF.</li> <li>Remove fuel tank. Refer to <u>FL-12, "Exploded View"</u>.</li> </ol>	
3. Drain fuel from the tank as per the following:	
- Remove fuel feed hose located on the fuel gauge retainer. Refer	
<ul> <li>Connect a spare fuel hose, one side to fuel gauge retainer when side to a fuel container.</li> </ul>	e the hose was removed and the other
- Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode v	
<ol> <li>Check refueling EVAP vapor cut valve for being stuck to close as Blow air into the refueling EVAP vapor cut valve (from the end of</li> </ol>	Per the following.
the air flows freely into the tank.	
5. Check refueling EVAP vapor cut valve for being stuck to open as	per the following.
	per the following.
<ul> <li>5. Check refueling EVAP vapor cut valve for being stuck to open as</li> <li>Connect vacuum pump to hose end.</li> <li>Remove fuel gauge retainer with fuel gauge unit.</li> <li>Always replace O-ring with new one.</li> </ul>	per the following.
<ul> <li>5. Check refueling EVAP vapor cut valve for being stuck to open as</li> <li>Connect vacuum pump to hose end.</li> <li>Remove fuel gauge retainer with fuel gauge unit.</li> </ul>	per the following.

### ON BOARD REFUELING VAPOR RECOVERY (ORVR)

### < DTC/CIRCUIT DIAGNOSIS >

- Apply vacuum pressure to hose end [-13.3 kPa (-0.136 kg/cm<sup>2</sup>, -1.93 psi)] with fuel gauge retainer remaining open and check that the pressure is applicable.



YES >> INSPECTION END

NO >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to FL-12, "Exploded View".

[VQ35DE1

А

### **REFRIGERANT PRESSURE SENSOR**

### < DTC/CIRCUIT DIAGNOSIS >

### REFRIGERANT PRESSURE SENSOR

### **Component Function Check**

1.CHECK REFRIGERANT PRESSURE SENSOR FUNCTION

- 1. Start engine and warm it up to normal operating temperature.
- 2. Turn A/Č switch and blower fan switch ON.
- 3. Check the voltage between ECM harness connector terminals under the following conditions.

	ECM		
Connector	+	_	Voltage (V)
Connector	Terminal	Terminal	
F8	63 (Refrigerant pressure sensor signal)	64 (Sensor ground)	1.0 - 4.0

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EC-442, "Diagnosis Procedure".

### **Diagnosis Procedure**

INFOID:000000009651303

### **1.**CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY

- 1. Disconnect refrigerant pressure sensor harness connector.
- 2. Turn ignition switch ON.
- 3. Check the voltage between refrigerant pressure sensor harness connector and ground.

Refrigerant pressure sensor		Ground	Voltage (V)	
Connector	Terminal	Ground	voltage (v)	
E300	1	Ground	Approx. 5	

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

# **2.**CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

Refrigerant pr	essure sensor	E	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E300	1	F8	96	Existed

### Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

## $\mathbf{3}.$ CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- Check the continuity between refrigerant pressure sensor harness connector and ECM harness connector.

### **REFRIGERANT PRESSURE SENSOR**

### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

Connector E300	essure sensor	EC	M	Continuity	
E200	Terminal	Connector	Terminal	Continuity	
E300	3	F8	64	Existed	
he inspect ES >> G D >> R CHECK RI	ion result nor O TO 4. epair or repla EFRIGERAN	ace error-dete T PRESSURE	cted parts. SENSOR IN	NPUT SIGNAL C	IRCUIT FOR OPEN AND SHORT
Check the tor.	e continuity b	etween refrig	erant pressu	re sensor harnes	s connector and ECM harness connec
efrigerant pr	essure sensor	EC	M	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
E300	2	F8	63	Existed	
<u>he inspect</u> ES >> G	ion result nor iO TO 5.	r short to grou <u>mal?</u> ace error-dete		to power.	
		T INCIDENT	12, "Intermitte	ent Incident".	
ES >> R				er to <u>HA-43, "Ex</u>	bloded View".

### SENSOR POWER SUPPLY2 CIRCUIT

### Description

ECM supplies a voltage of 5 V to some of the sensors systematically divided into 2 groups, respectively. Accordingly, when a short circuit develops in a sensor power source, a malfunction may occur simultaneously in the sensors belonging to the same group as the short-circuited sensor.

### Sensor power supply 1

- Accelerator pedal position (APP) sensor 1
- Camshaft position (CMP) sensor (PHASE)
- Electric throttle control actuator
- Battery current sensor

### NOTE:

If sensor power supply 1 circuit is malfunctioning, DTC P0643 is displayed.

### Sensor power supply 2

- Accelerator pedal position (APP) sensor 2
- Crankshaft position (CKP) sensor (POS)
- Refrigerant pressure sensor
- EVAP control system pressure sensor

### Diagnosis Procedure

### 1.CHECK SENSOR POWER SUPPLY 1

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connectors
- 3. Turn ignition switch ON.
- 4. Check the voltage between ECM harness connector and ground.

	+		Voltage (Approx.)	
E	CM	-		
Connector	Terminal			
F8	54			
10	96	Ground	5 V	
E16	103	Giodila	5 V	
LIU	107			

### Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-42. "Intermittent Incident".

NO >> GO TO 2.

# 2. CHECK SENSOR POWER SUPPLY 2 CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect following sensors harness connector.
- 3. Check harness for short to power and short to ground, between the following terminals.

ECM		Sensor				
+		Name	+			
Connector	Terminal	Name	Connector	Terminal		
F8	54	CKP sensor (POS)	F20	1		
FO	96	Refrigerant pressure sensor	E300	1		
E16	103	APP sensor 2	E110	5		
E16	107	EVAP control system pressure sensor	B22	3		

Is the inspection result normal?

INFOID:000000009888617

### SENSOR POWER SUPPLY2 CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >	[VQ35DE]
NO >> Repair or replace error-detected parts.	
3. CHECK COMPONENTS	A
<ul> <li>Check the following.</li> <li>Crankshaft position sensor (POS) (Refer to <u>EC-273, "Component Inspection"</u>.)</li> <li>Refrigerant pressure sensor (Refer to <u>EC-442, "Diagnosis Procedure"</u>.)</li> <li>APP sensor 2 (Refer to <u>EC-405, "Component Inspection"</u>.)</li> </ul>	EC
• EVAP control system pressure sensor (Refer to <u>EC-308</u> , "Component Inspection".)	C
<u>Is the inspection result normal?</u> YES >> Perform <u>GI-42, "Intermittent Incident</u> ".	
NO >> Replace malfunctioning component.	
	D
	E
	F
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### < DTC/CIRCUIT DIAGNOSIS >

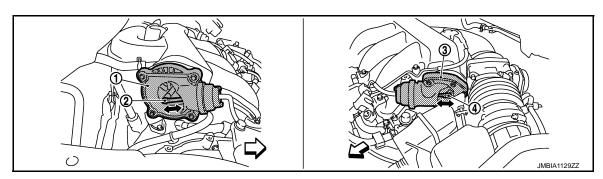
### VARIABLE INDUCTION AIR SYSTEM

### **Component Function Check**

### **1.**CHECK OVERALL FUNCTION-I

### () With CONSULT

- T. Start engine and warm it up to the normal operating temperature.
- 2. Perform "VIAS S/V-1" in "ACTIVE TEST" mode with CONSULT.
- 3. Turn VIAS control solenoid valve 1 "ON" and "OFF", and check that power valve actuator 1 rod moves.



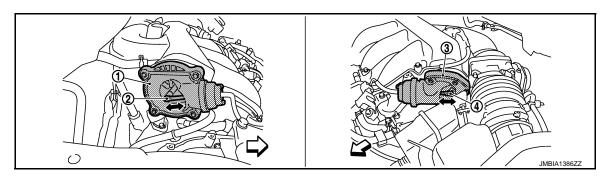
- 1. Power valve actuator 1
- 2. Power valve actuator 1 rod
- 3. Power valve actuator 2

Power valve actuator 2

- 4. Power valve actuator 2 rod
- C : Vehicle front

### **Without CONSULT**

- 1. Start engine and warm it up to the normal operating temperature.
- 2. Rev engine quickly up to approximately 5,000 rpm.
- 3. Check that power valve actuator 1 rod moves.



Power valve actuator 1 rod

3.

- 1. Power valve actuator 1
- 4. Power valve actuator 2 rod
- $\triangleleft$ : Vehicle front

### Is the inspection result normal?

YES >> GO TO 2.

NO >> <u>EC-447, "Diagnosis Procedure"</u>.

2. CHECK OVERALL FUNCTION-II

### With CONSULT

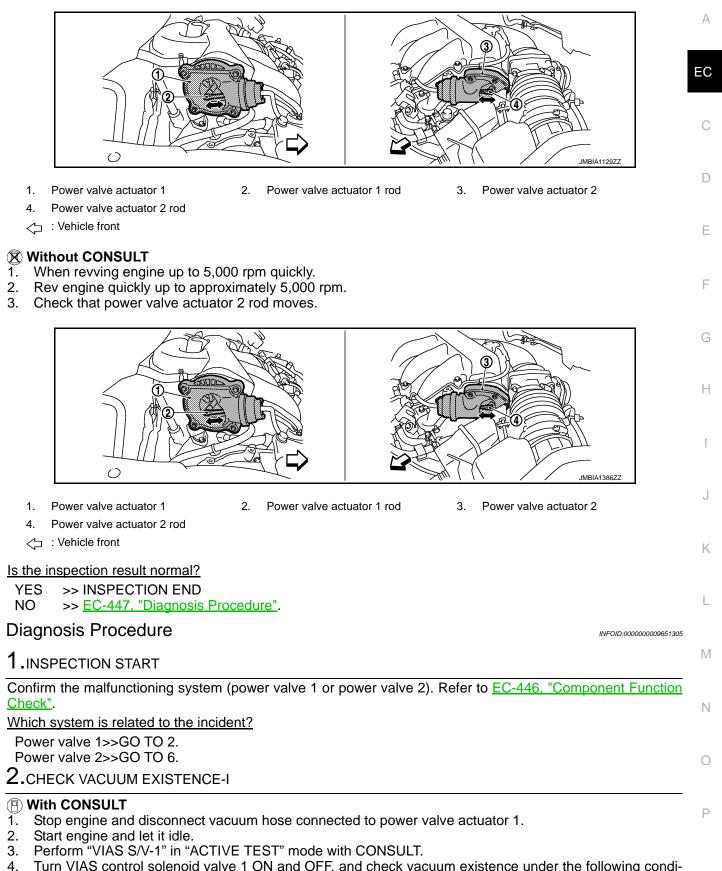
1. Perform "VIAS S/V-2" in "ACTIVE TEST" mode with CONSULT.

2.

2. Turn VIAS control solenoid valve 2 "ON" and "OFF", and check that power valve actuator 2 rod moves.

### < DTC/CIRCUIT DIAGNOSIS >

### [VQ35DE]



### < DTC/CIRCUIT DIAGNOSIS >

[VQ35DE]

VIAS S/V-1	Vacuum
ON	Existed
OFF	Not existed

### **Without CONSULT**

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 1.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Start engine.
- 4. Rev engine quickly up to approximately 5,000 rpm.
- 5. Check vacuum existence under the following conditions.

Condition	Vacuum
Idle	Existed
Rev engine quickly up to approximately 5,000 rpm	Not existed

### Is the inspection result normal?

- YES >> Repair or replace power valve actuator 1. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Component Parts Location"</u>.
- NO >> GO TO 3.

### 3.CHECK VACUUM TANK

- 1. Stop engine and disconnect vacuum hose connected to intake manifold collector.
- 2. Start engine and let it idle.
- 3. Check vacuum existence from intake manifold collector.

Does vacuum existence from the intake manifold collector?

YES >> GO TO 4.

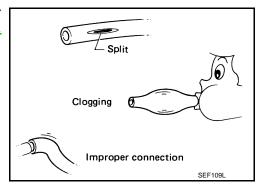
NO >> Replace intake manifold collector. Refer to EM-28, "Exploded View".

### 4. CHECK VACUUM HOSE

- 1. Stop engine.
- Check vacuum hose for crack, clogging, improper connection or disconnection. Refer to <u>EC-52</u>, <u>"VARIABLE INDUCTION AIR</u> <u>SYSTEM : System Description"</u>.

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair hoses or tubes.



### 5. CHECK VIAS CONTROL SOLENOID VALVE 1

Check VIAS control solenoid valve 1. Refer to EC-384, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace VIAS control solenoid valve 1. Refer to EM-28, "Exploded View".

6.CHECK VACUUM EXISTENCE-II

### (I) With CONSULT

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 2.
- 2. Start engine and let it idle.
- 3. Perform "VIAS S/V-2" in "ACTIVE TEST" mode with CONSULT.
- Turn VIAS control solenoid valve 2 ON and OFF, and check vacuum existence under the following conditions.

< DTC/CIRCUIT DIAGNOSIS >

VIAS S/V 2	Vacuum
ON	Existed
OFF	Not existed

### **Without CONSULT**

- 1. Stop engine and disconnect vacuum hose connected to power valve actuator 2.
- 2. Disconnect VIAS control solenoid valve 1 harness connector.
- 3. Start engine.
- 4. Rev engine quickly up to approximately 5,000 rpm.
- 5. Check vacuum existence under the following conditions.

Condition	Operation
Idle	Existed
Rev engine quickly up to approximately 5,000 rpm	Not existed

### Is the inspection result normal?

YES >> Repair or replace power valve actuator 2. Refer to <u>EC-15, "ENGINE CONTROL SYSTEM : Com-</u> ponent Parts Location".

NO >> GO TO 7.

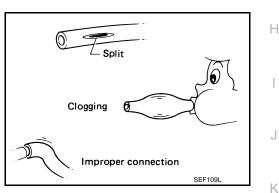
### 7. CHECK VACUUM HOSE

### 1. Stop engine.

 Check vacuum hose for crack, clogging, improper connection or disconnection. Refer to <u>EC-52</u>, "VARIABLE INDUCTION AIR <u>SYSTEM : System Description</u>".

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Repair hoses or tubes.



### **8.**CHECK VIAS CONTROL SOLENOID VALVE 2

Check VIAS control solenoid valve 2. Refer to EC-386, "Component Inspection".								
Is the inspection result normal?								
YES	>> Check intermittent incident. Refer to GI-42, "Intermittent Incident".							
NO	>> Replace VIAS control solenoid valve 2. Refer to <u>EM-28, "Exploded View"</u> .							
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### < SYMPTOM DIAGNOSIS >

[VQ35DE]

INFOID:000000009651306

# SYMPTOM DIAGNOSIS ENGINE CONTROL SYSTEM SYMPTOMS

### Symptom Table

### SYSTEM — BASIC ENGINE CONTROL SYSTEM

							S	MPT	ОМ						
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDRE/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)	Reference page
Warrant	y 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-429
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			<u>EC-141</u>
	Fuel injector circuit	1	1	2	3	2		2	2			2			EC-426
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			<u>EC-49</u>
Air	Positive crankcase ventilation sys- tem	3	3	4	4	4	4	4	4	4		4	1		<u>EC-30</u>
	Incorrect idle speed adjustment						1	1	1	1		1			EC-129
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	<u>EC-397,</u> <u>EC-402</u>
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-129
	Ignition circuit	1	1	2	2	2		2	2			2			<u>EC-431</u>
Power s	supply and ground circuit	2	2	3	3	3		3	3		2	3			<u>EC-163</u>
Mass ai	r flow sensor circuit	1			2										<u>EC-179,</u> EC-184
Engine	coolant temperature sensor circuit						3			3					<u>EC-195,</u> <u>EC-199</u>
Air fuel	ratio (A/F) sensor 1 circuit		1	2	3	2		2	2			2			EC-206, EC-210, EC-213, EC-235, EC-391
Throttle	position sensor circuit						2			2					EC-197, EC-261, EC-348, EC-349, EC-409
Accelera	ator pedal position sensor circuit			3	2	1									<u>EC-337,</u> <u>EC-404,</u> <u>EC-406,</u> <u>EC-411</u>

### < SYMPTOM DIAGNOSIS >

### [VQ35DE]

						S١	(MPT)	OM	SYMPTOM								
	(EXCP. HA)		SPOT		ELERATION					ATURE HIGH	NOIL	N	RGE)		E		
			SING/FLAT S	TONATION	LACK OF POWER/POOR ACCELERATION	LE	TING	-	N TO IDLE	OVERHEATS/WATER TEMPERATURE	FUEL CONSUMPTION	OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	Reference page			
	HARD/NO START/RESTART	E STALL	HESITATION/SURGING/FLAT	SPARK KNOCK/DETONATION	DF POWER/	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	DLING VIBRATION	SLOW/NO RETURN TO IDLE	HEATS/WATE	SIVE FUEL		RY DEAD (U				
	HARD/I	ENGINE	HESIT	SPARK	LACK (	HIGH II	ROUG	DNIJU	SLOW/	OVERH	EXCESSIVE	EXCESSIVE	BATTE				
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA				
Knock sensor circuit			2								3			<u>EC-269</u>			
Engine oil temperature sensor			4		2						3			<u>EC-255,</u> <u>EC-259</u>			
Crankshaft position sensor (POS) circuit	2	2												<u>EC-271</u>			
Camshaft position sensor (PHASE) circuit	3	2												<u>EC-274</u>			
Vehicle speed signal circuit		2	3		3						3			<u>EC-325</u>			
ECM	2	2	3	3	3	3	3	3	3	3	3			<u>EC-333,</u> <u>EC-335</u>			
Intake valve timing control solenoid valve cir- cuit		3	2		1	3	2	2	3		3			<u>EC-177</u>			
PNP signal circuit			3		3		3	3			3			EC-339			
VIAS control solenoid valve 1 circuit					1									<u>EC-383</u>			
VIAS control solenoid valve 2 circuit					1									<u>EC-385</u>			
Refrigerant pressure sensor circuit		2				3			3		4			<u>EC-442</u>			
Electrical load signal circuit							3							<u>EC-421</u>			
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	<u>HAC-55</u>			
ABS actuator and electric unit (control unit)			4											BRC-30			

(continued on next page)

### SYSTEM — ENGINE MECHANICAL & OTHER

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### < SYMPTOM DIAGNOSIS >

### [VQ35DE]

		SYMPTOM															
		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)	Reference page		
Warranty s	ymptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA			
Fuel	Fuel tank	5													<u>FL-13</u>		
	Fuel piping	5		5	5	5		5	5			5			<u>MA-16</u>		
	Vapor lock		5												—		
	Valve deposit														—		
	Poor fuel (Heavy weight gasoline, Low octane)	5	5	5	5	5		5	5			5			_		
Air	Air duct														<u>EM-26</u>		
	Air cleaner														<u>EM-26</u>		
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)		5	5	5	5		5		5	5			5			<u>EM-26</u>
	Electric throttle control actuator	5			5		5			5					<u>EM-29</u>		
	Air leakage from intake manifold/ Collector/Gasket														<u>EM-29,</u> EM-31		
Cranking	Battery	1	1	4		1		4	1					1	PG-105		
	Generator circuit	1	1	1		1		1	1					1	<u>CHG-21</u>		
	Starter circuit	3										1			<u>STR-9</u> , <u>STR-12</u>		
	Signal plate	6													<u>EM-101</u>		
	PNP signal	4													<u>TM-80</u>		
Engine	Cylinder head Cylinder head gasket	5	5	5	5	5		5	5		4	5	3		<u>EM-94</u>		
	Cylinder block										•		Ŭ				
	Piston												4				
	Piston ring																
	Connecting rod	6	6	6	6	6		6	6			6			<u>EM-105</u>		
	Bearing																
	Crankshaft																
Valve	Timing chain														<u>EM-82</u>		
mecha- nism	Camshaft														<u>EM-85</u>		
11311	Intake valve timing control	5	5	5	5	5		5	5			5			<u>EM-67</u>		
	Intake valve												3		<u>EM-94</u>		
	Exhaust valve												5		<u>LIVI-34</u>		

Revision: 2014 May

### < SYMPTOM DIAGNOSIS >

### [VQ35DE]

			SYMPTOM											А		
		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)	Reference page	EC C D
Warranty s	symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	+	
Exhaust	Exhaust manifold/Tube/Muffler/ Gasket	5	5	5	5	5		5	5			5			<u>EM-33, EX-</u> 4	F
	Three way catalyst														-	G
Lubrica- tion	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery/Oil cooler	5	5	5	5	5		5	5			5			<u>LU-8, LU-</u> <u>11, LU-12, LU-14</u>	
	Oil level (Low)/Filthy oil	-													<u>LU-8</u>	Н
Cooling	Radiator/Hose/Radiator filler cap														<u>CO-12</u>	
	Thermostat	-								5	-				<u>CO-24</u>	1
	Water pump														<u>CO-19</u>	
	Water gallery	5	5	5	5	5		5	5		4	5			<u>CO-2</u>	
	Cooling fan														<u>CO-17</u>	J
	Coolant level (Low)/Contaminat- ed coolant									5					<u>CO-8</u>	
NVIS (NIS NATS)	SAN Vehicle Immobilizer System —	1	1												<u>SEC-16</u>	K

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

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### NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

### NORMAL OPERATING CONDITION

### Description

INFOID:000000009651307

FUEL CUT CONTROL (AT NO LOAD AND HIGH ENGINE SPEED)

If the engine speed is above 2,000 rpm under no load (for example, the selector lever position is P or N and engine speed is over 2,000 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 be operated until the engine speed reaches 1,100 rpm, then fuel cut will be cancelled. **NOTE:** 

This function is different from deceleration control listed under Multiport Fuel Injection (MFI) System, <u>EC-39</u>, <u>"MULTIPORT FUEL INJECTION SYSTEM : System Description"</u>.

# < PERIODIC MAINTENANCE > PERIODIC MAINTENANCE IDLE SPEED

# Work Procedure 1.CHECK IDLE SPEED With CONSULT Check idle speed in "DATA MONITOR" mode with CONSULT. With GST Check idle speed with Service \$01 of GST.

>> INSPECTION END

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[VQ35DE]

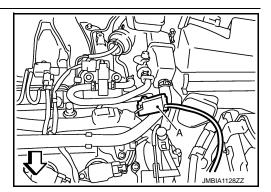
### < PERIODIC MAINTENANCE >

# **IGNITION TIMING**

### Work Procedure

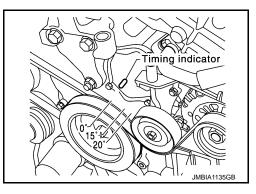
**1.**CHECK IGNITION TIMING

- Attach timing light to loop wires as shown. Timing light (A) 1.
- <⊐: Vehicle front



2. Check ignition timing.

>> INSPECTION END



[VQ35DE]

### **EVAP LEAK CHECK**

### < PERIODIC MAINTENANCE > EVAP LEAK CHECK

### Work Procedure

### CAUTION:

- Never use compressed air or a high pressure pump.
- Never exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in EVAP system.

### NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter (commercial service tool) to the EVAP service port may cause a leakage.

### (P) WITH CONSULT

- 1. To locate the EVAP leakage, install EVAP service port adapter (commercial service tool) and pressure pump to EVAP service port.
- 2. Turn ignition switch ON.

R WITHOUT CONSULT

0.028 kg/cm<sup>2</sup>, 0.2 to 0.4 psi).

and hose with pressure pump.

1.

port.

- 3. Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT.
- 4. Touch "START". A bar graph (Pressure indicating display) will appear on the screen.
- 5. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
- Remove EVAP service port adapter (commercial service tool) and hose with pressure pump.
- 7. Locate the leakage using a leakage detector (commercial service tool). Refer to EC-49, "EVAPORATIVE EMISSION SYS-TEM : System Description".

To locate the EVAP leakage, install EVAP service port adapter

(commercial service tool) and pressure pump to EVAP service

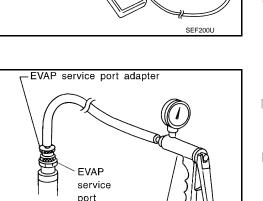
2. Apply battery voltage between the terminals of EVAP canister

3. To locate the leakage, deliver positive pressure to the EVAP sys-

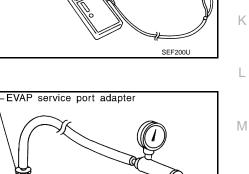
4. Remove EVAP service port adapter (commercial service tool)

tem until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to

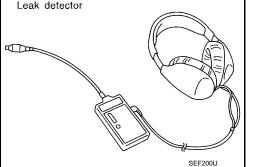
vent control valve to make a closed EVAP system.

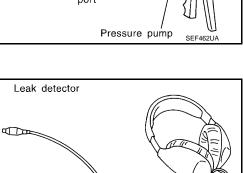


Pressure pump



D EVAP service port adapter Ε EVAP service port Pressure pump





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[VQ35DE]

INFOID:000000009651310

Revision: 2014 May

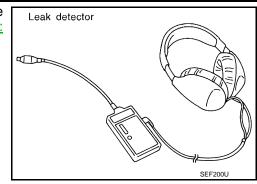
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### **EVAP LEAK CHECK**

### < PERIODIC MAINTENANCE >

 Locate the leakage using a leak detector (commercial service tool). Refer to <u>EC-49</u>, "EVAPORATIVE EMISSION SYSTEM : <u>System Description</u>".



[VQ35DE]

### < PERIODIC MAINTENANCE >

# POSITIVE CRANKCASE VENTILATION

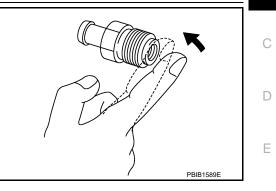
### Work Procedure

### 1.CHECK PCV VALVE

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 valve inlet.

### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace PCV valve. Refer to .<u>EM-52, "Exploded View"</u>



[VQ35DE]

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# REMOVAL AND INSTALLATION ECM

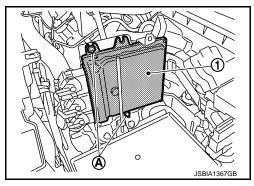
Removal and Installation

### CAUTION:

### Perform ADDITIONAL SERVICE WHEN REPLACING ECM. Refer to EC-133, "Work Procedure".

REMOVAL

- 1. Remove battery. Refer to PG-105, "Exploded View".
- 2. Disconnect ECM harness connectors. Refer to PG-5, "Harness Connector".
- 3. Remove ECM mounting nuts (1), and then remove ECM (A).



INSTALLATION Install in the reverse order of removal. INFOID:000000009651312

[VQ35DE]

# \*: Engine is warmed up to normal operating temperature and running under no load.

		K
Supply voltage	Battery voltage (11 – 14 V)	
Output voltage at idle (in N position)	0.9 – 1.2 V*	
Mass air flow (Using CONSULT or GST)	2.0 – 6.0 g/s at idle* 7.0 – 20.0 g/s at 2,500 rpm*	L

Calculated Load Value

### Condition Specification No load\* (in P or N position) $12 \pm 2^{\circ}$ BTDC

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Condition

Electric load: OFF (Lights, heater fan & rear window defogger)

Electric load: OFF (Lights, heater fan & rear window defogger)

\*: Under the following conditions

· Steering wheel: Kept in straight-ahead position

A/C switch: OFF

Idle Speed

A/C switch: OFF

**Ignition Timing** 

No load\* (in P or N position)

\*: Under the following conditions

### · Steering wheel: Kept in straight-ahead position

Condition	Specification (Using CONSULT or GST)
At idle	10 – 35 %
At 2,500 rpm	10 – 35 %

### Mass Air Flow Sensor

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Specification

 $650\pm50$  rpm

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