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SECTION **EC**

ENGINE CONTROL SYSTEM

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U0101-U1001

INFOID:000000006579699

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CONSULT-III GST*2	ECM*3		
U0101	0101*4	LOST COMM (TCM)	EC-160
U0140	0140*4	LOST COMM (BCM)	EC-162
U1001	1001*4	CAN COMM CIRCUIT	EC-164

*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: The troubleshooting for this DTC needs CONSULT-III.

P0011-P0075

INFOID:000000006579700

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0011	0011	INT/V TIM CONT-B1	EC-166
P0031	0031	A/F SEN1 HTR (B1)	EC-170
P0032	0032	A/F SEN1 HTR (B1)	EC-170
P0037	0037	HO2S2 HTR (B1)	EC-175
P0038	0038	HO2S2 HTR (B1)	EC-175
P0075	0075	INT/V TIM V/CIR-B1	EC-181

*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.

P0101-P0128

INFOID:000000006579701

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0101	0101	MAF SEN/CIRCUIT-B1	EC-185
P0102	0102	MAF SEN/CIRCUIT-B1	EC-192
P0103	0103	MAF SEN/CIRCUIT-B1	EC-192
P0112	0112	IAT SEN/CIRCUIT-B1	EC-199
P0113	0113	IAT SEN/CIRCUIT-B1	EC-199
P0116	0116	ECT SEN/CIRC	EC-203
P0117	0117	ECT SEN/CIRC	EC-206
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P0122	0122	TP SEN 2/CIRC-B1	EC-211
P0123	0123	TP SEN 2/CIRC-B1	EC-211
P0125	0125	ECT SENSOR	EC-216

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DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0127	0127	IAT SENSOR-B1	EC-219
P0128	0128	THERMSTAT FNCTN	EC-222

*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.

P0130-P0198

INFOID:0000000006579702

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0130	0130	A/F SENSOR1 (B1)	EC-224
P0131	0131	A/F SENSOR1 (B1)	EC-229
P0132	0132	A/F SENSOR1 (B1)	EC-234
P0137	0137	HO2S2 (B1)	EC-239
P0138	0138	HO2S2 (B1)	EC-246
P0139	0139	HO2S2 (B1)	EC-255
P014C	014C	A/F SENSOR1 (B1)	EC-264
P014D	014D	A/F SENSOR1 (B1)	EC-264
P015A	015A	A/F SENSOR1 (B1)	EC-264
P015B	015B	A/F SENSOR1 (B1)	EC-264
P0171	0171	FUEL SYS-LEAN-B1	EC-272
P0172	0172	FUEL SYS-RICH-B1	EC-278
P0181	0181	FTT SENSOR	EC-284
P0182	0182	FTT SEN/CIRCUIT	EC-288
P0183	0183	FTT SEN/CIRCUIT	EC-288
P0196	0196	EOT SEN/CIRC	EC-292
P0197	0197	EOT SEN/CIRC	EC-295
P0198	0198	EOT SEN/CIRC	EC-295

*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.

P0222-P0420

INFOID:0000000006579703

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0222	0222	TP SEN 1/CIRC-B1	EC-299
P0223	0223	TP SEN 1/CIRC-B1	EC-299
P0300	0300	MULTI CYL MISFIRE	EC-304
P0301	0301	CYL 1 MISFIRE	EC-304
P0302	0302	CYL 2 MISFIRE	EC-304
P0303	0303	CYL 3 MISFIRE	EC-304

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DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0304	0304	CYL 4 MISFIRE	EC-304
P0327	0327	KNOCK SEN/CIRC-B1	EC-310
P0328	0328	KNOCK SEN/CIRC-B1	EC-310
P0335	0335	CKP SEN/CIRCUIT	EC-314
P0340	0340	CMP SEN/CIRC-B1	EC-321
P0420	0420	TW CATALYST SYS-B1	EC-326

*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.

P0441-P0463

INFOID:000000006579704

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0441	0441	EVAP PURG FLOW/MON	EC-331
P0442	0442	EVAP SMALL LEAK	EC-336
P0443	0443	PURG VOLUME CONT/V	EC-343
P0444	0444	PURG VOLUME CONT/V	EC-351
P0445	0445	PURG VOLUME CONT/V	EC-351
P0447	0447	VENT CONTROL VALVE	EC-357
P0448	0448	VENT CONTROL VALVE	EC-363
P0451	0451	EVAP SYS PRES SEN	EC-369
P0452	0452	EVAP SYS PRES SEN	EC-372
P0453	0453	EVAP SYS PRES SEN	EC-379
P0455	0455	EVAP GROSS LEAK	EC-387
P0456	0456	EVAP VERY SML LEAK	EC-394
P0460	0460	FUEL LEV SEN SLOSH	EC-402
P0461	0461	FUEL LEVEL SENSOR	EC-404
P0462	0462	FUEL LEVL SEN/CIRC	EC-406
P0463	0463	FUEL LEVL SEN/CIRC	EC-406

*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.

P0500-P0643

INFOID:000000006579705

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0500	0500	VEH SPEED SEN/CIRC	EC-408
P0506	0506	ISC SYSTEM	EC-410
P0507	0507	ISC SYSTEM	EC-412
P050A	050A	COLD START CONTROL	EC-414

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DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P050B	050B	COLD START CONTROL	EC-414
P050E	050E	COLD START CONTROL	EC-414
P0603	0603	ECM BACK UP/CIRCUIT	EC-416
P0605	0605	ECM	EC-419
P0607	0607	ECM	EC-421
P0643	0643	SENSOR POWER/CIRC	EC-422

*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.

P0705-P0840

INFOID:000000006579706

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0705	0705	T/M RANGE SENSOR A	CVT-61
P0710	0710	FLUID TEMP SENSOR A*4	CVT-66
P0715	0715	INPUT SPEED SENSOR A	CVT-71
P0720	0720	OUTPUT SPEED SENSOR	CVT-76
P0740	0740	TORQUE CONVERTER	CVT-84
P0744	0744	TORQUE CONVERTER	CVT-89
P0745	0745	PC SOLENOID A	CVT-91
P0746	0746	PC SOLENOID A	CVT-96
P0776	0776	PC SOLENOID B	CVT-98
P0778	0778	PC SOLENOID B	CVT-100
P0840	0840	FLUID PRESS SEN/SW A	CVT-110

*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: When erasing this DTC, always use CONSULT-III or GST.

P0850-P1574

INFOID:000000006579707

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0850	0850	P-N POS SW/CIRCUIT	EC-427
P1148	1148	CLOSED LOOP-B1	EC-432
P1212	1212	TCS/CIRC	EC-433
P1217	1217	ENG OVER TEMP	EC-434
P1225	1225	CTP LEARNING-B1	EC-446
P1226	1226	CTP LEARNING-B1	EC-447
P1564	1564	ASCD SW	EC-448

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DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P1572	1572	ASCD BRAKE SW	EC-454
P1574	1574	ASCD VHL SPD SEN	EC-463

*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.

P1610-P1615

INFOID:000000006579708

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P1610	1610	LOCK MODE	BL-71
P1611	1611	ID DISCORD, IMM-ECM	
P1612	1612	CHAIN OF ECM-IMMU	
P1614	1614	CHAIN OF IMMU-KEY	
P1615	1615	DIFFERENCE OF KEY	

*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.

P1715-P1805

INFOID:000000006579709

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P1715	1715	IN PULY SPEED	EC-465
P1740	1740	SLCT SOLENOID	CVT-129
P1777	1777	STEP MOTOR	CVT-135
P1778	1778	STEP MOTOR	CVT-139
P1805	1805	BRAKE SW/CIRCUIT	EC-467

*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.

P2004-P2A00

INFOID:000000006579710

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P2004	2004	TUMBLE CONT/V	EC-472
P2014	2014	TUMBLE POS SEN	EC-479
P2100	2100	ETC MOT PWR-B1	EC-484
P2101	2101	ETC FNCTN/CIRC-B1	EC-488
P2103	2103	ETC MOT PWR	EC-484
P2118	2118	ETC MOT-B1	EC-494

INDEX FOR DTC

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DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P2119	2119	ETC ACTR-B1	EC-498
P2122	2122	APP SEN 1/CIRC	EC-500
P2123	2123	APP SEN 1/CIRC	EC-500
P2127	2127	APP SEN 2/CIRC	EC-505
P2128	2128	APP SEN 2/CIRC	EC-505
P2135	2135	TP SENSOR-B1	EC-512
P2138	2138	APP SENSOR	EC-517
P2A00	2A00	A/F SENSOR1 (B1)	EC-524

*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.

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PRECAUTIONS

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

INFOID:000000006579711

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 and SB section of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized 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 the SRS section.
- Do not 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:

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT 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.

On Board Diagnosis (OBD) System of Engine and CVT

INFOID:000000006579712

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

CAUTION:

- Be sure to turn the ignition switch OFF and disconnect the battery ground cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to [PG-60](#).
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EVAP system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

PRECAUTIONS

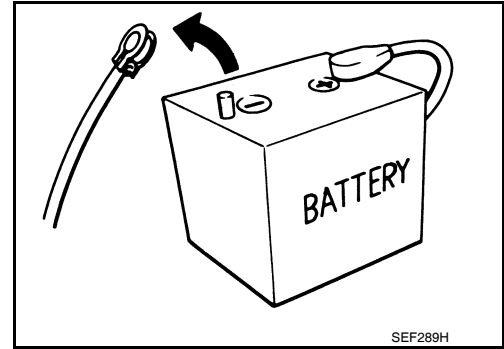
< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

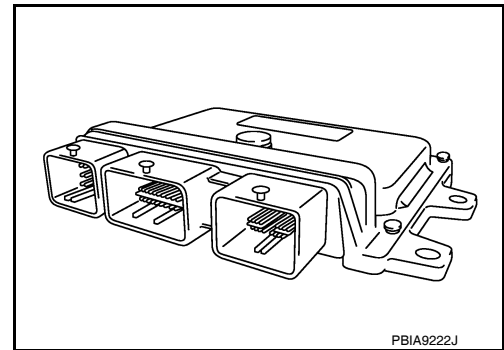
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Precaution

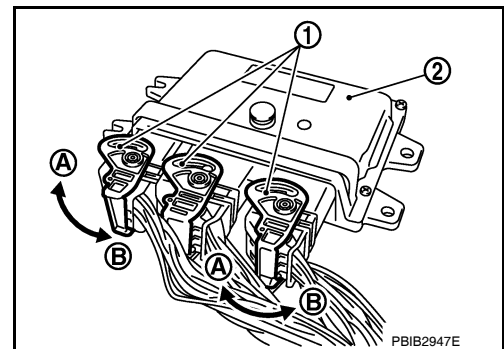
- Always use a 12 V battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.
- Before removing parts, turn ignition switch OFF and then disconnect negative battery cable.



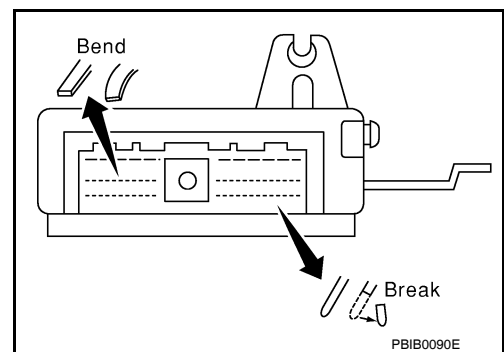
- Do not disassemble ECM.
- If battery cable is disconnected, the memory will return to the initial ECM values.
The ECM will now start to self-control at its initial values. Engine operation can vary slightly in this case. However, this is not an indication of a malfunction. Do not replace parts because 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, take care not to damage pin terminals (bend or break).
Make sure 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.



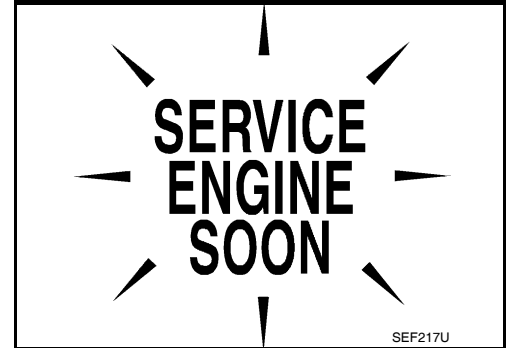
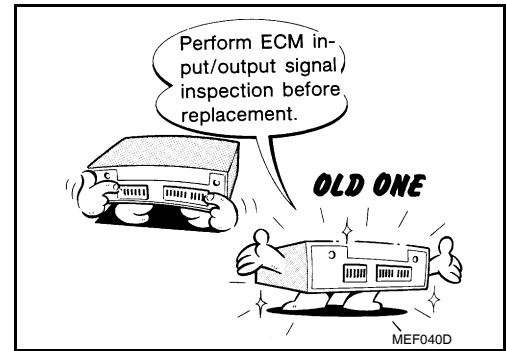
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PRECAUTIONS

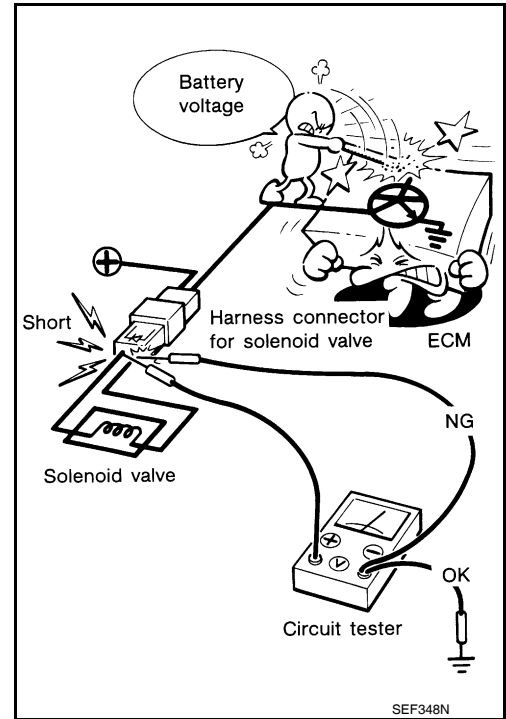
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[MR20DE (FOR CALIFORNIA)]

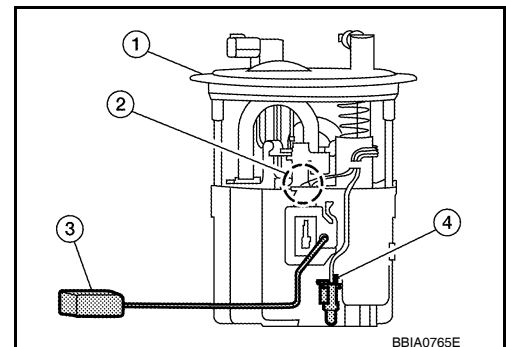
- Before replacing ECM, perform “ECM Terminals and Reference Value” inspection and make sure ECM functions properly. Refer to [EC-123, "ECM Terminal and Reference Value"](#).
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble electric throttle control actuator.
- Even a slight leak in the air intake system can cause serious incidents.
- Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).
- After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Overall Function Check. The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Overall Function Check should be a good result if the repair is completed.



- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.



- Do not operate fuel pump when there is no fuel in lines.
- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)
- Fuel tank temperature sensor (4)
- Tighten fuel hose clamps to the specified torque.

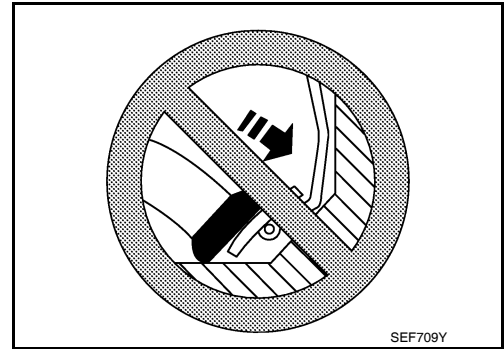


PRECAUTIONS

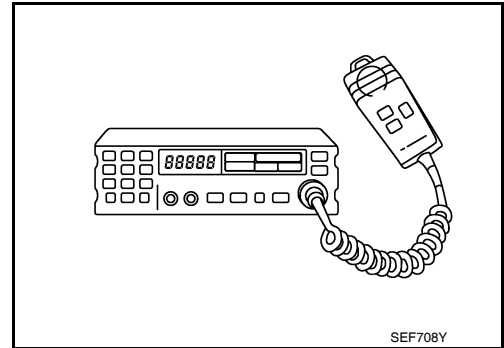
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[MR20DE (FOR CALIFORNIA)]

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



- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
 - 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. Do not 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.



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PREPARATION

< SERVICE INFORMATION >

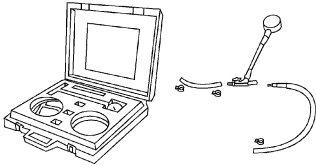
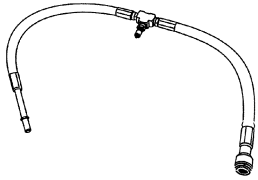
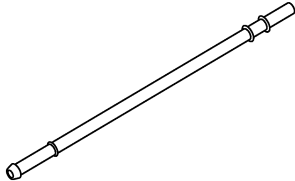
[MR20DE (FOR CALIFORNIA)]

PREPARATION

Special Service Tool

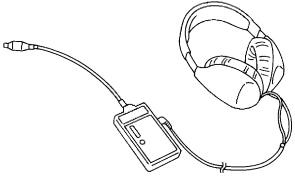
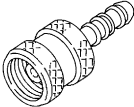
INFOID:000000006579714

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

Tool number (Kent-Moore No.) Tool name	Description
(J-44321) Fuel pressure gauge Kit  <p style="text-align: center;"><small>LEC642</small></p>	Checking fuel pressure
(J-44321-6) Fuel pressure adapter  <p style="text-align: center;"><small>LBIA0376E</small></p>	Connecting fuel pressure gauge to quick connector type fuel lines.
KV10118400 Fuel tube adapter  <p style="text-align: center;"><small>PBIB3043E</small></p>	Measuring fuel pressure

Commercial Service Tool

INFOID:000000006579715

Tool number (Kent-Moore No.) Tool name	Description
Leak detector i.e.: (J-41416)  <p style="text-align: center;"><small>S-NT703</small></p>	Locating the EVAP leak
EVAP service port adapter i.e.: (J-41413-OBD)  <p style="text-align: center;"><small>S-NT704</small></p>	Applying positive pressure through EVAP service port

PREPARATION

< SERVICE INFORMATION >

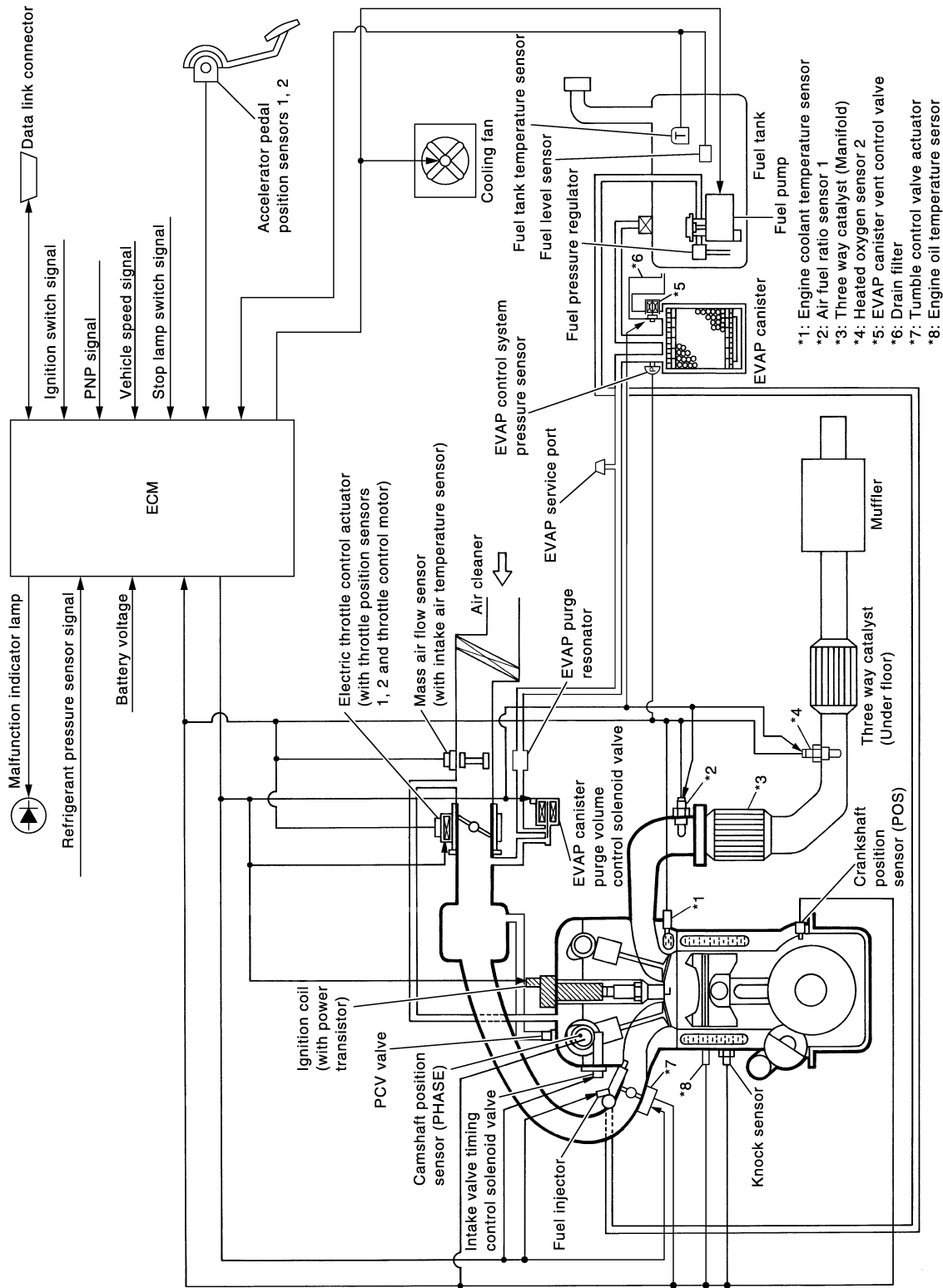
[MR20DE (FOR CALIFORNIA)]

Tool number (Kent-Moore No.) Tool name	Description	A
Fuel filler cap adapter i.e.: (MLR-8382) <div style="text-align: center;"> </div> <div style="text-align: center;">S-NT815</div>	Checking fuel tank vacuum relief valve opening pressure	EC C
Socket wrench <div style="text-align: center;"> </div> <div style="text-align: center;">S-NT705</div>	Removing and installing engine coolant temperature sensor	D E F
Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12) <div style="text-align: center;"> </div> <div style="text-align: center;">AEM488</div>	Reconditioning 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 Zirconia Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titanium Oxygen Sensor	G H
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907) <div style="text-align: center;"> </div> <div style="text-align: center;">S-NT779</div>	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.	I J K

ENGINE CONTROL SYSTEM

Schematic

INFOID:000000006579716



JPBIA3043GB

Multiport Fuel Injection (MFI) System

INFOID:000000006579717

INPUT/OUTPUT SIGNAL CHART

ENGINE CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*3 Piston position	Fuel injection & mixture ratio control	Fuel injector
Camshaft position sensor (PHASE)			
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		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) switch (M/T) Transmission range switch (CVT)	Gear position		
Battery	Battery voltage*3		
Knock sensor	Engine knocking condition		
EPS control unit	Power steering operation*2		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
Air conditioner switch	Air conditioner operation*2		
ABS actuator and electric unit (control unit)	Vehicle speed*2		
Combination meter			

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

*2: This signal is sent to the ECM through 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.

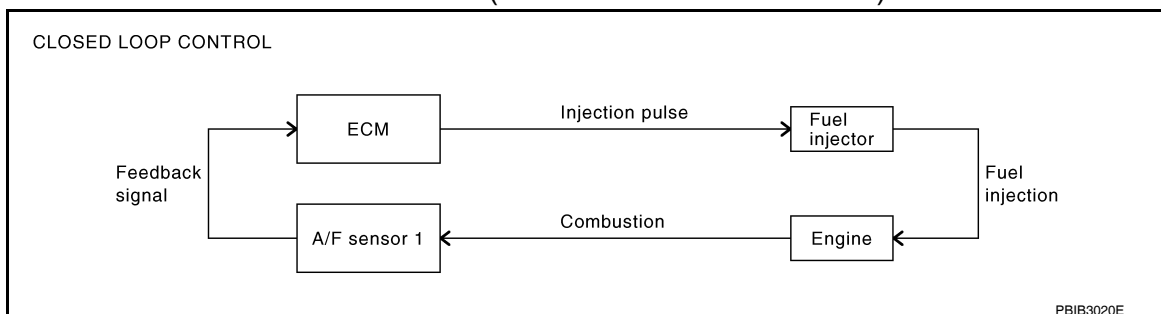
<Fuel increase>

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

<Fuel decrease>

- During deceleration
- During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



The mixture ratio feedback system provides the best air/fuel mixture ratio for drivability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses air fuel ratio (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 air fuel ratio (A/F) sensor 1, refer to [EC-229](#). 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 air fuel ratio (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 control stops in order to maintain stabilized fuel combustion.

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

MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from air fuel ratio (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.

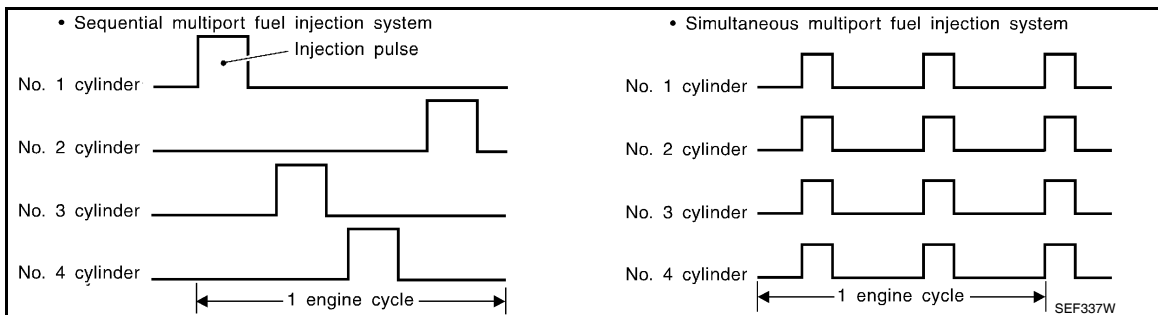
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"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 air fuel ratio (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 long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

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 firing order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System

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

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

ENGINE CONTROL SYSTEM

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

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.

Electronic Ignition (EI) System

INFOID:000000006579718

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2	Ignition timing control	Power transistor
Camshaft position sensor (PHASE)	Piston position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Battery	Battery voltage*2		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch (M/T) Transmission range switch (CVT)	Gear position		
ABS actuator and electric unit (control unit)	Vehicle speed*1		
Combination meter			

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

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

SYSTEM DESCRIPTION

Firing order: 1 - 3 - 4 - 2

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

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.

Fuel Cut Control (at No Load and High Engine Speed)

INFOID:000000006579719

INPUT/OUTPUT SIGNAL CHART

ENGINE CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Sensor	Input Signal to ECM	ECM function	Actuator
Park/neutral position (PNP) switch (M/T) Transmission range switch (CVT)	Neutral position	Fuel cut control	Fuel injector
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
ABS actuator and electric unit (control unit) Combination meter	Vehicle speed*		

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

SYSTEM DESCRIPTION

If the engine speed is above 2,000 rpm under no load (for example, the shift lever position is P or N (CVT), Neutral (M/T) and engine speed is over 2,400 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 1,500 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under [EC-34. "Multiport Fuel Injection \(MFI\) System"](#).

AIR CONDITIONING CUT CONTROL

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

AIR CONDITIONING CUT CONTROL

Input/Output Signal Chart

INFOID:000000006579720

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner ON signal*1	Air conditioner cut control	Air conditioner relay
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*2		
Refrigerant pressure sensor	Refrigerant pressure		
EPS control unit	Power steering operation*1		
ABS actuator and electric unit (control unit)	Vehicle speed*1		
Combination meter			

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

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

System Description

INFOID:000000006579721

This system improves engine operation when the air conditioner is used. Under the following conditions, the air conditioner is turned off.

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

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Description

INFOID:000000006579722

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch	Brake pedal operation		
ASCD clutch switch (M/T models)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/neutral position (PNP) switch (M/T) Transmission range switch (CVT)	Gear position		
ABS actuator and electric unit (control unit)	Vehicle speed*		
Combination meter			
TCM (CVT models)	Powertrain revolution*		

*: This signal is sent to the ECM through 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 indicator and SET indicator in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.

NOTE:

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

SET OPERATION

Press MAIN switch. (The CRUISE indicator in 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. (Then SET indicator in combination meter illuminates.)

ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is depressed 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 keep the new set speed.

CANCEL OPERATION

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

- CANCEL switch is pressed
- More than two switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to the neutral position (M/T models)
- Selector lever is changed to N, P, R position (CVT models)
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.

- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.

When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ACCELERATE switch.

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

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

COAST OPERATION

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

A

RESUME OPERATION

When the RESUME/ACCELERATE switch is depressed after cancel operation other than depressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

EC

- Brake pedal is released.
- Clutch pedal is released (M/T models)
- Selector lever is in other than P and N positions (CVT models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

C

Component Description

INFOID:000000006579723

D

ASCD STEERING SWITCH

Refer to [EC-448](#).

E

ASCD BRAKE SWITCH

Refer to [EC-454](#) and [EC-531](#).

F

ASCD CLUTCH SWITCH

Refer to [EC-454](#) and [EC-531](#).

STOP LAMP SWITCH

Refer to [EC-454](#), [EC-467](#) and [EC-531](#).

G

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EC-484](#), [EC-488](#), [EC-494](#) and [EC-498](#).

H

ASCD INDICATOR

Refer to [EC-539](#).

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CAN COMMUNICATION

System Description

INFOID:000000006579724

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.

EVAPORATIVE EMISSION SYSTEM

< SERVICE INFORMATION >

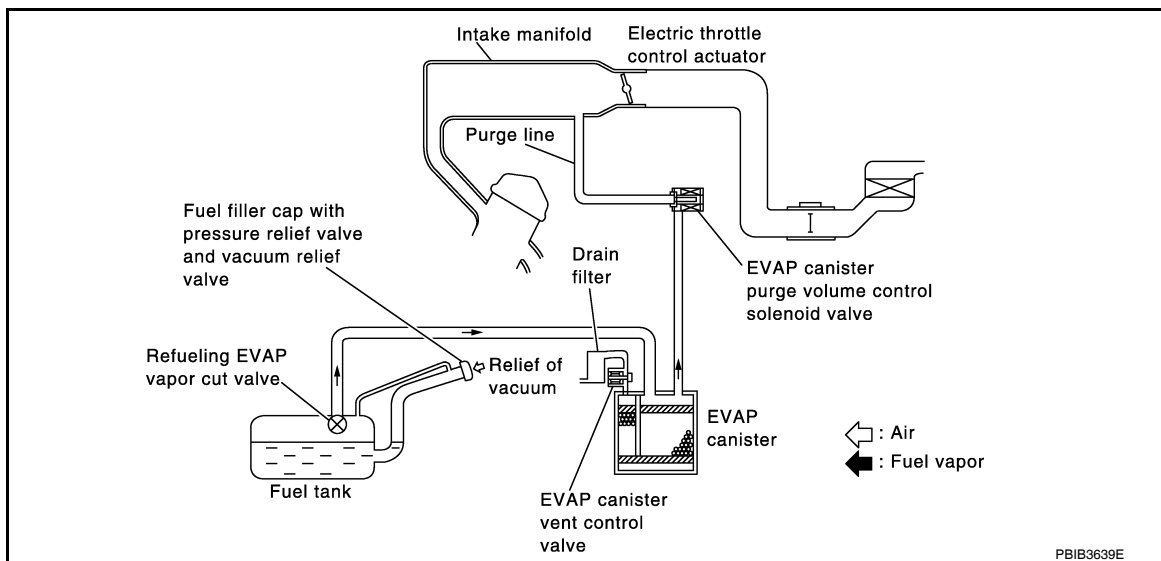
[MR20DE (FOR CALIFORNIA)]

EVAPORATIVE EMISSION SYSTEM

Description

INFOID:000000006579725

SYSTEM DESCRIPTION



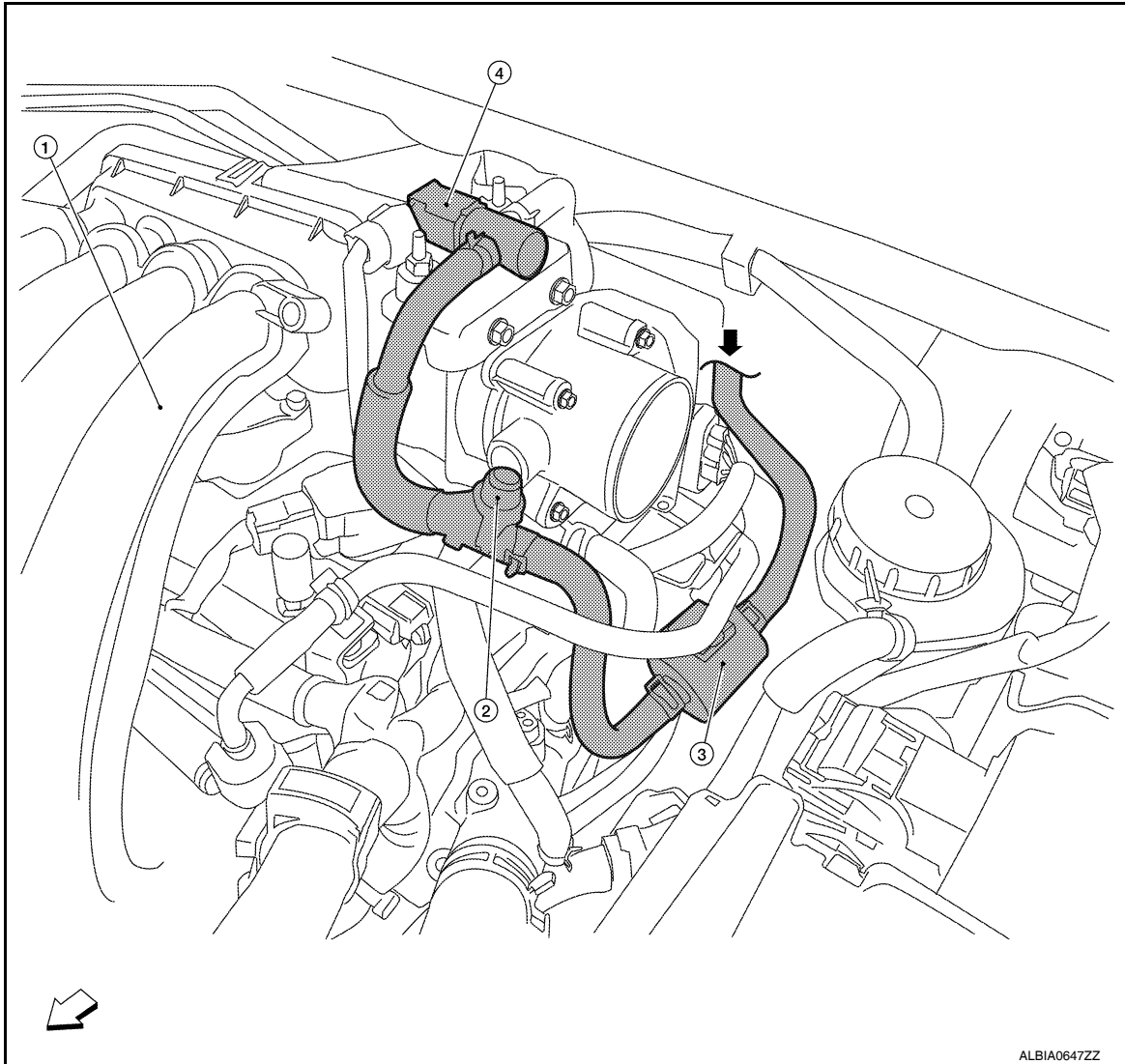
The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon 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.

EVAPORATIVE EMISSION LINE DRAWING

EVAPORATIVE EMISSION SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]



↔ : Vehicle front

← : From next figure

1. Intake manifold

2. EVAP service port

3. EVAP purge resonator

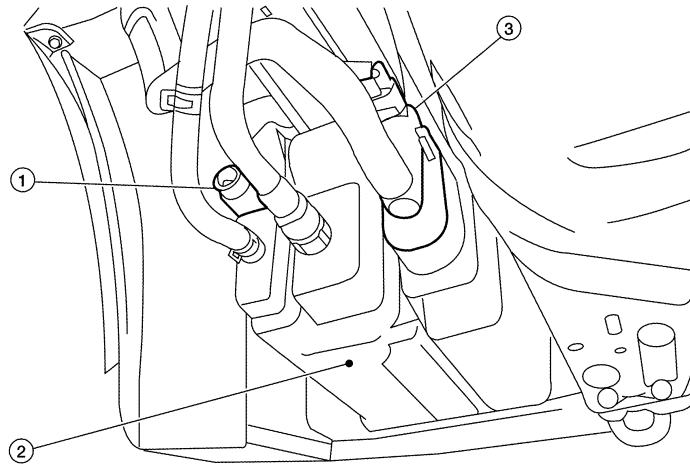
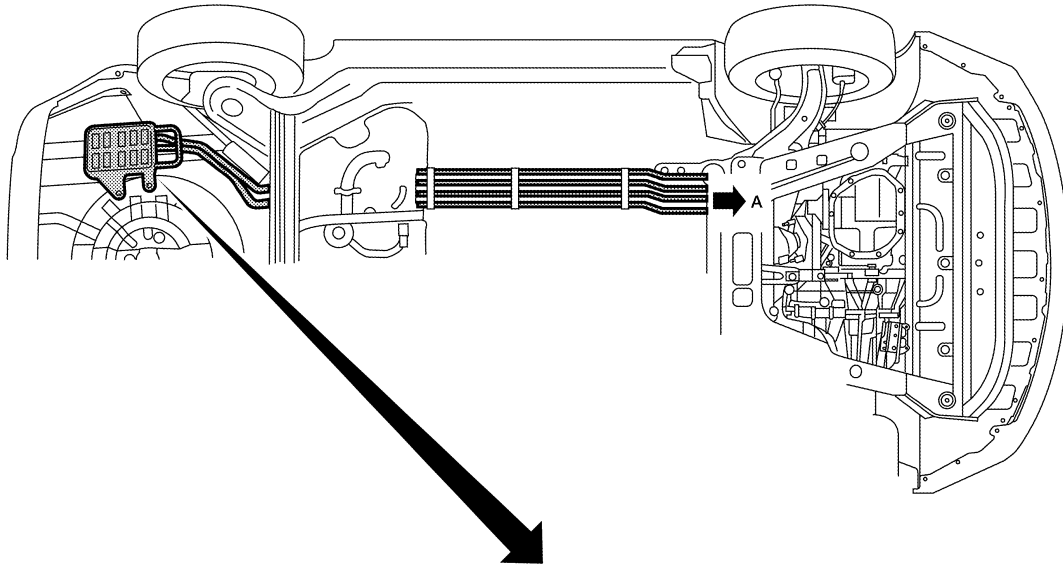
4. EVAP canister purge volume control solenoid valve

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

EVAPORATIVE EMISSION SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]



BBIA0746E

← To previous figure

1. EVAP control system pressure sensor 2. EVAP canister 3. EVAP canister vent control valve

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

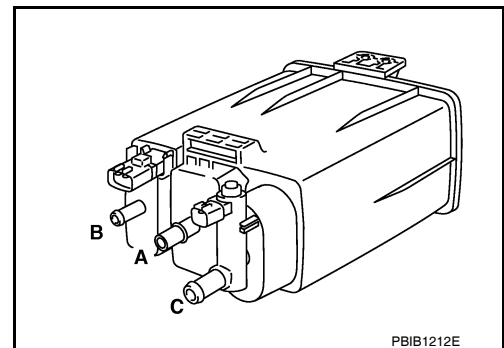
Component Inspection

INFOID:000000006579726

EVAP CANISTER

Check EVAP canister as follows:

1. Block port (B).
2. Blow air into port (A) and confirm that it flows freely out of port (C).
3. Release blocked port (B).
4. Apply vacuum pressure to port (B) and confirm that vacuum pressure exists at the ports (A) and (C).
5. Block port (A) and (B).
6. Apply pressure to port (C) and check that there is no leakage.



PBIB1212E

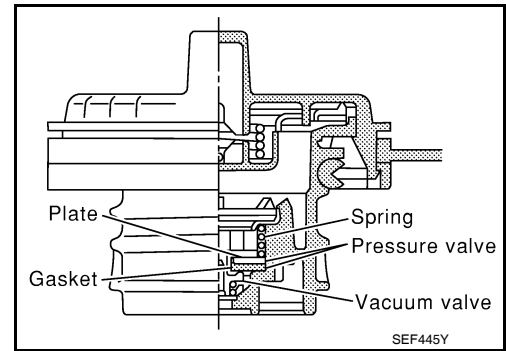
FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FILLER CAP)

EVAPORATIVE EMISSION SYSTEM

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Wipe clean valve housing.



2. Check valve opening pressure and vacuum.

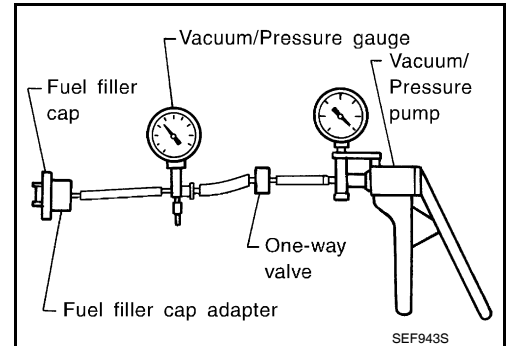
Pressure: 15.3 - 20.0 kPa
(0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.4 kPa
(-0.061 to -0.035 kg/cm², -0.87 to -0.48 psi)

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

CAUTION:

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



EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-356, "Component Inspection"](#).

FUEL TANK TEMPERATURE SENSOR

Refer to [EC-291, "Component Inspection"](#).

EVAP CANISTER VENT CONTROL VALVE

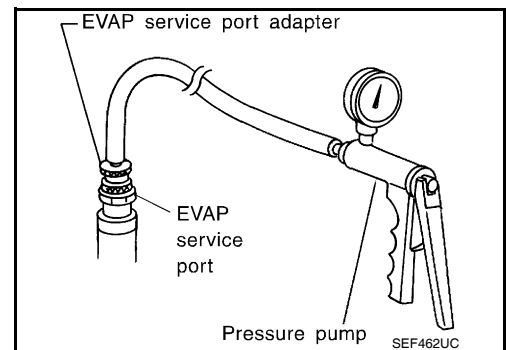
Refer to [EC-361, "Component Inspection"](#).

EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-378, "Component Inspection"](#).

EVAP SERVICE PORT

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



ON BOARD REFUELING VAPOR RECOVERY (ORVR)

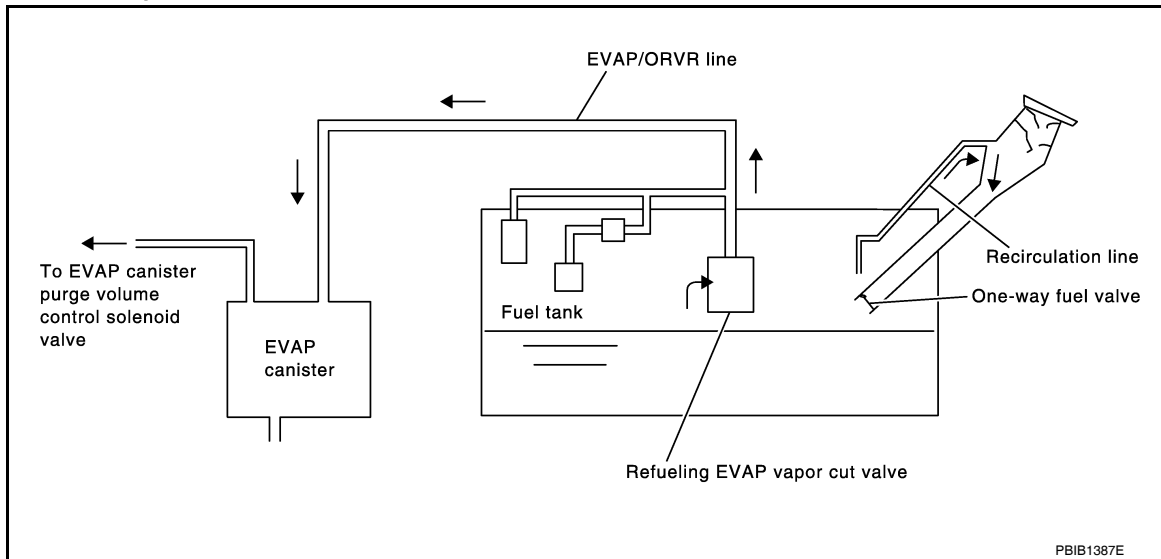
< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

System Description

INFOID:000000006579729



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.

WARNING:

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

- Put a "CAUTION: FLAMMABLE" sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO₂ 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-100, "Fuel Pressure Check"](#).
 - Disconnect negative battery cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

Diagnosis Procedure

INFOID:000000006579730

SYMPTOM: FUEL ODOR FROM EVAP CANISTER IS STRONG.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 2.
- NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

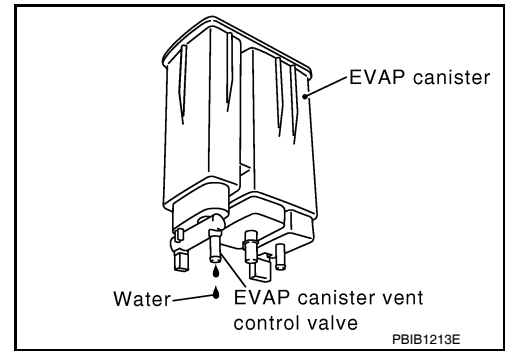
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 3.
- No >> GO TO 6.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to [FL-14, "Removal and Installation"](#).

>> GO TO 4.

4. CHECK DRAIN FILTER

Refer to [EC-50, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace drain filter. Refer to [FL-14, "Removal and Installation"](#).

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 [EC-43, "Description"](#).

6. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-50, "Component Inspection"](#).

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-14, "Removal and Installation"](#).

SYMPTOM: CANNOT REFUEL/FUEL ODOR FROM THE FUEL FILLER OPENING IS STRONG WHILE REFUELING.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 2.
- NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[MR20DE (FOR CALIFORNIA)]

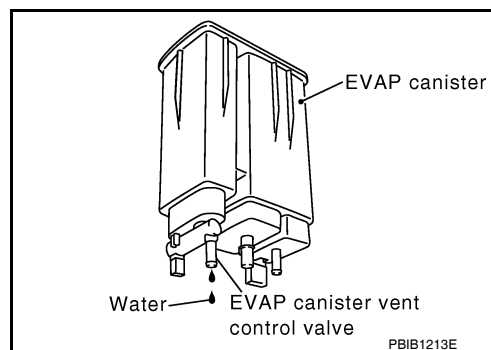
< SERVICE INFORMATION >

Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 3.

No >> GO TO 5.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to [FL-14, "Removal and Installation"](#).

>> GO TO 4.

4. CHECK DRAIN FILTER

Refer to [EC-50, "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace drain filter. Refer to [FL-14, "Removal and Installation"](#).

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 [EC-43, "Description"](#).

6. CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling EVAP vapor cut valve for clogging, kink, looseness and improper connection.

OK or NG

OK >> GO TO 7.

NG >> Repair or replace hoses and tubes. Refer to [EC-43, "Description"](#).

7. CHECK FILLER NECK TUBE

Check recirculation line for clogging, dents and cracks.

OK or NG

OK >> GO TO 8.

NG >> Replace filler neck tube. Refer to [FL-14, "Removal and Installation"](#).

8. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-50, "Component Inspection"](#).

OK or NG

OK >> GO TO 9.

NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-14, "Removal and Installation"](#).

9. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

OK or NG

OK >> GO TO 10.

NG >> Replace fuel filler tube. Refer to [FL-5, "Checking Fuel Line"](#).

10. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

OK or NG

OK >> GO TO 11.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

NG >> Repair or replace one-way fuel valve with fuel tank. Refer to [FL-14. "Removal and Installation"](#).

11. CHECK ONE-WAY FUEL VALVE-II

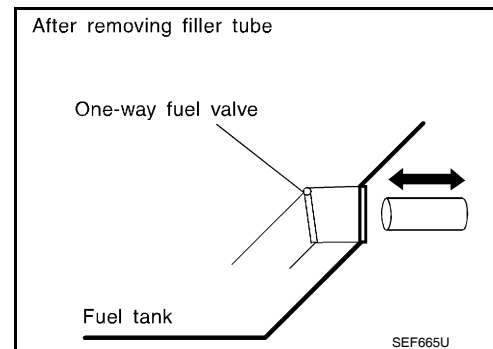
1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.
3. Check one-way fuel valve for operation as follows.
When a stick is inserted, the valve should open, when removing stick it should close.

Do not drop any material into the tank.

OK or NG

OK >> **INSPECTION END**

NG >> Replace fuel filler tube or replace one-way fuel valve with fuel tank. Refer to [FL-14. "Removal and Installation"](#).



INFOID:000000006579731

Component Inspection

REFUELING EVAP VAPOR CUT VALVE

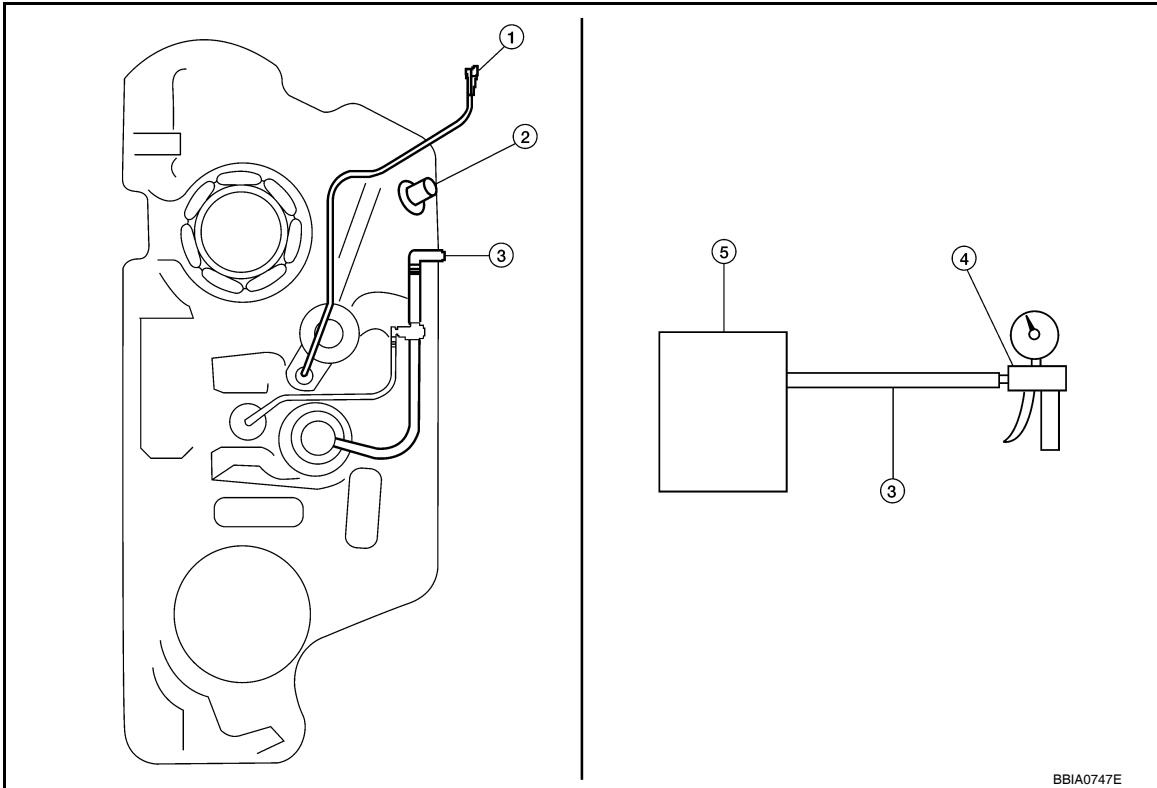
Ⓟ WITH CONSULT-III

1. Remove fuel tank. Refer to [FL-10](#).
2. Drain fuel from the tank as follows:
 - a. Remove fuel feed hose located on the fuel gauge retainer.
 - b. Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
 - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-III.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose end.
 - b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to hose end [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]



- | | | |
|-------------------------------|----------------|-------------------|
| 1. Recirculation line | 2. Filler tube | 3. EVAP/ORVR line |
| 4. Vacuum/pressure handy pump | 5. Fuel tank | |

⊗ WITHOUT CONSULT-III

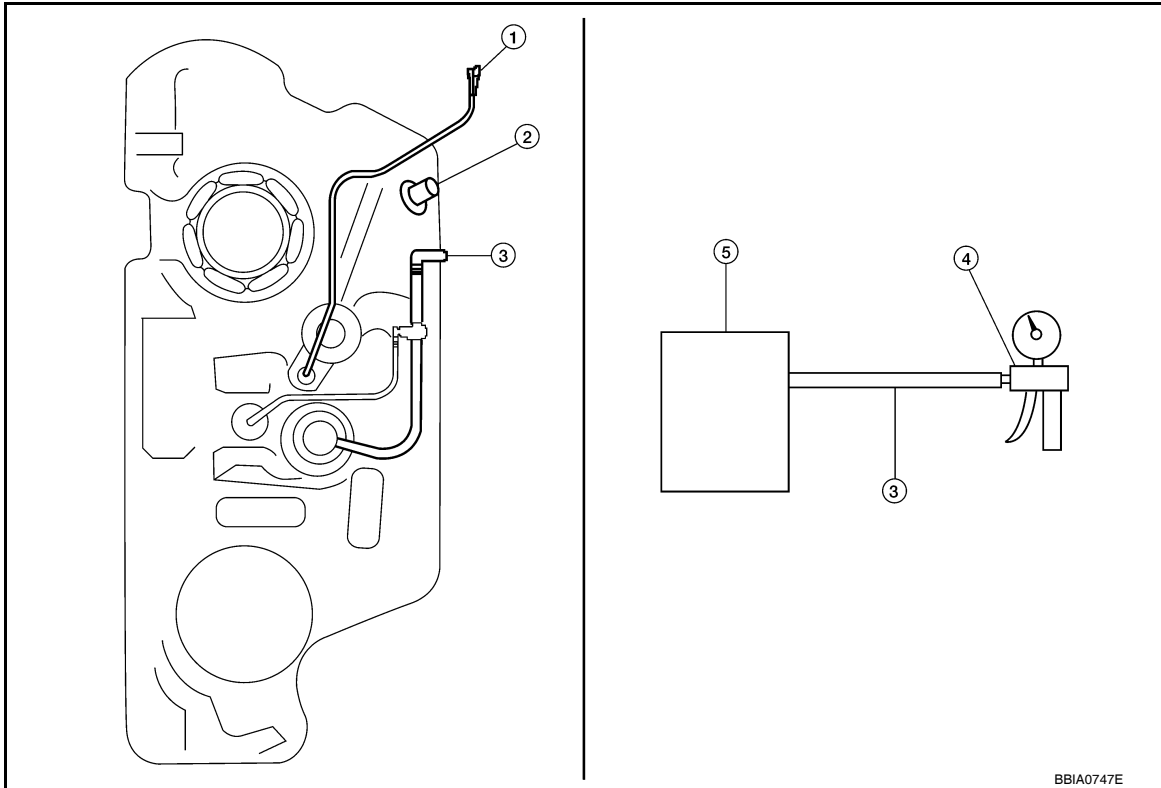
1. Remove fuel tank. Refer to [FL-10](#).
2. Drain fuel from the tank as follows:
 - a. Remove fuel gauge retainer.
 - b. Drain fuel from the tank using a handy pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose end.
 - b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to hose end [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.

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ON BOARD REFUELING VAPOR RECOVERY (ORVR)

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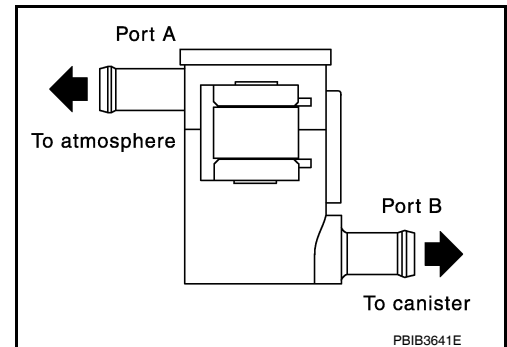
[MR20DE (FOR CALIFORNIA)]



- 1. Recirculation line
- 2. Filler tube
- 3. EVAP/ORVR line
- 4. Vacuum/pressure handy pump
- 5. Fuel tank

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to [FL-14, "Removal and Installation"](#).



POSITIVE CRANKCASE VENTILATION

< SERVICE INFORMATION >

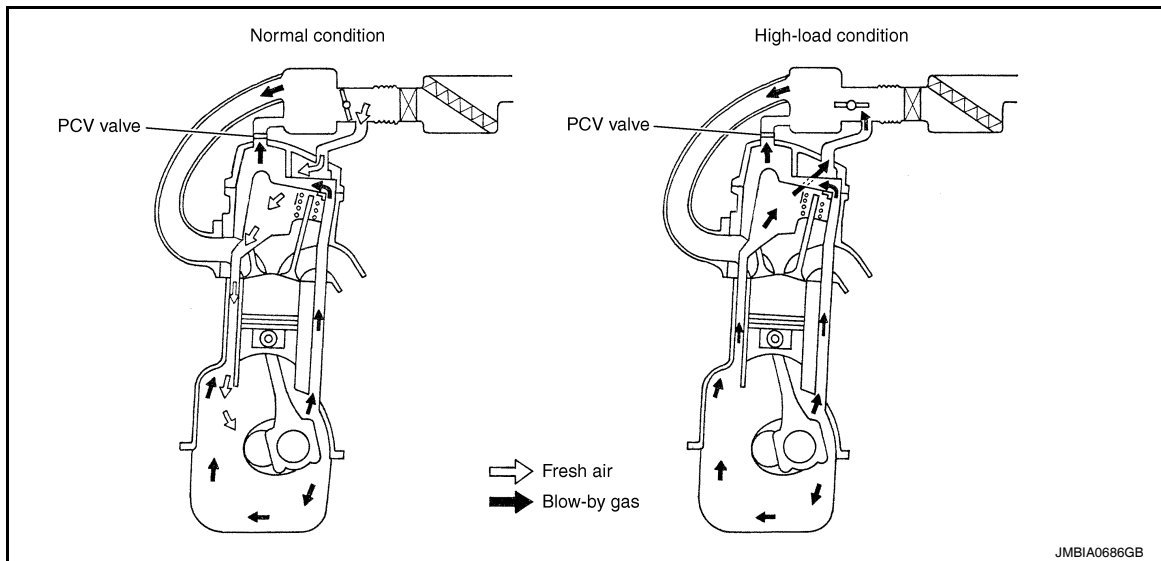
[MR20DE (FOR CALIFORNIA)]

POSITIVE CRANKCASE VENTILATION

Description

INFOID:000000006579732

SYSTEM DESCRIPTION

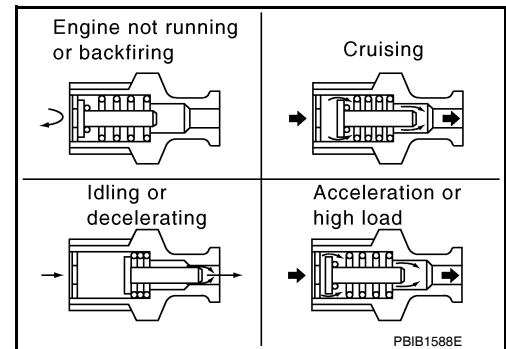


This system returns blow-by gas to the intake manifold.

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 then 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.

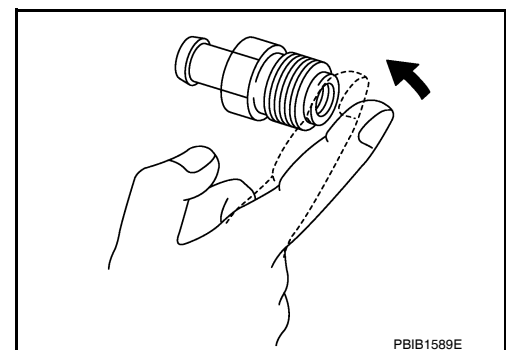


Component Inspection

INFOID:000000006579733

PCV (POSITIVE CRANKCASE VENTILATION) 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.



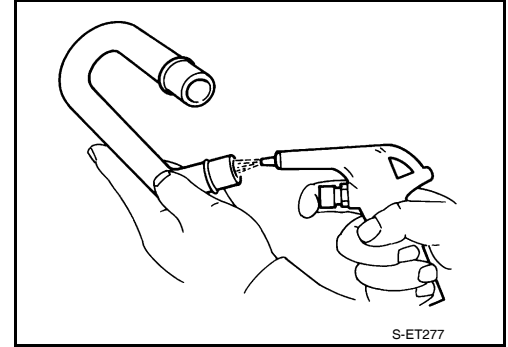
POSITIVE CRANKCASE VENTILATION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

PCV VALVE VENTILATION HOSE

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



NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)

Description

INFOID:000000006579734

- If the security indicator illuminates with the ignition switch ON or DTC P1610 - P1615 is displayed in “SELF DIAGNOSTIC RESULT” mode, perform the trouble diagnosis for corresponding to the detected DTC. Refer to [EC-26, "P1610-P1615"](#).
- Check that no DTC is displayed in “SELF DIAGNOSIS RESULT” mode of “BCM” before erasing the detected DTC in “ENGINE” mode with CONSULT-III.
- When replacing ECM, refer to [EC-97, "Procedure After Replacing ECM"](#).

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FUEL FILLER CAP WARNING SYSTEM

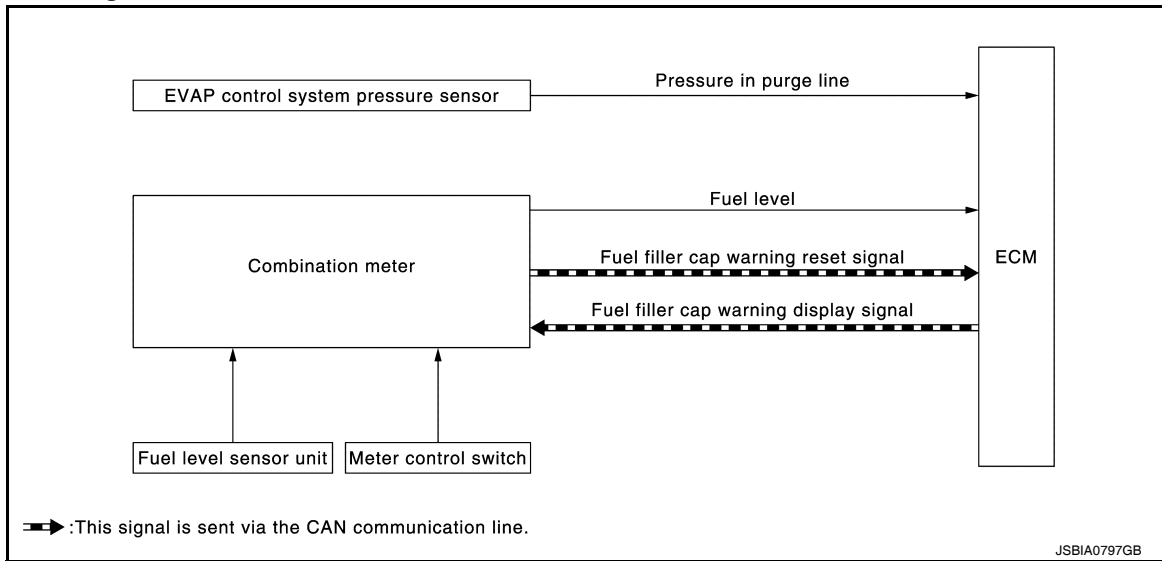
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[MR20DE (FOR CALIFORNIA)]

FUEL FILLER CAP WARNING SYSTEM

System Diagram

INFOID:000000006607837



System Description

INFOID:000000006607838

INPUT/OUTPUT SIGNAL CHART

Input

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

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 turns OFF, according to any condition listed below:

- Reset operation is performed by operating the odometer/trip meter 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.
- Fuel refilled.

FUEL FILLER CAP WARNING SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

- DTC erased by using CONSULT-III.

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.

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Introduction

INFOID:000000006579735

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

Emission-related diagnostic information	Diagnostic service
Diagnostic Trouble Code (DTC)	Service \$03 of SAE J1979/ISO 15031-5
Freeze Frame data	Service \$02 of SAE J1979/ISO 15031-5
System Readiness Test (SRT) code	Service \$01 of SAE J1979/ISO 15031-5
1st trip Diagnostic Trouble Code (1st Trip DTC)	Service \$07 of SAE J1979/ISO 15031-5
1st trip Freeze Frame data	—
Test values and Test limits	Service \$06 of SAE J1979/ISO 15031-5
Calibration ID	Service \$09 of SAE J1979/ISO 15031-5
Permanent Diagnostic Trouble Code (Permanent DTC)	Service \$0A* of SAE J1979/ISO 15031-5

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

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

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	SRT status	Test value	Permanent DTC status
CONSULT-III	×	×	×	×	×	×	—	×
GST	×	×	×	—	×	×	×	×
ECM	×	x*	—	—	—	×	—	—

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

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

(Refer to [EC-108, "Fail-Safe Chart"](#).)

Two Trip Detection Logic

INFOID:000000006579736

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

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

×: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnoses (Refer to EC-59, "Emission-related Diagnostic Information" .)	—	×	—	—	×	—	—	—
Except above	—	—	—	×	—	×	×	—

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When there is an open circuit on MIL circuit, the ECM cannot warn the driver by MIL lighting up 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 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.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut
--	--

Emission-related Diagnostic Information

INFOID:000000006579737

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

x: Applicable —: Not applicable

Items (CONSULT-III screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT-III GST*2	ECM*3					
LOST COMM (TCM)	U0101	0101*5	—	1	×	B	EC-160
LOST COMM (BCM)	U0140	0140*5	—	1	×	B	EC-162
CAN COMM CIRCUIT	U1001	1001*5	—	2	—	—	EC-164
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	0000	—	—	Flashing*6	—	EC-83
INT/V TIM CONT-B1	P0011	0011	×	2	×	B	EC-166
A/F SEN1 HTR (B1)	P0031	0031	—	2	×	B	EC-170
A/F SEN1 HTR (B1)	P0032	0032	—	2	×	B	EC-170
HO2S2 HTR (B1)	P0037	0037	—	2	×	B	EC-175
HO2S2 HTR (B1)	P0038	0038	—	2	×	B	EC-175
INT/V TIM V/CIR-B1	P0075	0075	—	2	×	B	EC-181
MAF SEN/CIRCUIT-B1	P0101	0101	—	2	×	B	EC-185
MAF SEN/CIRCUIT-B1	P0102	0102	—	1	×	B	EC-192
MAF SEN/CIRCUIT-B1	P0103	0103	—	1	×	B	EC-192
IAT SEN/CIRCUIT-B1	P0112	0112	—	2	×	B	EC-199
ECT SEN/CIRC	P0116	0116	—	2	×	B	EC-203
ECT SEN/CIRC	P0117	0117	—	1	×	B	EC-206
ECT SEN/CIRC	P0118	0118	—	1	×	B	EC-206
IAT SEN/CIRCUIT-B1	P0113	0113	—	2	×	B	EC-199
TP SEN 2/CIRC-B1	P0122	0122	—	1	×	B	EC-211
TP SEN 2/CIRC-B1	P0123	0123	—	1	×	B	EC-211
ECT SENSOR	P0125	0125	—	2	×	B	EC-216
IAT SENSOR-B1	P0127	0127	—	2	×	B	EC-219
THERMSTAT FNCTN	P0128	0128	—	2	×	B	EC-222
A/F SENSOR1 (B1)	P0130	0130	—	2	×	A	EC-224
A/F SENSOR1 (B1)	P0131	0131	—	2	×	B	EC-229
A/F SENSOR1 (B1)	P0132	0132	—	2	×	B	EC-234
HO2S2 (B1)	P0137	0137	×	2	×	A	EC-239
HO2S2 (B1)	P0138	0138	×	2	×	A	EC-246
HO2S2 (B1)	P0139	0139	×	2	×	A	EC-255
A/F SENSOR1 (B1)	P014C	014C	×	2	×	A	EC-264

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Items (CONSULT-III screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT-III GST*2	ECM*3					
A/F SENSOR1 (B1)	P014D	014D	×	2	×	A	EC-264
A/F SENSOR1 (B1)	P015A	015A	×	2	×	A	EC-264
A/F SENSOR1 (B1)	P015B	015B	×	2	×	A	EC-264
FUEL SYS-LEAN-B1	P0171	0171	—	2	×	B	EC-272
FUEL SYS-RICH-B1	P0172	0172	—	2	×	B	EC-278
FTT SENSOR	P0181	0181	—	2	×	B	EC-284
FTT SEN/CIRCUIT	P0182	0182	—	2	×	B	EC-288
FTT SEN/CIRCUIT	P0183	0183	—	2	×	B	EC-288
EOT SEN/CIRC	P0196	0196	—	2	×	B	EC-292
EOT SEN/CIRC	P0197	0197	—	2	×	B	EC-295
EOT SEN/CIRC	P0198	0198	—	2	×	B	EC-295
TP SEN 1/CIRC-B1	P0222	0222	—	1	×	B	EC-299
TP SEN 1/CIRC-B1	P0223	0223	—	1	×	B	EC-299
MULTI CYL MISFIRE	P0300	0300	—	1 or 2	×	B	EC-304
CYL 1 MISFIRE	P0301	0301	—	1 or 2	×	B	EC-304
CYL 2 MISFIRE	P0302	0302	—	1 or 2	×	B	EC-304
CYL 3 MISFIRE	P0303	0303	—	1 or 2	×	B	EC-304
CYL 4 MISFIRE	P0304	0304	—	1 or 2	×	B	EC-304
KNOCK SEN/CIRC-B1	P0327	0327	—	2	—	—	EC-310
KNOCK SEN/CIRC-B1	P0328	0328	—	2	—	—	EC-310
CKP SEN/CIRCUIT	P0335	0335	—	2	×	B	EC-314
CMP SEN/CIRC-B1	P0340	0340	—	2	×	B	EC-321
TW CATALYST SYS-B1	P0420	0420	×	2	×	A	EC-326
EVAP PURG FLOW/MON	P0441	0441	×	2	×	A	EC-331
EVAP SMALL LEAK	P0442	0442	×	2	×	A	EC-336
PURG VOLUME CONT/V	P0443	0443	—	2	×	A	EC-343
PURG VOLUME CONT/V	P0444	0444	—	2	×	B	EC-351
PURG VOLUME CONT/V	P0445	0445	—	2	×	B	EC-351
VENT CONTROL VALVE	P0447	0447	—	2	×	B	EC-357
VENT CONTROL VALVE	P0448	0448	—	2	×	B	EC-363
EVAP SYS PRES SEN	P0451	0451	—	2	×	A	EC-369
EVAP SYS PRES SEN	P0452	0452	—	2	×	B	EC-372
EVAP SYS PRES SEN	P0453	0453	—	2	×	B	EC-379
EVAP GROSS LEAK	P0455	0455	—	2	×	A	EC-387
EVAP VERY SML LEAK	P0456	0456	×*7	2	×	A	EC-394
FUEL LEV SEN SLOSH	P0460	0460	—	2	×	A	EC-402
FUEL LEVEL SENSOR	P0461	0461	—	2	×	B	EC-404
FUEL LEVL SEN/CIRC	P0462	0462	—	2	×	B	EC-406
FUEL LEVL SEN/CIRC	P0463	0463	—	2	×	B	EC-406
VEH SPEED SEN/CIRC*8	P0500	0500	—	2	×	B	EC-408
ISC SYSTEM	P0506	0506	—	2	×	B	EC-410
ISC SYSTEM	P0507	0507	—	2	×	B	EC-412

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Items (CONSULT-III screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT-III GST*2	ECM*3					
COLD START CONTROL	P050A	050A	—	2	×	A	EC-414
COLD START CONTROL	P050B	050B	—	2	×	A	EC-414
COLD START CONTROL	P050E	050E	—	2	×	A	EC-414
ECM BACK UP/CIRCUIT	P0603	0603	—	2	×	B	EC-416
ECM	P0605	0605	—	1 or 2	— or ×	B	EC-419
ECM	P0607	0607	—	1 (CVT) 2 (M/T)	× (CVT) — (M/T)	B	EC-421
SENSOR POWER/CIRC	P0643	0643	—	1	×	B	EC-422
T/M RANGE SENSOR A	P0705	0705	—	2	×	B	CVT-61
FLUID TEMP SENSOR A*9	P0710	0710	—	1	×	B	CVT-66
INPUT SPEED SENSOR A	P0715	0715	—	2	×	B	CVT-71
OUTPUT SPEED SENSOR*8	P0720	0720	—	2	×	B	CVT-76
TORQUE CONVERTER	P0740	0740	—	2	×	B	CVT-84
TORQUE CONVERTER	P0744	0744	—	2	×	B	CVT-89
PC SOLENOID A	P0745	0745	—	2	×	B	CVT-91
PC SOLENOID A	P0746	0746	—	1	×	B	CVT-96
PC SOLENOID B	P0776	0776	—	2	×	B	CVT-98
PC SOLENOID B	P0778	0778	—	2	×	B	CVT-100
FLUID PRESS SEN/SW A	P0840	0840	—	2	×	B	CVT-110
P-N POS SW/CIRCUIT	P0850	0850	—	2	×	B	EC-427
CLOSED LOOP-B1	P1148	1148	—	1	×	A	EC-432
TCS/CIRC	P1212	1212	—	2	—	—	EC-433
ENG OVER TEMP	P1217	1217	—	1	×	B	EC-434
CTP LEARNING-B1	P1225	1225	—	2	—	—	EC-446
CTP LEARNING-B1	P1226	1226	—	2	—	—	EC-447
ASCD SW	P1564	1564	—	1	—	—	EC-448
ASCD BRAKE SW	P1572	1572	—	1	—	—	EC-454
ASCD VHL SPD SEN	P1574	1574	—	1	—	—	EC-463
LOCK MODE	P1610	1610	—	2	—	—	BL-173
ID DISCORD,IMMU-ECM	P1611	1611	—	2	—	—	BL-173
CHAIN OF ECM-IMMU	P1612	1612	—	2	—	—	BL-173
CHAIN OF IMMU-KEY	P1614	1614	—	2	—	—	BL-173
DIFFERENCE OF KEY	P1615	1615	—	2	—	—	BL-173
IN PULY SPEED	P1715	1715	—	2	—	—	EC-465
SLCT SOLENOID	P1740	1740	—	2	×	B	CVT-129
STEP MOTOR	P1777	1777	—	1	×	B	CVT-135
STEP MOTOR	P1778	1778	—	2	×	B	CVT-139
BRAKE SW/CIRCUIT	P1805	1805	—	2	—	—	EC-467
TUMBLE CONT/V	P2004	2004	—	2	×	B	EC-472
TUMBLE POS SEN	P2014	2014	—	2	×	B	EC-479
ETC MOT PWR-B1	P2100	2100	—	1	×	B	EC-484
ETC FNCTN/CIRC-B1	P2101	2101	—	1	×	B	EC-488

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Items (CONSULT-III screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT-III GST*2	ECM*3					
ETC MOT PWR	P2103	2103	—	1	×	B	EC-484
ETC MOT-B1	P2118	2118	—	1	×	B	EC-494
ETC ACTR-B1	P2119	2119	—	1	×	B	EC-498
APP SEN 1/CIRC	P2122	2122	—	1	×	B	EC-500
APP SEN 1/CIRC	P2123	2123	—	1	×	B	EC-500
APP SEN 2/CIRC	P2127	2127	—	1	×	B	EC-505
APP SEN 2/CIRC	P2128	2128	—	1	×	B	EC-505
TP SENSOR-B1	P2135	2135	—	1	×	B	EC-512
APP SENSOR	P2138	2138	—	1	×	B	EC-517
A/F SENSOR1 (B1)	P2A00	2A00	—	2	×	A	EC-524

*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-59, "Emission-related Diagnostic Information"](#), "PERMANENT DIAGNOSTIC TROUBLE CODE (PERMANENT DTC)".

*5: The troubleshooting for this DTC needs CONSULT-III.

*6: When the ECM in the mode of displaying SRT status, MIL may flash. For the details, refer to "How to Display SRT Status".

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

*8: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

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

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

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

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

For malfunctions in which 1st trip DTCs are displayed, refer to "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS". 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-III.

1st trip DTC is specified in Service \$07 of SAE J1979/ISO 15031-5. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to [EC-103, "Trouble Diagnosis Introduction"](#). Then perform DTC Confirmation Procedure or Overall Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

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

 **WITH CONSULT-III**

 **WITH GST**

CONSULT-III or GST Examples: P0340, P0850, P1148, etc.

These DTCs are prescribed by SAE J2012/ISO 15031-6.

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

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The number of blinks of the MIL in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0340, 0850, 1148, etc.

These DTCs are controlled by NISSAN.

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

DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-III. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

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

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

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-III or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen, not on the GST. For details, see [EC-130. "CONSULT-III Function \(ENGINE\)"](#).

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

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

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

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

SYSTEM READINESS TEST (SRT) CODE

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.

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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 Item

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

SRT item (CONSULT-III indication)	Performance Priority*	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420
EVAP SYSTEM	2	EVAP control system purge flow monitoring	P0441
	1	EVAP control system	P0442
	2	EVAP control system	P0456
HO2S	2	Air fuel ratio (A/F) sensor 1	P014C, P014D, P015A, P015B
		Heated oxygen sensor 2	P0137
		Heated oxygen sensor 2	P0138
		Heated oxygen sensor 2	P0139
EGR/VVT SYSTEM	3	Intake valve timing control function	P0011

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

SRT Set Timing

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

Self-diagnosis result		Example					
		Diagnosis	Ignition cycle				
			← ON →	OFF	← ON →	OFF	
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)	
		P0402	OK (1)	— (1)	— (1)	OK (2)	
		P1402	OK (1)	OK (2)	— (2)	— (2)	
		SRT of EGR	"CMPLT"	"CMPLT"	"CMPLT"	"CMPLT"	
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)	
		P0402	— (0)	— (0)	OK (1)	— (1)	
		P1402	OK (1)	OK (2)	— (2)	— (2)	
		SRT of EGR	"INCMP"	"INCMP"	"CMPLT"	"CMPLT"	
NG exists	Case 3	P0400	OK	OK	—	—	
		P0402	—	—	—	—	
		P1402	NG	—	NG	NG	NG (Consecutive NG)
		(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.

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—: Self-diagnosis is not carried out.

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

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

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

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

NOTE:

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

SRT Service Procedure

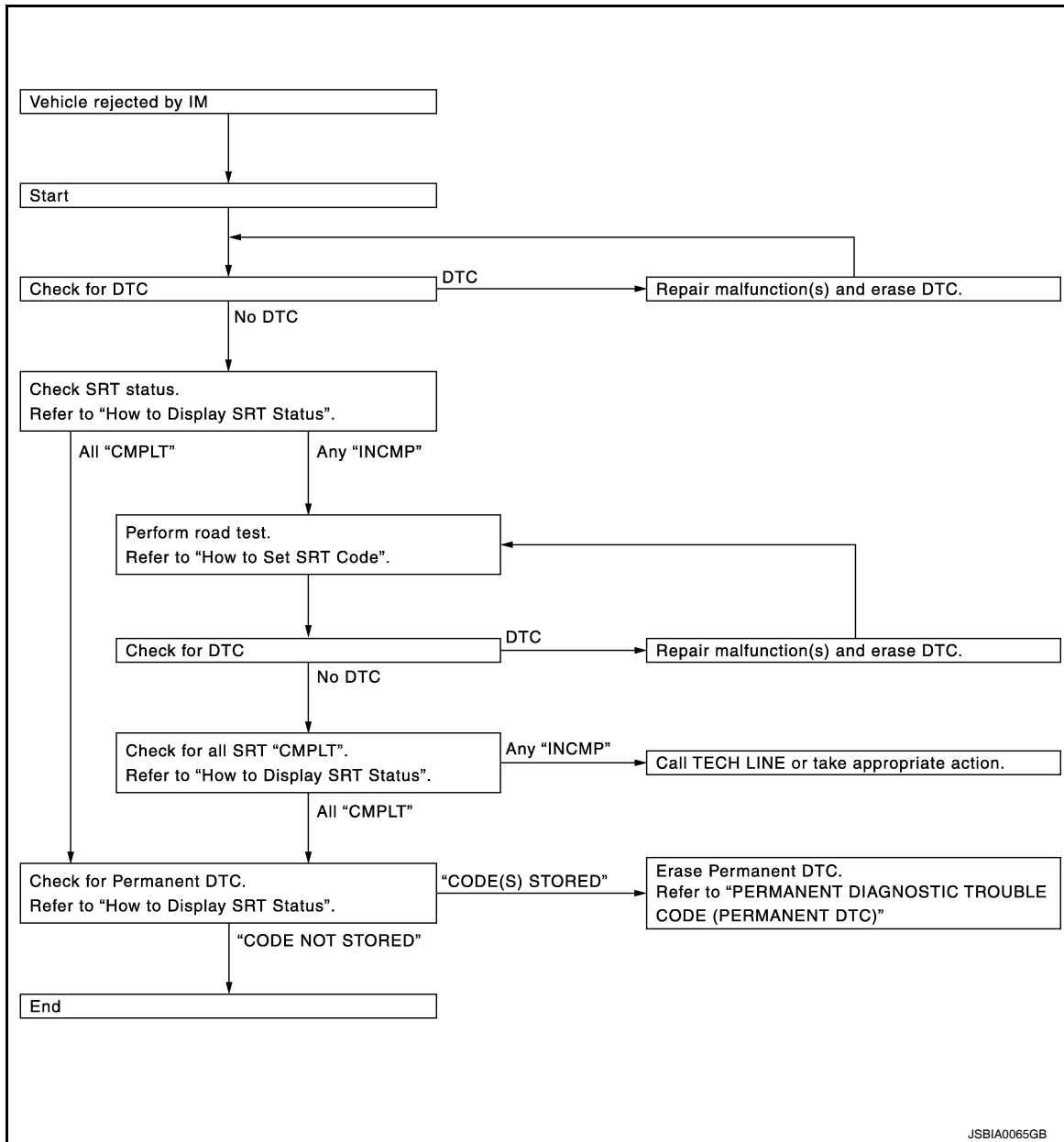
If a vehicle has failed the state emissions inspection due to one or more SRT items indicating “INCMP”, review the flowchart diagnostic sequence referring to the following flow chart.

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How to Display SRT Status

WITH CONSULT-III

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

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

NOTE:

- Though displayed on the CONSULT-III screen, "HO2S HTR" is not SRT item.
- "SRT STATUS" provides the presence or absence of permanent DTCs stored in ECM memory.

WITH GST

Selecting Service \$01 with GST

NO TOOLS

A SRT code itself cannot be displayed, however SRT status can.

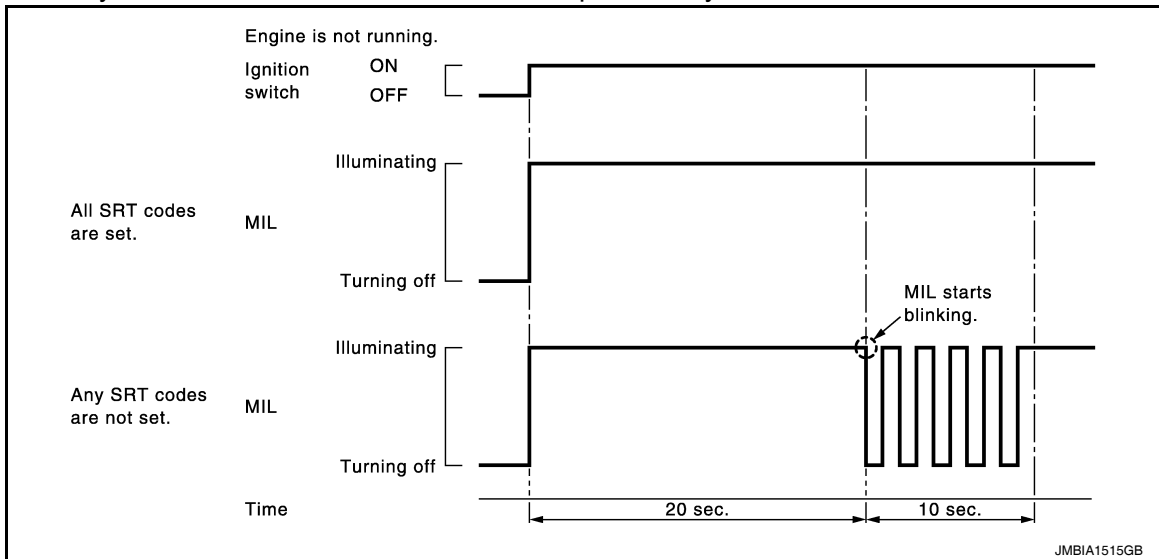
1. Turn ignition switch ON and wait 20 seconds.
2. SRT status is indicated as shown below.
 - When all SRT codes are set, MIL illuminates continuously.

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- When any SRT codes are not set, MIL will blink periodically for 10 seconds.



How to Set SRT Code

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

WITH CONSULT-III

Perform corresponding DTC Confirmation Procedure one by one based on Performance Priority in the table on "SRT Item".

WITHOUT CONSULT-III

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

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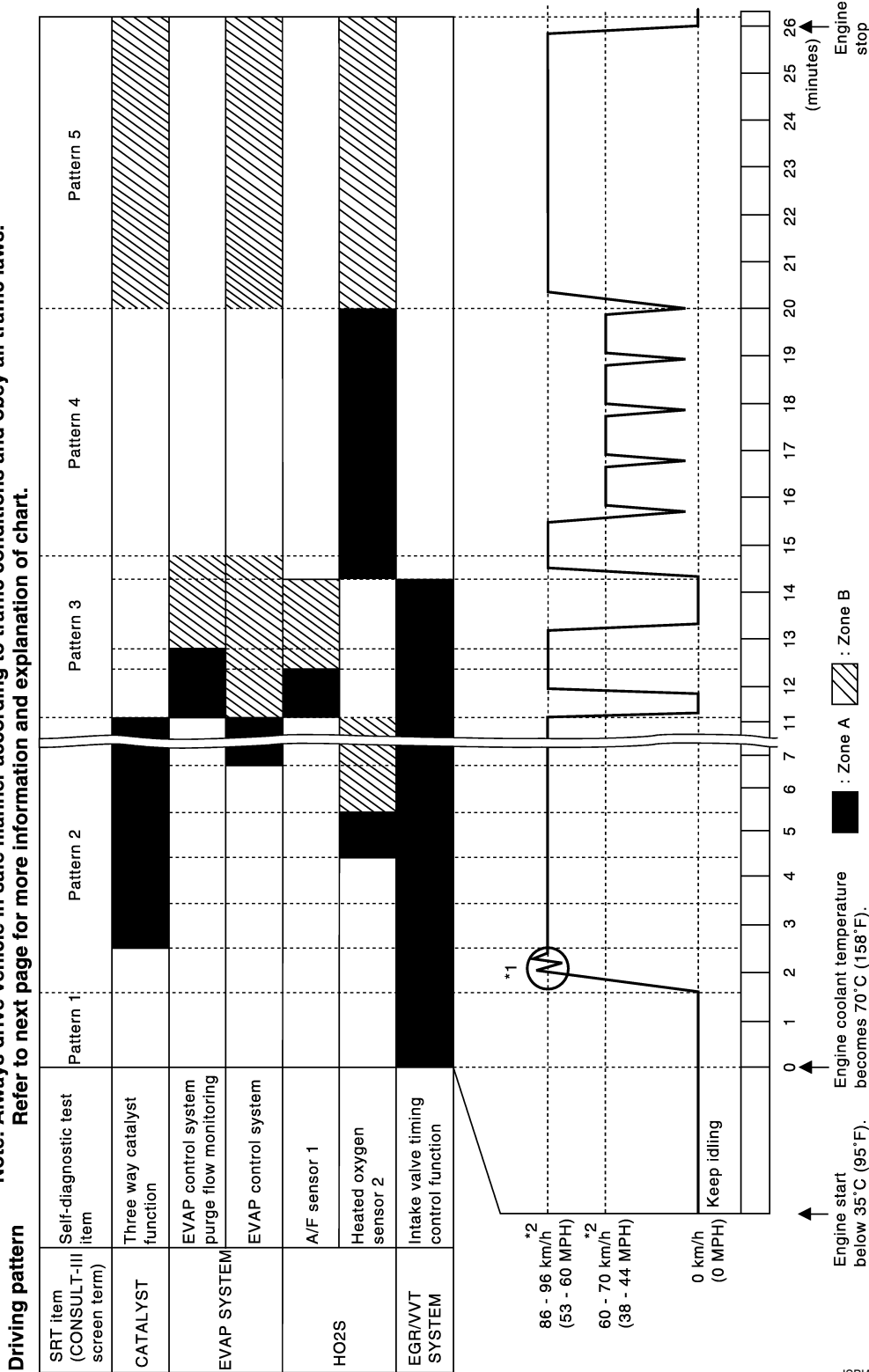
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Driving Pattern

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



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*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.

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Zone A refers to the range where the time, required for the diagnosis under normal conditions*, is the shortest.

Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.

Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

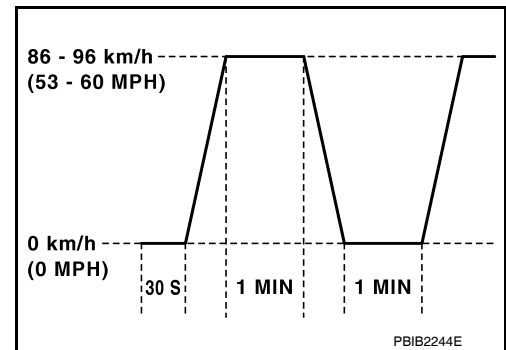
- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 38 and ground is 3.0 - 4.3 V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 38 and ground is lower than 1.4 V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 43 and ground is less than 4.1 V).**

Pattern 2:

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

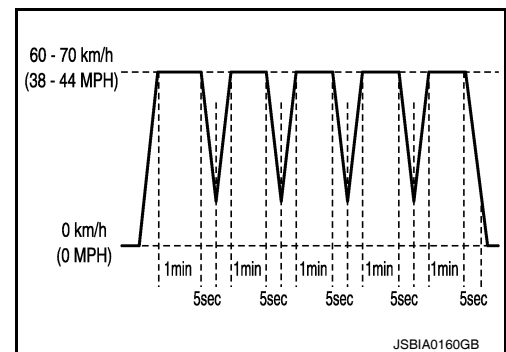
Pattern 3:

- Operate vehicle following the driving pattern shown in the figure.
- Release the accelerator pedal during decelerating vehicle speed from 90 km/h (56 MPH) to 0 km/h (0 MPH).



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 maintain the speed.
- Release the accelerator pedal fully at least 5 seconds.
- Repeat the above two steps at least 5 times.



Pattern 5:

- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

Suggested Transmission Gear Position for CVT Models

Set the selector lever in the D position.

Suggested upshift speeds for M/T models

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

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	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:	For quick acceleration in low altitude areas	For high altitude areas [over 1,219m (4,000 ft)]:
Gear change	ACCEL shift point km/h (MPH)	km/h (MPH)	km/h (MPH)
1st to 2nd	13 (8)	24 (15)	24 (15)
2nd to 3rd	27 (17)	40 (25)	40 (25)
3rd to 4th	40 (25)	53 (33)	65 (40)
4th to 5th	58 (36)	71 (44)	72 (45)
5th to 6th	82 (51)	82 (51)	82 (51)

Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate.

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

Gear	km/h (MPH)
1st	50 (30)
2nd	90 (55)
3rd	—
4th	—
5th	—
6th	—

PERMANENT DIAGNOSTIC TROUBLE CODE (PERMANENT DTC)

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.

Permanent DTC Item

For permanent DTC items, MIL turns ON. Refer to [EC-59, "Emission-related Diagnostic Information"](#), "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS".

Permanent DTC Set Timing

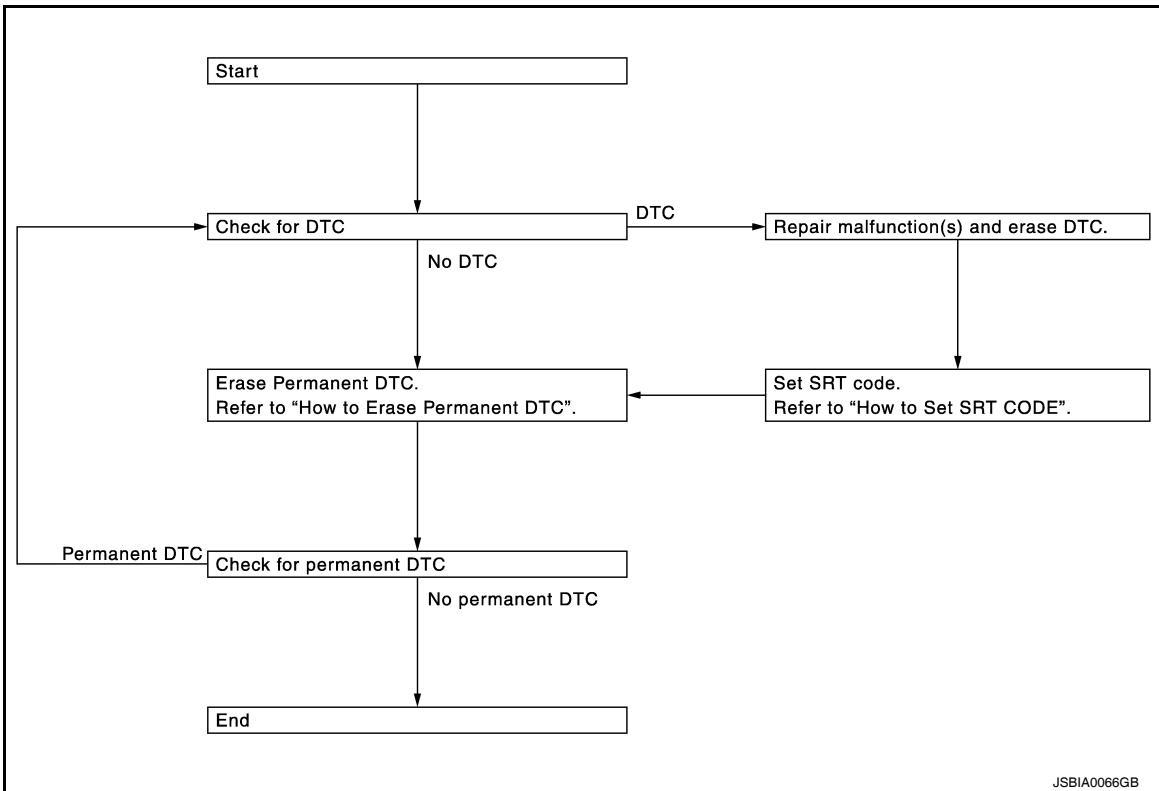
The setting timing of permanent DTC is stored in ECM with the lighting of MIL when a DTC is confirmed.

Permanent DTC Service Procedure

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How to Display Permanent DTC Status

WITH CONSULT-III

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

NOTE:

Permanent DTCs stored in ECM memory are displayed on the CONSULT-III screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).

CAUTION:

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".

PERMANENT DTC & SRT CONFIRMATION : PERMANENT DTC STATUS		
<p>CAUTION: Turn ignition switch from ON to OFF twice to update the information on the status screen.</p>		
PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D
XXXX	INCMP	INCMP
XXXX	CMPLT	INCMP
XXXX	INCMP	CMPLT
XXXX	CMPLT	INCMP
XXXX	INCMP	INCMP
XXXX	INCMP	INCMP
<p>The previous trip information is displayed. →</p>		

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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.
4. Turn ignition switch ON.
5. Select Service \$0A with GST .

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

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)

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
HO2S	01H	Air fuel ratio (A/F) sensor 1 (Bank 1)	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	89H	84H	The amount of shift in air fuel ratio
			P2A00	8AH	84H	The amount of shift in air fuel ratio
			P0130	8BH	0BH	Difference in sensor output voltage
			P0133	8CH	83H	Response gain at the limited frequency
			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
			P014D	90H	84H	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
	02H	Heated oxygen sensor 2 (Bank 1)	P0138	07H	0CH	Minimum sensor output voltage for test cycle
			P0137	08H	0CH	Maximum sensor output voltage for test cycle
			P0138	80H	0CH	Sensor output voltage
			P0139	81H	0CH	Difference in sensor output voltage
	03H	Heated oxygen sensor 3 (Bank 1)	P0143	07H	0CH	Minimum sensor output voltage for test cycle
			P0144	08H	0CH	Maximum sensor output voltage for test cycle
			P0146	80H	0CH	Sensor output voltage
			P0145	81H	0CH	Difference in sensor output voltage

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
HO2S	05H	Air fuel ratio (A/F) sensor 1 (Bank 2)	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
			P0153	87H	04H	Response rate: Response ratio (Lean to Rich)
			P0153	88H	04H	Response rate: Response ratio (Rich to Lean)
			P2A03	89H	84H	The amount of shift in air fuel ratio
			P2A03	8AH	84H	The amount of shift in air fuel ratio
			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		
	P015D	94H	01H	O2 Sensor Delayed Response - Lean to Rich Bank 2 Sensor 1		
	06H	Heated oxygen sensor 2 (Bank 2)	P0158	07H	0CH	Minimum sensor output voltage for test cycle
			P0157	08H	0CH	Maximum sensor output voltage for test cycle
			P0158	80H	0CH	Sensor output voltage
			P0159	81H	0CH	Difference in sensor output voltage
	07H	Heated oxygen sensor 3 (Bank2)	P0163	07H	0CH	Minimum sensor output voltage for test cycle
			P0164	08H	0CH	Maximum sensor output voltage for test cycle
			P0166	80H	0CH	Sensor output voltage
			P0165	81H	0CH	Difference in sensor output voltage

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
CATALYST	21H	Three way catalyst function (Bank1)	P0420	80H	01H	O2 storage index
			P0420	82H	01H	Switching time lag engine exhaust index value
			P2423	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2423	84H	84H	O2 storage index in HC trap catalyst
	22H	Three way catalyst function (Bank2)	P0430	80H	01H	O2 storage index
			P0430	82H	01H	Switching time lag engine exhaust index value
			P2424	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2424	84H	84H	O2 storage index in HC trap catalyst
EGR SYSTEM	31H	EGR function	P0400	80H	96H	Low Flow Faults: EGR temp change rate (short term)
			P0400	81H	96H	Low Flow Faults: EGR temp change rate (long term)
			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
VVT SYSTEM	35H	VVT Monitor (Bank1)	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)
			P0014	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)
	36H	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)
			P0024	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
EVAP SYSTEM	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)
	3CH	EVAP control system leak (Very small leak)	P0456	80H	05H	Leak area index (for more than 0.02 inch)
			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	
O2 SENSOR HEATER	41H	A/F sensor 1 heater (Bank 1)	Low Input:P0031 High Input:P0032	81H	0BH	Converted value of Heater electric current to voltage
	42H	Heated oxygen sensor 2 heater (Bank 1)	Low Input:P0037 High Input:P0038	80H	0CH	Converted value of Heater electric current to voltage
	43H	Heated oxygen sensor 3 heater (Bank 1)	P0043	80H	0CH	Converted value of Heater electric current to voltage
	45H	A/F sensor 1 heater (Bank 2)	Low Input:P0051 High Input:P0052	81H	0BH	Converted value of Heater electric current to voltage
	46H	Heated oxygen sensor 2 heater (Bank 2)	Low Input:P0057 High Input:P0058	80H	0CH	Converted value of Heater electric current to voltage
	47H	Heated oxygen sensor 3 heater (Bank 2)	P0063	80H	0CH	Converted value of Heater electric current to voltage
Secondary Air	71H	Secondary Air system	P0411	80H	01H	Secondary Air Injection System Incorrect Flow Detected
			Bank1: P0491 Bank2: P0492	81H	01H	Secondary Air Injection System Insufficient 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 Switching Valve Stuck Open
			P2440	85H	01H	Secondary Air Injection System Switching 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
	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

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
MISFIRE	A1H	Multiple Cylinder Misfires	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
			P0301	89H	24H	Misfiring counter at 200 revolution of the first cylinder
			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

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
MISFIRE	A2H	No. 1 Cylinder Misfire	P0301	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving 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 driving 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 driving 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 driving 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 driving 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 driving 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 driving 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 driving cycles
			P0308	0CH	24H	Misfire counts for last/current driving cycles

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC

 With **CONSULT-III**

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 CVT related items, skip step 1.
1. Erase DTC in TCM.
 2. Select "ENGINE" with CONSULT-III.
 3. Select "SELF-DIAG RESULTS".

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4. Touch "ERASE". (The DTC in the ECM will be erased.)

With GST

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.

1. Select Service \$04 with GST.

No Tools

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.

1. Erase DTC in ECM. Refer to How to Erase Diagnostic Test Mode II (Self-diagnostic Results).

• **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**

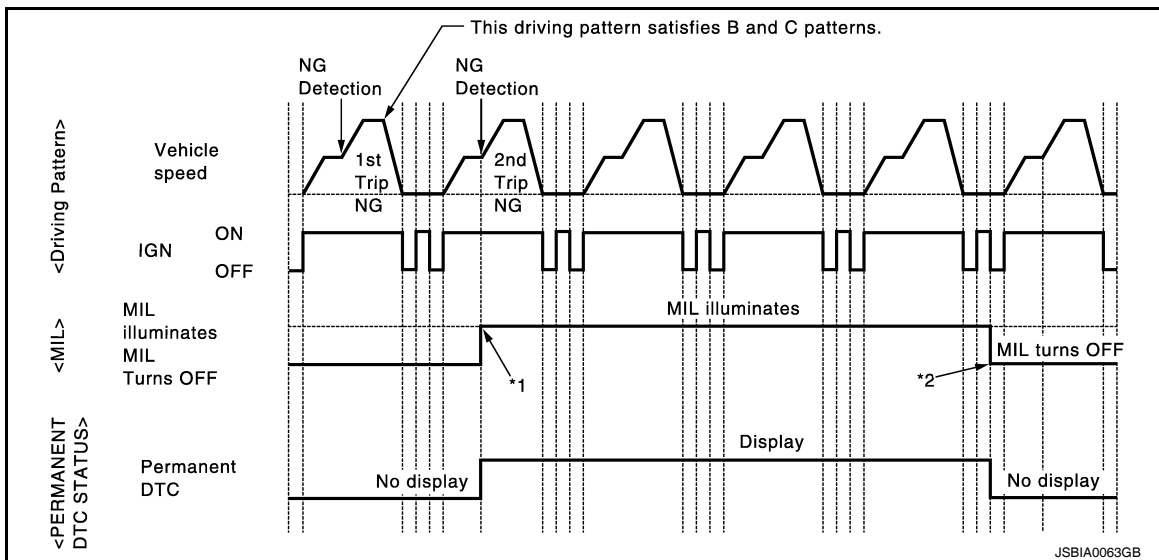
• **The following data are cleared when the ECM memory is erased.**

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

How to Erase Permanent DTC

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 row.



*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 (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.

x: Applicable —: Not applicable

Group *	Perform "DTC CONFIRMATION PROCEDURE" for applicable DTCs.	Driving pattern	
		B	D
A	x	—	—
B	—	x	x

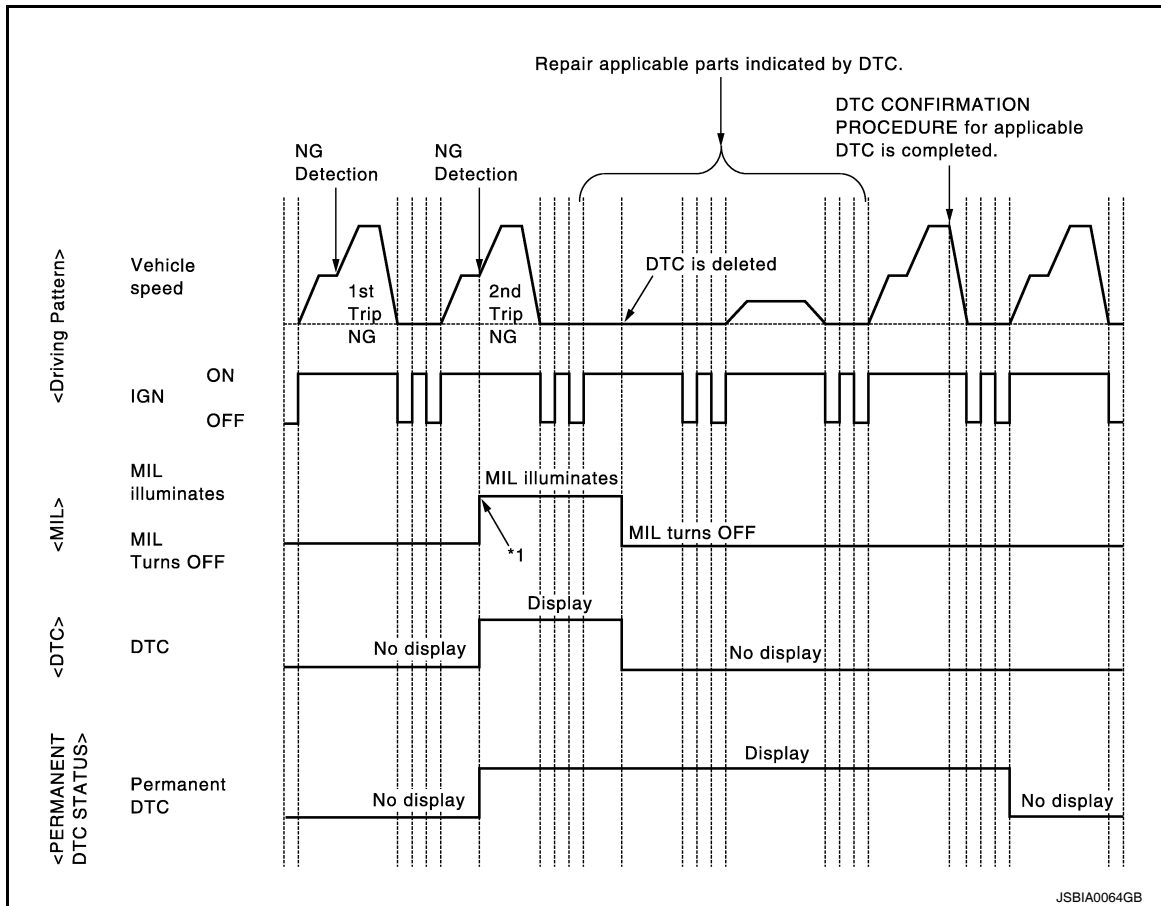
*: For group, refer to [EC-59, "Emission-related Diagnostic Information"](#), "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS".

Group A

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]



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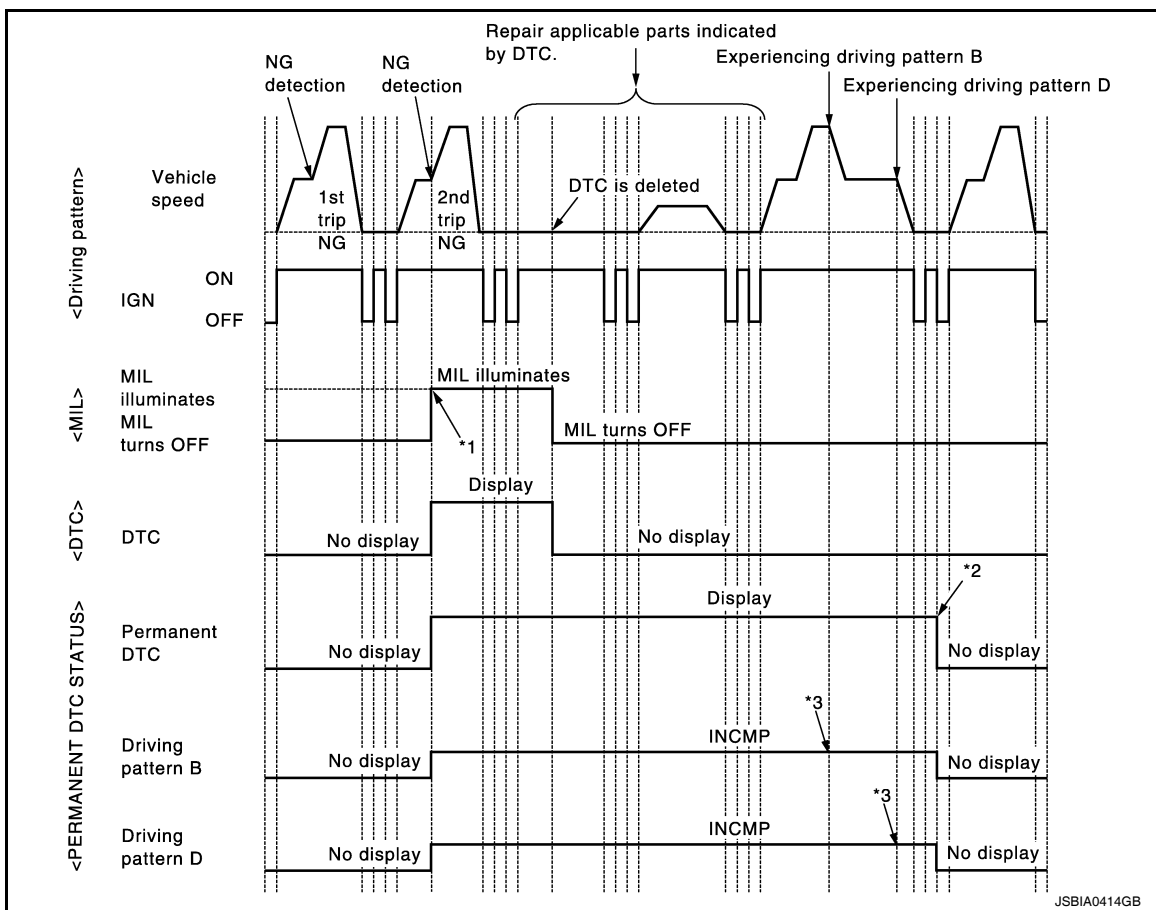
*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.

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. Check permanent DTC. Refer to [EC-59, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
 6. Perform "DTC CONFIRMATION PROCEDURE" for DTCs which are the same as permanent DTCs stored in ECM.
 7. Turn ignition switch OFF and wait at least 10 seconds.
 8. Turn ignition switch ON.
 9. Turn ignition switch OFF and wait at least 10 seconds.
 10. Turn ignition switch ON.
 11. Check permanent DTC. Refer to [EC-59, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
 12. Check that the permanent DTCs have been erased.
- Group B

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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

*2: After experiencing Driving pattern B and D, permanent DTC is erased.

*3: 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.
- When experiencing both driving pattern B and D during the same trip, the experience of driving pattern D is counted by priority.

With CONSULT-III

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. Check permanent DTC. Refer to [EC-59, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
6. Start engine and warm it up to normal operating temperature.
7. Use "PERMANENT DTC WORK SUPPORT" to drive the vehicle according to driving pattern B.

CAUTION:

- Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
8. Turn ignition switch OFF and wait at least 10 seconds.
 9. Turn ignition switch ON.
 10. Turn ignition switch OFF and wait at least 10 seconds.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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11. Turn ignition switch ON.
12. Check permanent DTC. Refer to [EC-59, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
13. Drive the vehicle according to driving pattern D.
CAUTION:
 - Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
14. Turn ignition switch OFF and wait at least 10 seconds.
15. Turn ignition switch ON.
16. Turn ignition switch OFF and wait at least 10 seconds.
17. Turn ignition switch ON.
18. Check permanent DTC. Refer to [EC-59, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
19. Check that the permanent DTCs have been erased.

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.
4. Turn ignition switch ON.
5. Check permanent DTC. Refer to [EC-59, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
6. Start engine and warm it up to normal operating temperature.
7. Drive the vehicle according to driving pattern B.
CAUTION:
 - Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
8. Turn ignition switch OFF and wait at least 10 seconds.
9. Turn ignition switch ON.
10. Turn ignition switch OFF and wait at least 10 seconds.
11. Turn ignition switch ON.
12. Check permanent DTC. Refer to [EC-59, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
13. Drive the vehicle according to driving pattern D.
CAUTION:
 - Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
14. Turn ignition switch OFF and wait at least 10 seconds.
15. Turn ignition switch ON.
16. Turn ignition switch OFF and wait at least 10 seconds.
17. Turn ignition switch ON.
18. Check permanent DTC. Refer to [EC-59, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
19. Check that the permanent DTCs have been erased.

DRIVING PATTERN

Driving Pattern B

- Driving pattern B means a trip satisfying the following conditions.
- Engine speed reaches 400 rpm or more.

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- Water temperature reaches 70°C (158°F) or more.
- Vehicle speed of 70 – 120 km/h (44 – 75 MPH) is maintained for 60 seconds or more under the control of closed loop.
- Vehicle speed of 30 – 60 km/h (19 – 37 MPH) is maintained for 10 seconds or more under the control of closed loop.
- 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.
- The state of driving at 10 km/h (7 MPH) or more reaches 10 minutes or more in total.
- A lapse of 22 minutes or more after engine start.

CAUTION:

Always drive at a safe speed.

NOTE:

- Drive the vehicle at a constant velocity.
- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern B.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern B.

Driving Pattern D

- Driving pattern D means operating vehicle as per the following.
- 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.

CAUTION:

Always drive at a safe speed.

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.

Malfunction Indicator Lamp (MIL)

INFOID:000000006579738

DESCRIPTION

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.

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

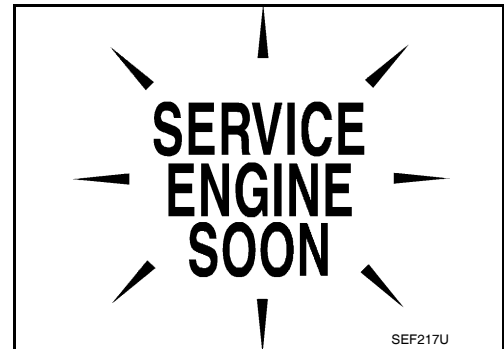
NOTE:

Check the MIL circuit if MIL does not illuminate. Refer to [EC-568, "Wiring Diagram"](#).

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 DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following three functions.

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Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position  Engine stopped 	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> • Misfire (Possible three way catalyst damage) • One trip detection diagnoses
Mode II	Ignition switch in ON position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by MIL lighting up 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 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.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut
--	--

MIL Flashing Without DTC

When any SRT codes are not set, MIL may flash without DTC. For the details, refer to [EC-59. "Emission-related Diagnostic Information"](#).

HOW TO SWITCH DIAGNOSTIC TEST 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 malfunction.
- Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.

How to Set Diagnostic Test Mode II (Self-diagnostic Results)

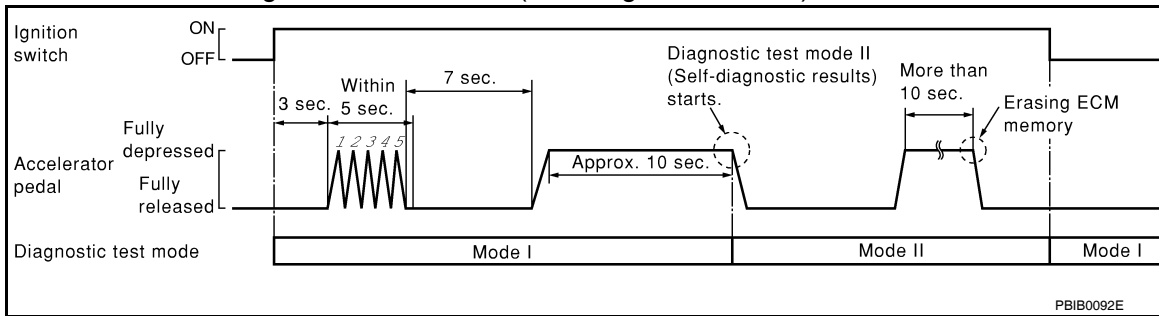
1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.
 - a. Fully depress the accelerator pedal.
 - b. Fully release the accelerator pedal.
3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MIL starts blinking.
4. Fully release the accelerator pedal.

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ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to "How to Set Diagnostic Test Mode II (Self-diagnostic Results)".
2. Fully depress the accelerator pedal and keep it for more than 10 seconds. The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to [DI-47](#) or [EC-568](#).

DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MIL	Condition
ON	When the malfunction is detected.
OFF	No malfunction

These DTC numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

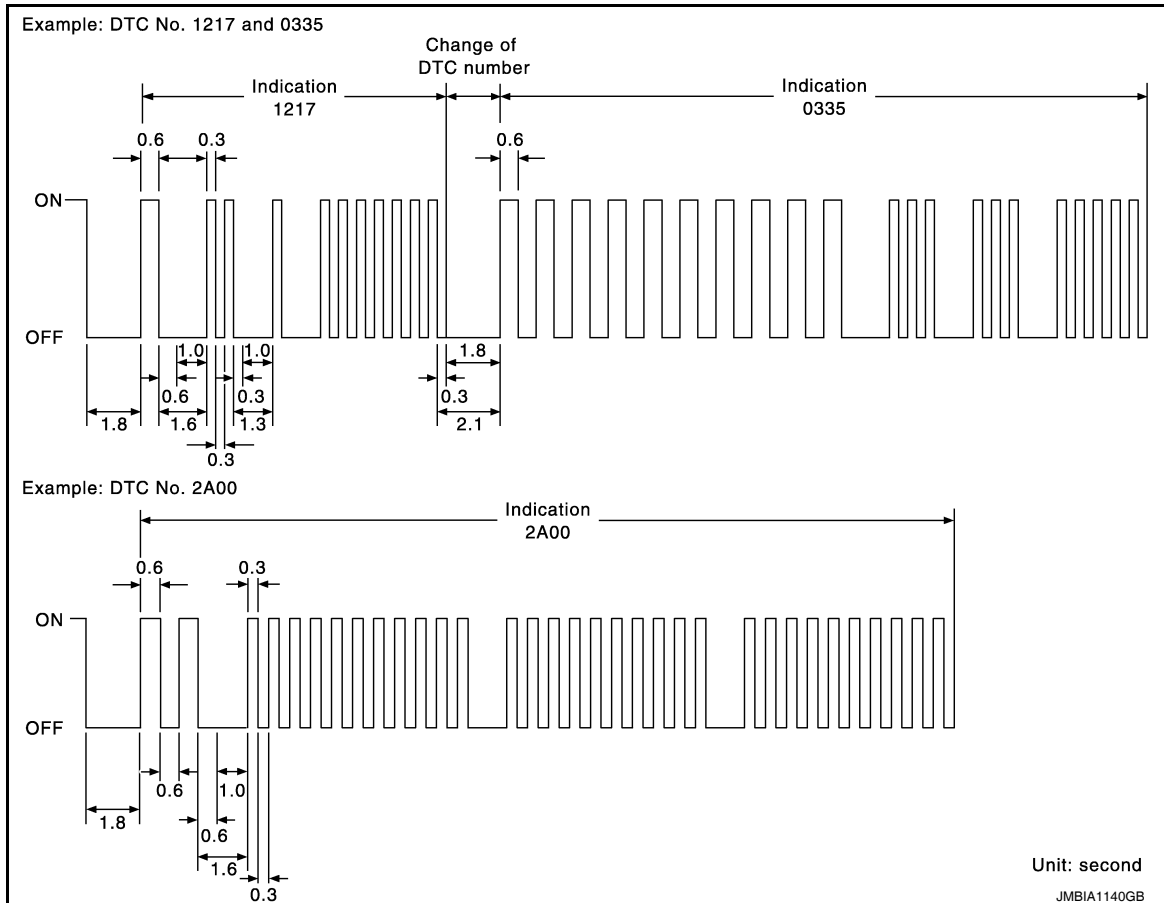
In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), 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 uniden-

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tified codes can be identified by using the CONSULT-III 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. The “zero” is indicated by the number of ten flashes. The “A” is indicated by the number of eleven flash. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle. The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second 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-second OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See [EC-22](#))

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back-up memory in the ECM by depressing accelerator pedal.

Refer to "How to Erase Diagnostic Test Mode II (Self-diagnostic Results)".

- If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.
- Be careful not to erase the stored memory before starting trouble diagnoses.

OBD System Operation Chart

INFOID:000000006579739

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. For details, refer to [EC-58, "Two Trip Detection Logic"](#).
- The MIL will go 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

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C) without the same malfunction recurring. The "TIME" in "SELF-DIAGNOSTIC RESULTS" mode of CONSULT-III 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.

SUMMARY CHART

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

For details about patterns B and C under "Fuel Injection System" and "Misfire", see "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 "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM".

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

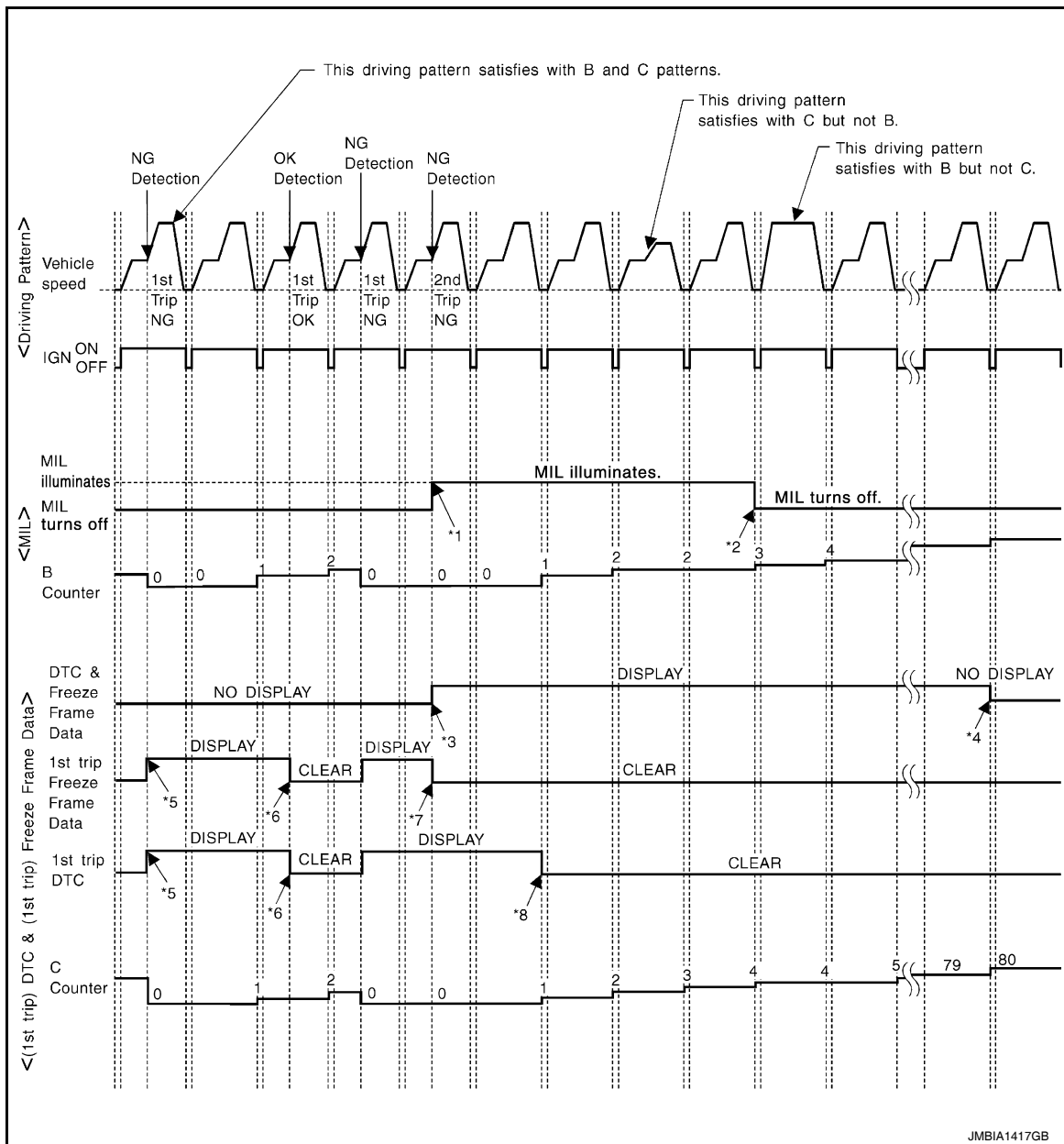
*2: Clear timing is when the same malfunction is detected in the 2nd trip.

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

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*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 (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

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

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

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

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

<Driving Pattern C>

Driving pattern C means the vehicle operation as follows:

The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data) ± 375 rpm

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

Engine coolant temperature (T) condition:

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

Example:

If the stored freeze frame data is as follows:

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

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

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

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

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

A

EC

C

D

E

F

G

H

I

J

K

L

M

N

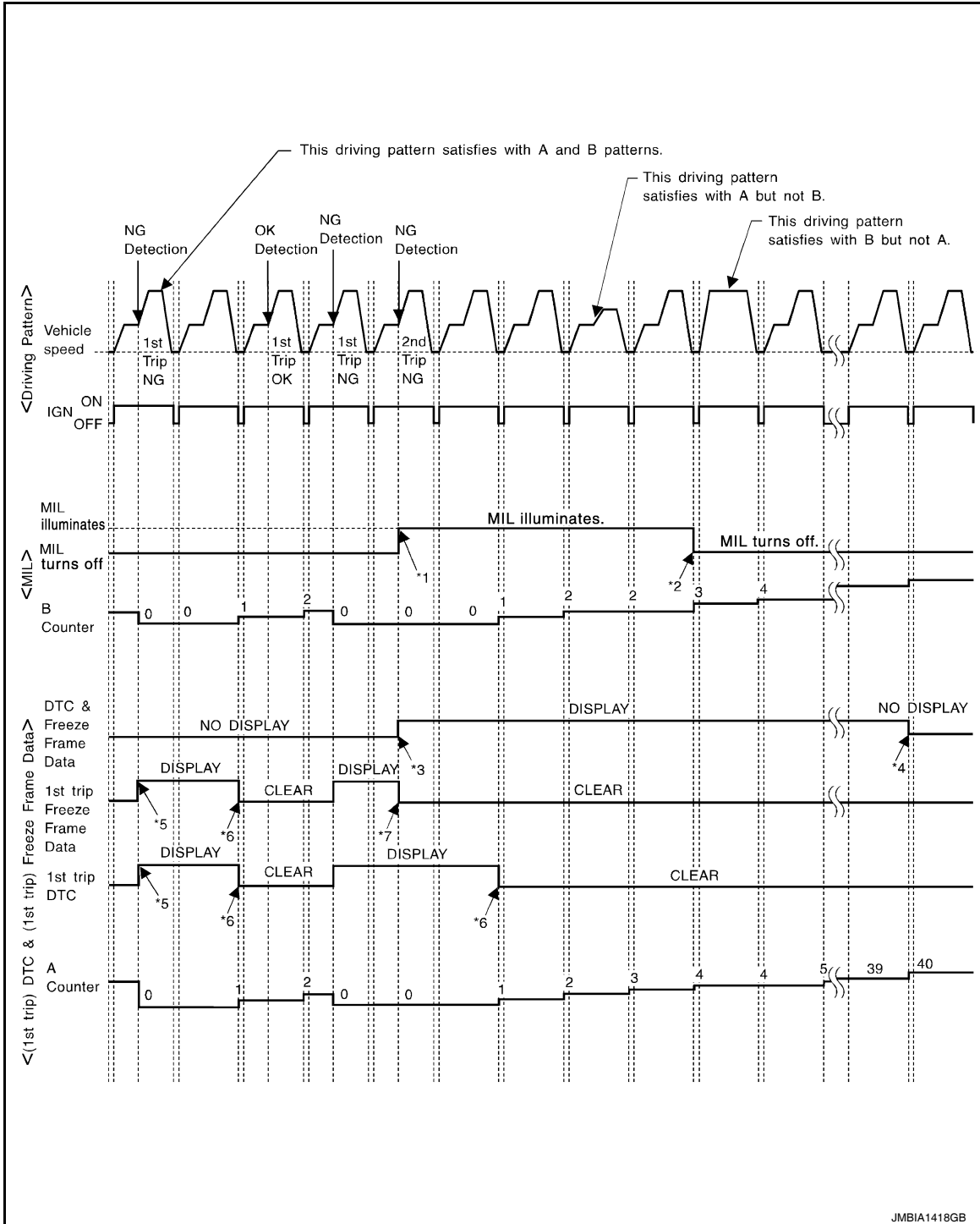
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P

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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[MR20DE (FOR CALIFORNIA)]



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- *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 (pattern B) without any malfunctions.
- *3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

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*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

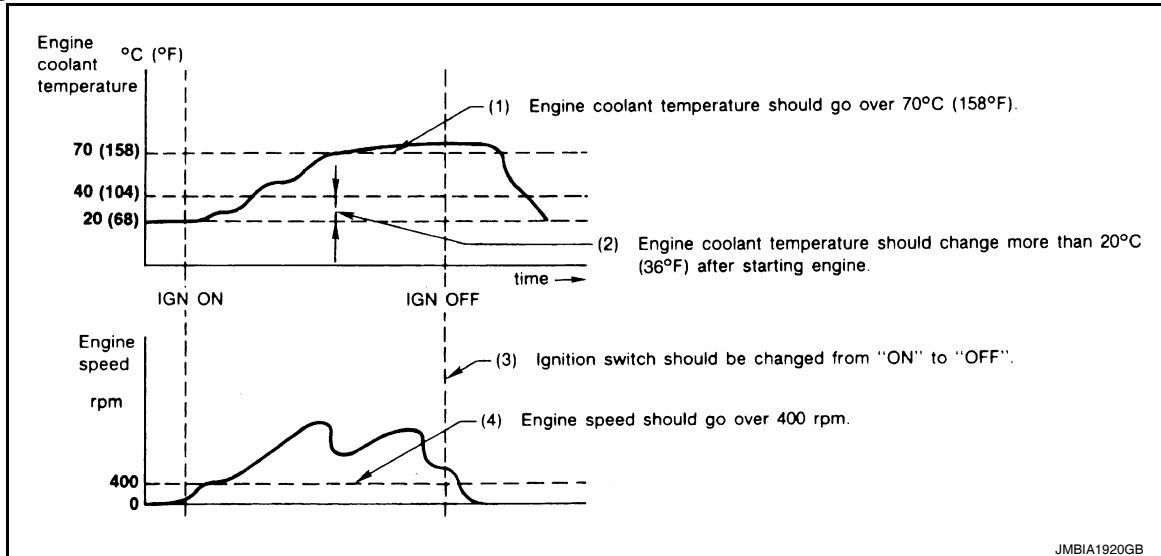
*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

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

<Driving Pattern A>



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

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

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

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

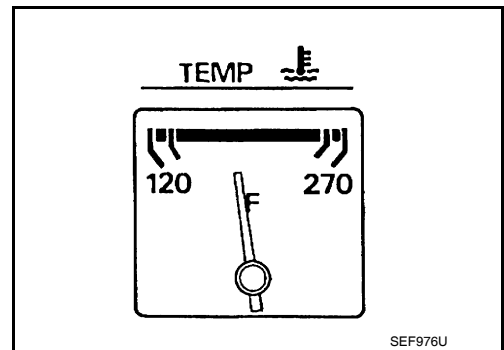
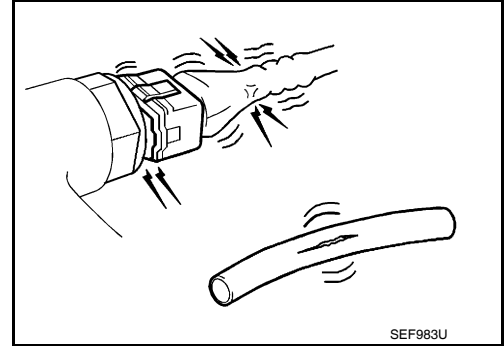
BASIC SERVICE PROCEDURE

Basic Inspection

INFOID:000000006579740

1. INSPECTION START

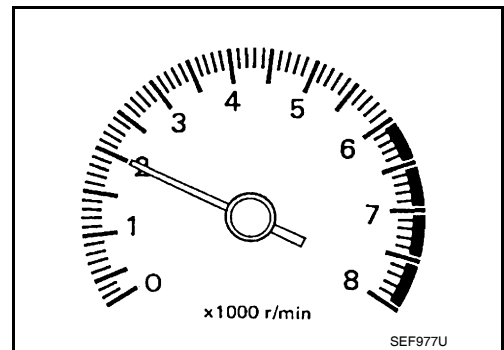
1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Wiring harness for improper connections, pinches and cut
 - Vacuum hoses for splits, kinks and improper connections
 - Hoses and ducts for leaks
 - Air cleaner clogging
 - Gasket
3. Confirm that electrical or mechanical loads are not applied.
 - Headlamp switch is OFF.
 - Air conditioner switch is OFF.
 - Rear window defogger switch is OFF.
 - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge. Ensure engine stays below 1,000 rpm.



5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-III or GST.

OK or NG

- OK >> GO TO 3.
 NG >> GO TO 2.



2. REPAIR OR REPLACE

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

>> GO TO 3.

3. CHECK TARGET IDLE SPEED

Ⓟ With CONSULT-III

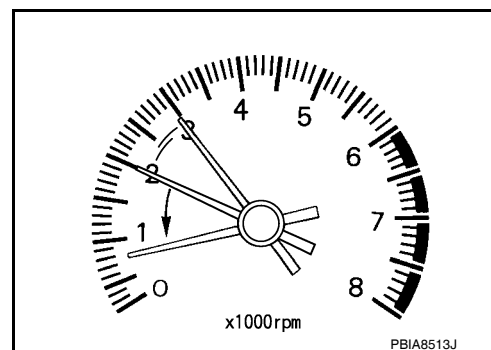
1. Run engine at about 2,000 rpm for about 2 minutes under no load.

BASIC SERVICE PROCEDURE

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



- Read idle speed in "DATA MONITOR" mode with CONSULT-III. Refer to [EC-96. "Idle Speed and Ignition Timing Check"](#).

M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

⊗ Without CONSULT-III

- Run engine at about 2,000 rpm for about 2 minutes under no load.
- Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
- Check idle speed. Refer to [EC-96. "Idle Speed and Ignition Timing Check"](#).

M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.

NG >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

- Stop engine.
- Perform [EC-98. "Accelerator Pedal Released Position Learning"](#).

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-98. "Throttle Valve Closed Position Learning"](#).

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-99. "Idle Air Volume Learning"](#).

Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 7.

No >> 1. Follow the instruction of Idle Air Volume Learning.

2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

Ⓜ With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Read idle speed in "DATA MONITOR" mode with CONSULT-III. Refer to [EC-96. "Idle Speed and Ignition Timing Check"](#).

M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

⊗ **Without CONSULT-III**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed. Refer to [EC-96, "Idle Speed and Ignition Timing Check"](#).

M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

OK or NG

- OK >> GO TO 10.
 NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Check crankshaft position sensor (POS) and circuit.
 Refer to [EC-314](#).
- Check camshaft position sensor (PHASE) and circuit.
 Refer to [EC-321](#).

OK or NG

- OK >> GO TO 9.
 NG >> 1. Repair or replace.
 2. GO TO 4.

9. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
 Refer to [BL-171, "ECM Re-communicating Function"](#).

>> GO TO 4.

10. CHECK IGNITION TIMING

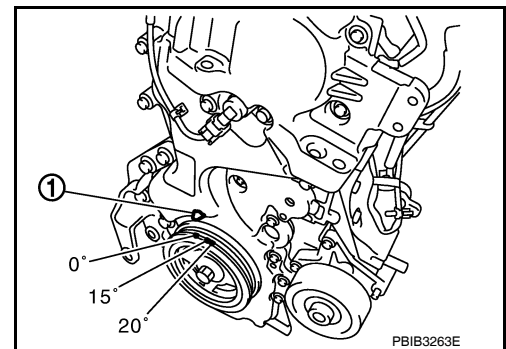
1. Run engine at idle.
 2. Check ignition timing with a timing light.
 Refer to [EC-96, "Idle Speed and Ignition Timing Check"](#).
- Timing indicator (1)

M/T: 6 ± 5° BTDC (in Neutral position)

CVT: 6 ± 5° BTDC (in P or N position)

OK or NG

- OK >> GO TO 19.
 NG >> GO TO 11.



11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-98, "Throttle Valve Closed Position Learning"](#).

>> GO TO 13.

< SERVICE INFORMATION >

13. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-99. "Idle Air Volume Learning"](#).

Is Idle Air Volume Learning carried out successfully?

Yes or No

- Yes >> GO TO 14.
- No >> 1. Follow the instruction of Idle Air Volume Learning.
- 2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

Ⓜ With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-III. Refer to [EC-96. "Idle Speed and Ignition Timing Check"](#).

M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

ⓧ Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed. Refer to [EC-96. "Idle Speed and Ignition Timing Check"](#).

M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

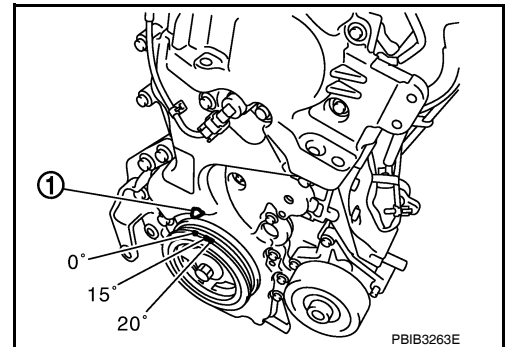
1. Run engine at idle.
2. Check ignition timing with a timing light. Refer to [EC-96. "Idle Speed and Ignition Timing Check"](#).
- Timing indicator (1)

M/T: 6 ± 5° BTDC (in Neutral position)

CVT: 6 ± 5° BTDC (in P or N position)

OK or NG

- OK >> GO TO 19
- NG >> GO TO 16.



16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to [EM-40](#).

OK or NG

- OK >> GO TO 17.
- NG >> 1. Repair the timing chain installation.
- 2. GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

- Check crankshaft position sensor (POS) and circuit. Refer to [EC-314](#).
- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-321](#).

OK or NG

- OK >> GO TO 18.
- NG >> 1. Repair or replace.

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BASIC SERVICE PROCEDURE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-171, "ECM Re-communicating Function"](#).

>> GO TO 4.

19. INSPECTION END

Did you replace ECM, referring this Basic Inspection procedure?

Yes or No

- Yes >> 1. Perform [EC-98, "VIN Registration"](#).
2. **INSPECTION END**
- No >> **INSPECTION END**

Idle Speed and Ignition Timing Check

INFOID:000000006579741

IDLE SPEED

 WITH CONSULT-III

Check idle speed in "DATA MONITOR" mode with CONSULT-III.


 WITH GST

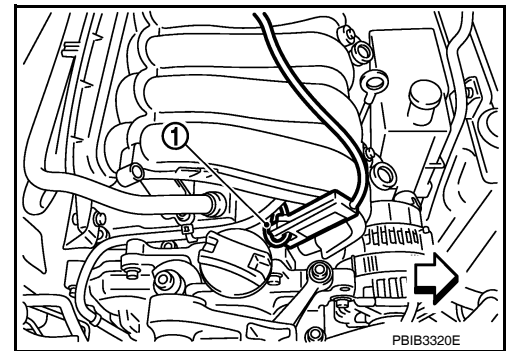
Check idle speed in Service \$01 with GST.

IGNITION TIMING

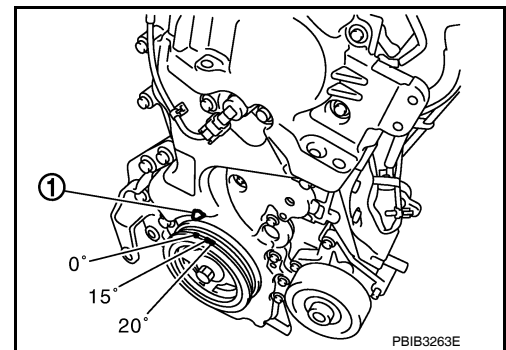
Any of following two methods may be used.

Method A

1. Attach timing light to loop wire (1) as shown.
 -  : Vehicle front



2. Check ignition timing.
 - Timing indicator (1)



Method B

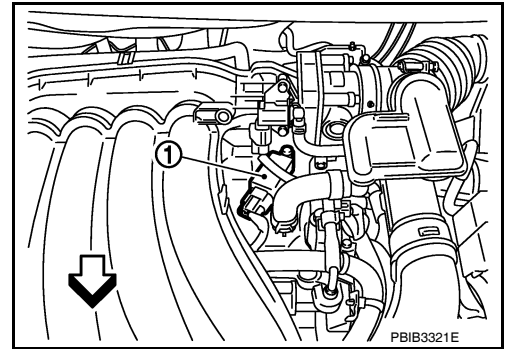
1. Remove No. 4 ignition coil (1).

BASIC SERVICE PROCEDURE

[MR20DE (FOR CALIFORNIA)]

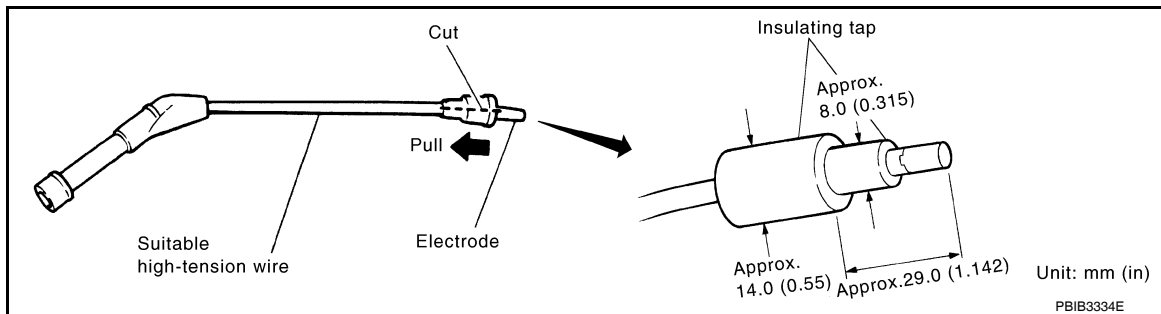
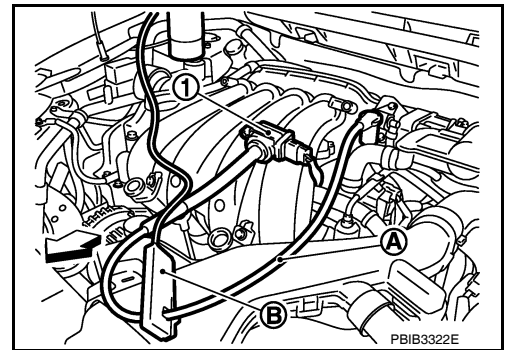
< SERVICE INFORMATION >

- ⇐ : Vehicle front

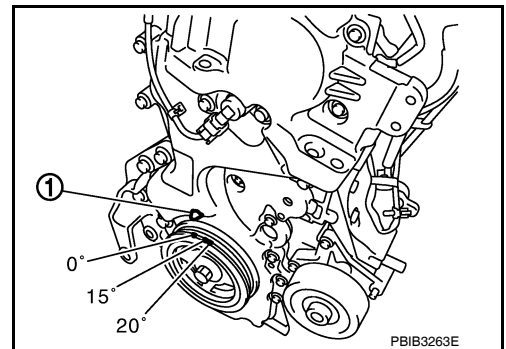


2. Connect No. 4 ignition coil (1) and No. 4 spark plug with suitable high-tension wire (A) as shown, and attach timing light clamp (B) to this wire.

- ⇐ : Vehicle front



3. Check ignition timing.
 - Timing indicator (1)



Procedure After Replacing ECM

INFOID:000000006579742

When replacing ECM, the following procedure must be performed.

1. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-171, "ECM Re-communicating Function"](#).
2. Perform [EC-98, "VIN Registration"](#).
3. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).
4. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).

5. Perform [EC-99, "Idle Air Volume Learning"](#).

VIN Registration

INFOID:000000006579743

DESCRIPTION

VIN Registration is an operation to registering 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).

OPERATION PROCEDURE

④ With CONSULT-III

1. Check the VIN of the vehicle and note it. Refer to [GI-45](#).
2. Turn ignition switch ON and engine stopped.
3. Select "VIN REGISTRATION" in "WORK SUPPORT" mode.
4. Follow the instruction of CONSULT-III display.

Accelerator Pedal Released Position Learning

INFOID:000000006579744

DESCRIPTION

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

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF and wait at least 10 seconds.

Throttle Valve Closed Position Learning

INFOID:000000006579745

DESCRIPTION

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 the electric throttle control actuator or ECM is disconnected or electric throttle control actuator inside is cleaned.

OPERATION PROCEDURE

④ With CONSULT-III

1. Turn ignition switch ON.
2. Select "CLSD THL POS LEARN" in "WORK SUPPORT" mode of "ENGINE" using CONSULT-III.
3. Follow the instructions on the CONSULT-III 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-III

1. Start the engine.
NOTE:
Engine coolant temperature is 25°C (77°F) or less before engine starts.
2. Warm up the engine.
NOTE:
Raise engine coolant temperature until it reaches 65°C (149°F) or more.
3. 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.

Idle Air Volume Learning

INFOID:000000006579746

DESCRIPTION

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

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

PREPARATION

Before performing Idle Air Volume Learning, make sure that all of the following conditions are satisfied. Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9 V (At idle)
- Engine coolant temperature: 70 - 95°C (158 - 203°F)
- Park/neutral position (PNP) switch (M/T): ON
Selector lever (CVT): P or N
- Electric load switch: OFF
[Air conditioner, headlamp rear window defogger]
On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started the headlamp will not be illuminated.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
 - For CVT models
- With CONSULT-III: Drive vehicle until "ATF TEMP SEN" in "DATA MONITOR" mode of "TRANSMISSION" system indicates less than 0.9 V.
- Without CONSULT-III: Drive vehicle for 10 minutes.
 - For M/T models
- Drive vehicle for 10 minutes.

OPERATION PROCEDURE

☑ With CONSULT-III

1. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).
2. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.
6. Touch "START" and wait 20 seconds.
7. Make sure that "CMPLT" is displayed on CONSULT-III screen. If "CMPLT" is not displayed, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the DIAGNOSTIC PROCEDURE below.
8. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.
Refer to [EC-92, "Basic Inspection"](#).

Item	Specification
Idle speed	M/T: 675 ± 50 rpm (in Neutral position) CVT: 700 ± 50 rpm (in P or N position)
Ignition timing	M/T: 6 ± 5° BTDC (in Neutral position) CVT: 6 ± 5° BTDC (in P or N position)

☒ Without CONSULT-III

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.

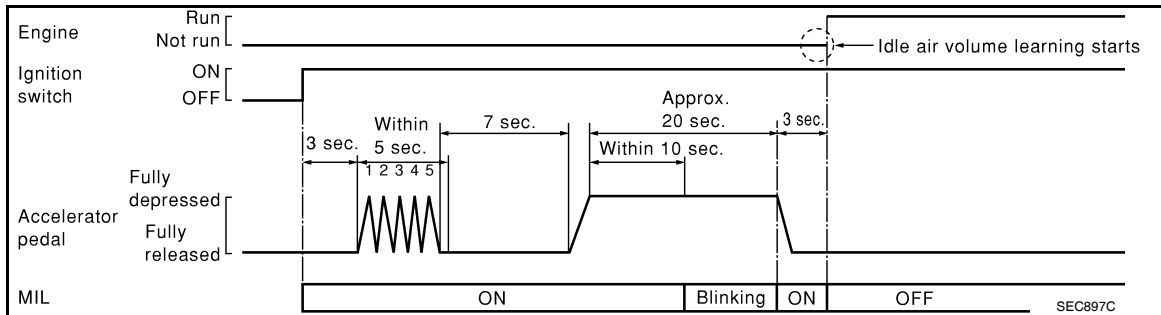
1. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).
2. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).

BASIC SERVICE PROCEDURE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
7. Repeat the following procedure quickly five times within 5 seconds.
 - a. Fully depress the accelerator pedal.
 - b. Fully release the accelerator pedal.
8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
9. Fully release the accelerator pedal within 3 seconds after the MIL turned ON.
10. Start engine and let it idle.
11. Wait 20 seconds.



12. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications. Refer to [EC-92, "Basic Inspection"](#).

Item	Specification
Idle speed	M/T: 675 ± 50 rpm (in Neutral position) CVT: 700 ± 50 rpm (in P or N position)
Ignition timing	M/T: 6 ± 5° BTDC (in Neutral position) CVT: 6 ± 5° BTDC (in P or N position)

13. If idle speed and ignition timing are not within the specification, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the DIAGNOSTIC PROCEDURE below.

DIAGNOSTIC PROCEDURE

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

1. Check that throttle valve is fully closed.
2. Check PCV valve operation.
3. Check that downstream of throttle valve is free from air leakage.
4. When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.
It is useful to perform [EC-145](#).
5. If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle air volume learning all over again:
 - Engine stalls.
 - Erroneous idle.

Fuel Pressure Check

INFOID:000000006579747

FUEL PRESSURE RELEASE

Ⓟ With CONSULT-III

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

BASIC SERVICE PROCEDURE

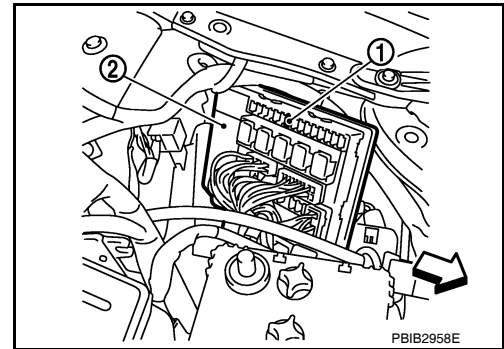
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

5. Turn ignition switch OFF.

⊗ Without CONSULT-III

1. Remove fuel pump fuse (1) located in IPDM E/R (2).
 - ↶: Vehicle front
2. Start engine.
3. After engine stalls, crank it two or three 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.

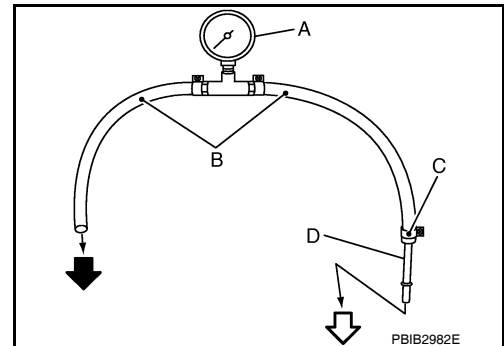
NOTE:

- Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because B16 models do not have fuel return system.
- The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.
- Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains seal ability with O-rings inside.
- Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C, etc.) Fuel pressure gauge may indicate false readings due to varying engine load and changes in manifold vacuum.

1. Release fuel pressure to zero. Refer to "FUEL PRESSURE RELEASE".

2. Prepare fuel hose for fuel pressure check B and fuel tube adapter (KV10118400) D, then connect fuel pressure gauge A.

- ↶: To quick connector
- ↰: To fuel tube (engine side)
- C: Clamp
- Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
- To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
- Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
- Use pressure gauge to check fuel pressure.

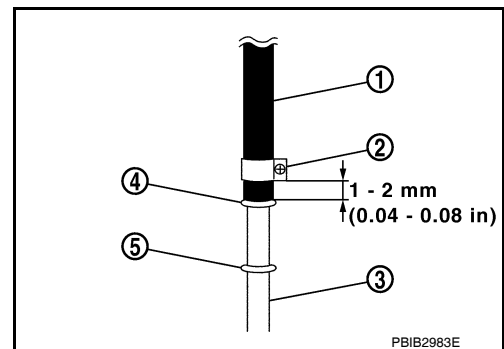


3. Remove fuel hose. Refer to [EM-36](#).

- Do not twist or kink fuel hose because it is plastic hose.

4. Connect fuel hose for fuel pressure check (1) to fuel tube (engine side) with clamp (2) as shown in the figure.

- No.2 spool (5)
- Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
- Apply proper amount of gasoline between top of the fuel tube (3) and No.1 spool (4).
- Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
- Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
- When reconnecting fuel line, always use new clamps.
- Use a torque driver to tighten clamps.
- Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).



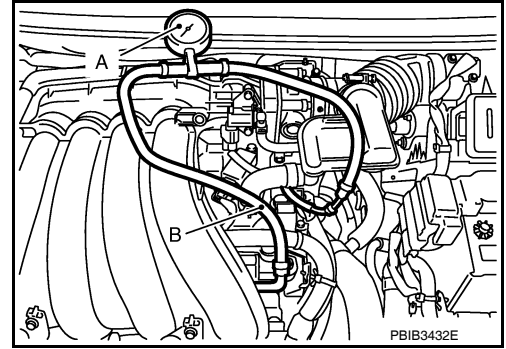
Tightening torque: 1 - 1.5 N·m (0.1 - 0.15 kg·m, 9 - 13 in·lb)

BASIC SERVICE PROCEDURE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Make sure that clamp screw does not contact adjacent parts.
5. Connect fuel tube adapter to quick connector.
 - A: Fuel pressure gauge
 - B: Fuel hose for fuel pressure check
 6. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
 7. Turn ignition switch ON and check for fuel leakage.
 8. Start engine and check for fuel leakage.
 9. Read the indication of fuel pressure gauge.
 - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
 - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.



At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

10. If result is unsatisfactory, go to next step.
11. Check the following.
 - Fuel hoses and fuel tubes for clogging
 - Fuel filter for clogging
 - Fuel pump
 - Fuel pressure regulator for cloggingIf OK, replace fuel pressure regulator.
If NG, repair or replace.
12. Check the following.
 - Fuel hoses and fuel tubes for clogging
 - Fuel filter for clogging
 - Fuel pump
 - Fuel pressure regulator for cloggingIf OK, replace fuel pressure regulator.
If NG, repair or replace.
13. Before disconnecting fuel pressure gauge and fuel pressure adapter J-44321-6, release fuel pressure to zero. Refer to "FUEL PRESSURE RELEASE".

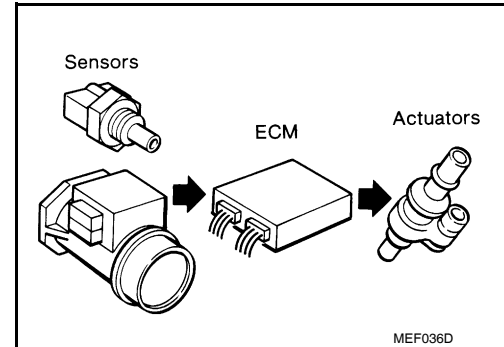
TROUBLE DIAGNOSIS

Trouble Diagnosis Introduction

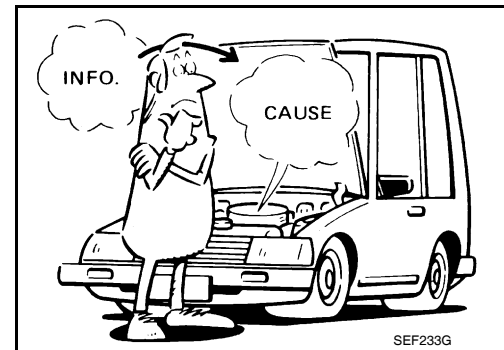
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INTRODUCTION

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



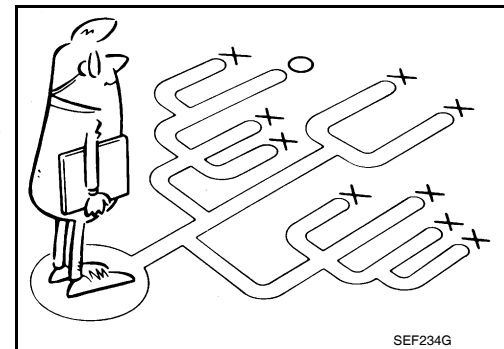
It is much more difficult to diagnose an incident that occurs intermittently rather than continuously. Most intermittent incidents are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



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

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

Start your diagnosis by looking for conventional malfunctions first. This will help troubleshoot drivability malfunctions on an electronically controlled engine vehicle.



WORK FLOW

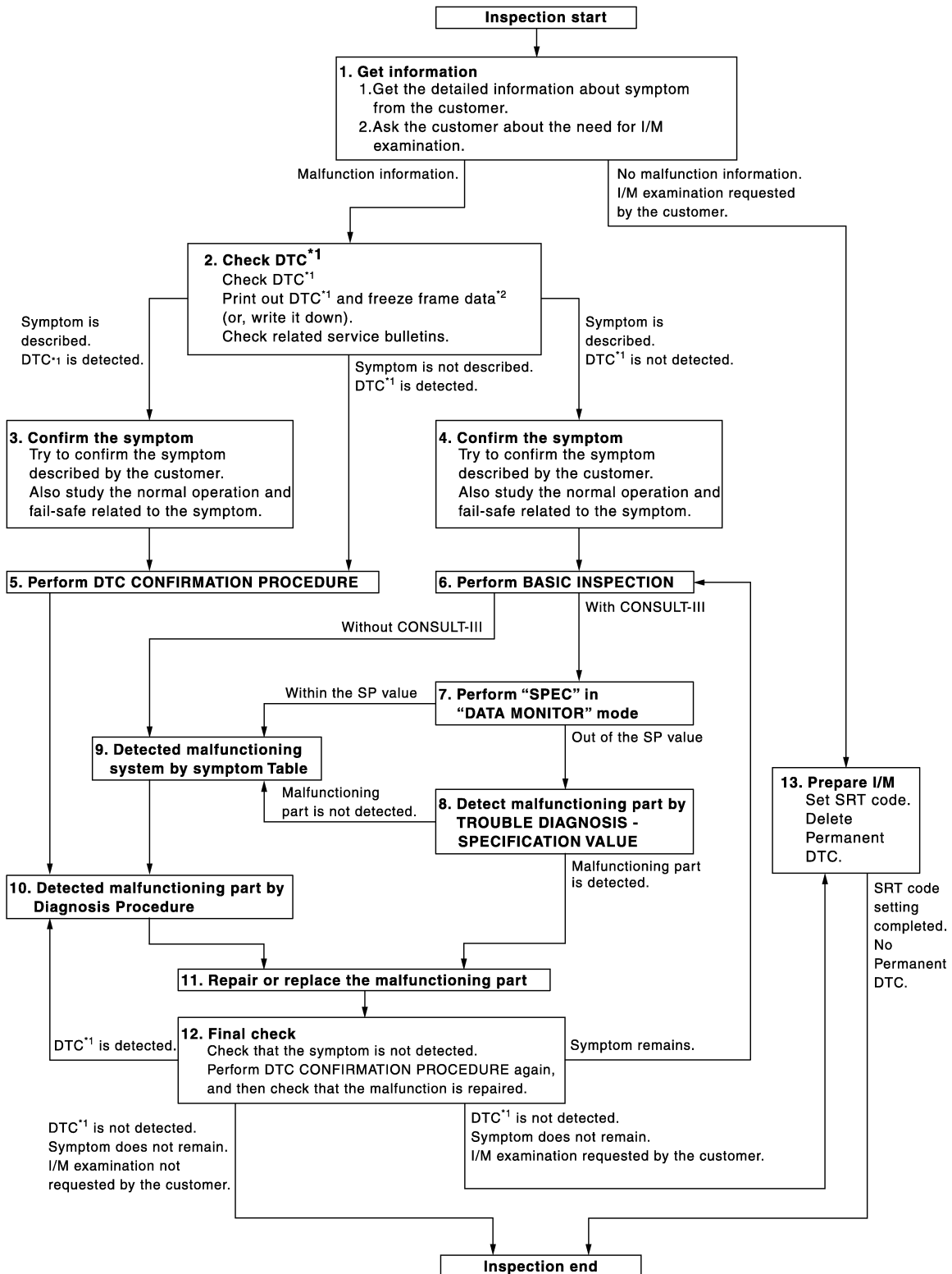
Overall Sequence

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TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]



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*1: Include 1st trip DTC.

*2: Include 1st trip freeze frame data.

Detailed Flow

1. GET INFORMATION FOR SYMPTOM

TROUBLE DIAGNOSIS

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. 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".
2. Ask if the customer requests I/M examination.

Malfunction information, obtained>>GO TO 2.

No malfunction information, but a request for I/M examination>>GO TO 13.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.
 - Record DTC and freeze frame data. (Print them out with CONSULT-III or GST.)
 - Erase DTC. (Refer to [EC-59. "Emission-related Diagnostic Information"](#).)
 - Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to [EC-110. "Symptom Matrix Chart"](#).)
3. Check related service bulletins for information.

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.

Diagnosis Work Sheet is useful to verify the incident.

Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.

Also study the normal operation and fail-safe related to the symptom.

Diagnosis Work Sheet is useful to verify the incident.

Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.

If two or more DTCs are detected, refer to [EC-108. "DTC Inspection Priority Chart"](#) and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- 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 CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.

NO >> Check according to [EC-153. "Description"](#).

6.PERFORM BASIC INSPECTION

Perform [EC-92. "Basic Inspection"](#).

Do you have CONSULT-III?

YES >> GO TO 7.

NO >> GO TO 9.

< SERVICE INFORMATION >

7.PERFORM SPEC IN DATA MONITOR MODE**With CONSULT-III**

Make sure that "MAS A/F SE-B1", "B/FUEL SCHDL" and "A/F ALPHA-B1" are within the SP value using CONSULT-III "SPEC" in "DATA MONITOR" mode. Refer to [EC-145, "Inspection Procedure"](#).

Is the measurement value within the SP value?

- YES >> GO TO 9.
NO >> GO TO 8.

8.DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to [EC-145, "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 [EC-110, "Symptom Matrix Chart"](#) 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 [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#).

Is a malfunctioning part detected?

- YES >> GO TO 11.
NO >> Monitor input data from related sensors or check voltage of related ECM terminals using CONSULT-III. Refer to [EC-123, "ECM Terminal and Reference Value"](#), [EC-140, "CONSULT-III Reference Value in Data Monitor"](#).

11.REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it. Refer to [EC-59, "Emission-related Diagnostic Information"](#).

>> GO TO 12.

12.FINAL CHECK

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 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 (Transmission Control Module). Refer to [EC-59, "Emission-related Diagnostic Information"](#).
NO-2 >> I/M examination, requested from the customer: GO TO 13.

13.PREPARE FOR I/M EXAMINATION

1. Set SRT codes. Refer to [EC-59, "Emission-related Diagnostic Information"](#).
2. Erase permanent DTCs. Refer to [EC-59, "Emission-related Diagnostic Information"](#).

TROUBLE DIAGNOSIS

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

>> INSPECTION END

DIAGNOSTIC WORKSHEET

Description

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

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

Utilize a diagnostic worksheet as shown in the following "Worksheet Sample" in order to organize all the information for troubleshooting. Some conditions may cause the MIL to come on steady or blink and DTC to be detected. Examples:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere.

KEY POINTS

WHAT Vehicle & engine model
WHEN Date, Frequencies
WHERE..... Road conditions
HOW Operating conditions, Weather conditions, Symptoms

SEF907L

Worksheet Sample

Customer name MR/MS		Model & Year	VIN
Engine #		Trans.	Mileage
Incident Date		Manuf. Date	In Service Date
Fuel and fuel filler cap		<input type="checkbox"/> Vehicle ran out of fuel causing misfire <input type="checkbox"/> Fuel filler cap was left off or incorrectly screwed on.	
Symptoms	<input type="checkbox"/> Startability	<input type="checkbox"/> Impossible to start <input type="checkbox"/> No combustion <input type="checkbox"/> Partial combustion <input type="checkbox"/> Partial combustion affected by throttle position <input type="checkbox"/> Partial combustion NOT affected by throttle position <input type="checkbox"/> Possible but hard to start <input type="checkbox"/> Others []	
	<input type="checkbox"/> Idling	<input type="checkbox"/> No fast idle <input type="checkbox"/> Unstable <input type="checkbox"/> High idle <input type="checkbox"/> Low idle <input type="checkbox"/> Others []	
	<input type="checkbox"/> Driveability	<input type="checkbox"/> Stumble <input type="checkbox"/> Surge <input type="checkbox"/> Knock <input type="checkbox"/> Lack of power <input type="checkbox"/> Intake backfire <input type="checkbox"/> Exhaust backfire <input type="checkbox"/> Others []	
	<input type="checkbox"/> Engine stall	<input type="checkbox"/> At the time of start <input type="checkbox"/> While idling <input type="checkbox"/> While accelerating <input type="checkbox"/> While decelerating <input type="checkbox"/> Just after stopping <input type="checkbox"/> While loading	
Incident occurrence		<input type="checkbox"/> Just after delivery <input type="checkbox"/> Recently <input type="checkbox"/> In the morning <input type="checkbox"/> At night <input type="checkbox"/> In the daytime	
Frequency		<input type="checkbox"/> All the time <input type="checkbox"/> Under certain conditions <input type="checkbox"/> Sometimes	
Weather conditions		<input type="checkbox"/> Not affected	
	Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Raining <input type="checkbox"/> Snowing <input type="checkbox"/> Others []	
	Temperature	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold <input type="checkbox"/> Humid °F	
Engine conditions		<input type="checkbox"/> Cold <input type="checkbox"/> During warm-up <input type="checkbox"/> After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm	
Road conditions		<input type="checkbox"/> In town <input type="checkbox"/> In suburbs <input type="checkbox"/> Highway <input type="checkbox"/> Off road (up/down)	
Driving conditions		<input type="checkbox"/> Not affected <input type="checkbox"/> At starting <input type="checkbox"/> While idling <input type="checkbox"/> At racing <input type="checkbox"/> While accelerating <input type="checkbox"/> While cruising <input type="checkbox"/> While decelerating <input type="checkbox"/> While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH	
Malfunction indicator lamp		<input type="checkbox"/> Turned on <input type="checkbox"/> Not turned on	

MTBL0017

TROUBLE DIAGNOSIS

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[MR20DE (FOR CALIFORNIA)]

DTC Inspection Priority Chart

INFOID:000000006579749

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

Priority	Detected items (DTC)
1	<ul style="list-style-type: none"> • U0101 U0140 U1001 CAN communication line • P0101 P0102 P0103 Mass air flow sensor • P0112 P0113 P0127 Intake air temperature sensor • P0116 P0117 P0118 P0125 Engine coolant temperature sensor • P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor • P0128 Thermostat function • P0181 P0182 P0183 Fuel tank temperature sensor • P0196 P0197 P0198 Engine oil temperature sensor • P0327 P0328 Knock sensor • P0335 Crankshaft position sensor (POS) • P0340 Camshaft position sensor (PHASE) • P0460 P0461 P0462 P0463 Fuel level sensor • P0500 Vehicle speed sensor • P0605 P0607ECM • P0643 Sensor power supply • P0705 Transmission range switch • P0850 Park/neutral position (PNP) switch • P1610 - P1615 NATS • P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor
2	<ul style="list-style-type: none"> • P0031 P0032 Air fuel ratio (A/F) sensor 1 heater • P0037 P0038 Heated oxygen sensor 2 heater • P0075 Intake valve timing control solenoid valve • P0130 P0131 P0132 P014C P014D P015A P015B P2A00 Air fuel ratio (A/F) sensor 1 • P0137 P0138 P0139 Heated oxygen sensor 2 • P0441 EVAP control system purge flow monitoring • P0443 P0444 P0445 EVAP canister purge volume control solenoid valve • P0447 P0448 EVAP canister vent control valve • P0451 P0452 P0453 EVAP control system pressure sensor • P0603 ECM power supply • P1217 Engine over temperature (OVERHEAT) • P1805 Brake switch • P2004 Tumble control valve motor • P2014 Tumble control valve position sensor • P2100 P2103 Throttle control motor relay • P2101 Electric throttle control function • P2118 Throttle control motor
3	<ul style="list-style-type: none"> • P0011 Intake valve timing control • P0171 P0172 Fuel injection system function • P0300 - P0304 Misfire • P0420 Three way catalyst function • P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) • P0455 EVAP control system (GROSS LEAK) • P0506 P0507 Idle speed control system • P050A P050B P050E Cold start control • P0710 P0715 P0720 P0740 P0744 P0745 P0746 P0776 P0778 P0840 P0845 P1740 P1777 P1778 CVT related sensors, solenoid valves and switches • P1148 Closed loop control • P1212 TCS communication line • P1564 ASCD steering switch • P1572 ASCD brake switch • P1574 ASCD vehicle speed sensor • P1715 Input speed sensor • P2119 Electric throttle control actuator

Fail-Safe Chart

INFOID:000000006579750

When the DTC listed below is detected, the ECM enters fail-safe mode and the MIL lights up.

TROUBLE DIAGNOSIS

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[MR20DE (FOR CALIFORNIA)]

DTC No.	Detected items	Engine operating condition in fail-safe mode								
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 temperature sensor circuit	<p>Engine coolant temperature will be determined by ECM based on the following condition. CONSULT-III displays the engine coolant temperature decided by ECM.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Engine coolant temperature decided (CONSULT-III display)</th> </tr> </thead> <tbody> <tr> <td>Just as ignition switch is turned ON or START</td> <td style="text-align: center;">40°C (104°F)</td> </tr> <tr> <td>Approx 4 minutes or more after engine starting</td> <td style="text-align: center;">80°C (176°F)</td> </tr> <tr> <td>Except as shown above</td> <td style="text-align: center;">40 - 80°C (104 - 176°F) (Depends on the time)</td> </tr> </tbody> </table> <p>When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.</p>	Condition	Engine coolant temperature decided (CONSULT-III display)	Just as ignition switch is turned ON or START	40°C (104°F)	Approx 4 minutes or more after engine starting	80°C (176°F)	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
Condition	Engine coolant temperature decided (CONSULT-III display)									
Just as ignition switch is turned ON or START	40°C (104°F)									
Approx 4 minutes or more after engine starting	80°C (176°F)									
Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)									
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	<p>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. So, the acceleration will be poor.</p>								
P0500	Vehicle speed sensor	When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (Highest) while engine is running.								
P0643	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P2100 P2103	Throttle control relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
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 actuator	<p>(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.</p> <p>(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.</p> <p>(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P (CVT), Neutral (M/T) position, and engine speed will not exceed 1,000 rpm or more.</p>								
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	<p>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. So, the acceleration will be poor.</p>								

- When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting up 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 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.

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Engine operating condition in fail-safe mode

Engine speed will not rise more than 2,500 rpm due to the fuel cut

Symptom Matrix Chart

INFOID:000000006579751

SYSTEM — BASIC ENGINE CONTROL SYSTEM

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-549
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-100
	Fuel injector circuit	1	1	2	3	2		2	2			2			EC-544
	Evaporative emission system	3	3	4	4	4	4	4	4	4	4	4			EC-43
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-53
	Incorrect idle speed adjustment						1	1	1	1		1			EC-92
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-488 , EC-498
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-92
	Ignition circuit	1	1	2	2	2		2	2			2			EC-554
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-154
Mass air flow sensor circuit					2										EC-185 , EC-192
Engine coolant temperature sensor circuit		1					3			3					EC-204 , EC-208 , EC-217
Air fuel ratio (A/F) sensor 1 circuit			1	2	3	2		2	2			2			EC-224 , EC-229 , EC-234 , EC-264 , EC-524
Throttle position sensor circuit							2			2					EC-211 , EC-299 , EC-446 , EC-447 , EC-512
Accelerator pedal position sensor circuit				3	2	1									EC-422 , EC-500 , EC-505 , EC-517

TROUBLE DIAGNOSIS

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	SYMPTOM												Reference page	
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Knock sensor circuit			2								3			EC-310
Engine oil temperature sensor circuit			4		2						3			EC-293 , EC-296
Crankshaft position sensor (POS) circuit	2	2												EC-314
Camshaft position sensor (PHASE) circuit	3	2												EC-321
Vehicle speed signal circuit		2	3		3						3			EC-408
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-419
Intake valve timing control solenoid valve circuit		3	2		1	3	2	2	3		3			EC-181
Park/neutral position (PNP) signal circuit			3		3		3	3			3			EC-427
Refrigerant pressure sensor circuit		2				3			3		4			EC-563
Electrical load signal circuit							3							EC-542
Tumble control valve motor circuit														EC-474
Tumble control valve position sensor circuit					4	4								EC-481
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	MTC-28
ABS actuator and electric unit (control unit)			4											BRC-45

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

(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

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		SYMPTOM												Reference page		
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATSWATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Fuel	Fuel tank	5	5												FL-10	
	Fuel piping			5	5	5		5	5			5			EM-36	
	Vapor lock															—
	Valve deposit															—
	Poor fuel (Heavy weight gasoline, Low octane)	5			5	5	5		5	5			5			—
Air	Air duct														EM-16	
	Air cleaner														EM-16	
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)		5	5		5		5	5			5			EM-18	
	Electric throttle control actuator	5			5		5			5					EM-18	
	Air leakage from intake manifold/Collector/Gasket														EM-18	
Cranking	Battery	1	1	1		1		1	1					1	SC-5	
	Generator circuit														SC-26	
	Starter circuit	3										1			SC-11	
	Signal plate	6													EM-80	
	Park/neutral position (PNP) switch (M/T) Transmission range switch (CVT)	4													MT-144 or CVT-61	
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-65	
	Cylinder head gasket										4		3			
	Cylinder block															
	Piston												4			
	Piston ring															
	Connecting rod	6	6	6	6	6		6	6			6			EM-80	
	Bearing															
Crankshaft																

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[MR20DE (FOR CALIFORNIA)]

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Valve mechanism	Timing chain														EM-40
	Camshaft														EM-50
	Intake valve timing control	5	5	5	5	5		5	5			5			EM-40
	Intake valve												3		EM-65
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			EM-23, EX-5
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5			EM-27, LU-9
	Oil level (Low)/Filthy oil														LU-6
Cooling	Radiator/Hose/Radiator filler cap														CO-15
	Thermostat									5					CO-21
	Water control valve														CO-24
	Water pump	5	5	5	5	5		5	5		4	5			CO-19
	Water gallery														CO-24
	Cooling fan														CO-17
	Coolant level (Low)/Contaminated coolant									5					CO-11
NVIS (NISSAN Vehicle Immobilizer System-NATS)		1	1												BL-170

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

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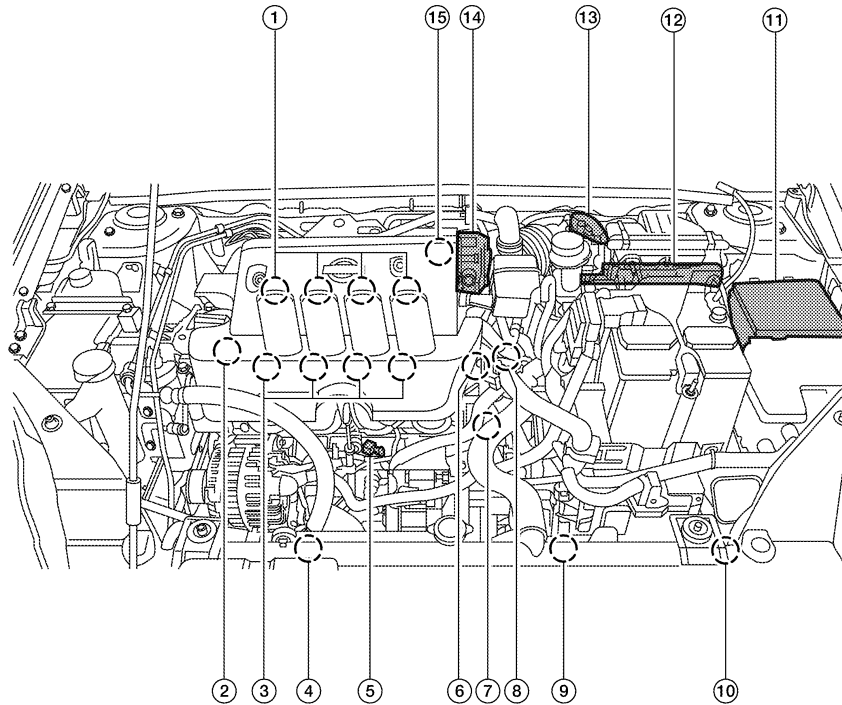
TROUBLE DIAGNOSIS

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[MR20DE (FOR CALIFORNIA)]

Engine Control Component Parts Location

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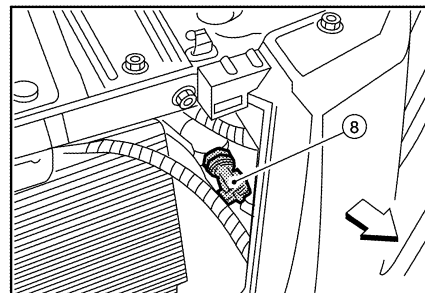
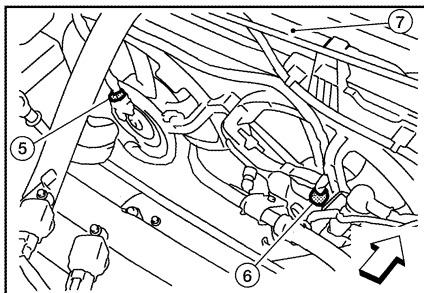
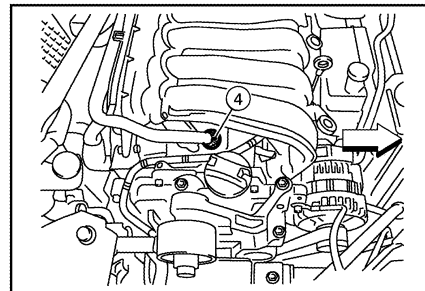
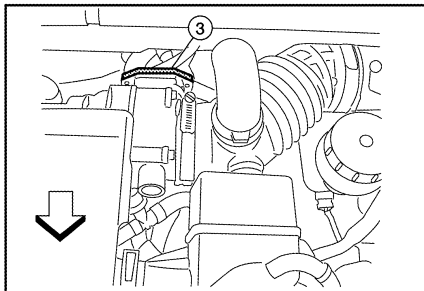
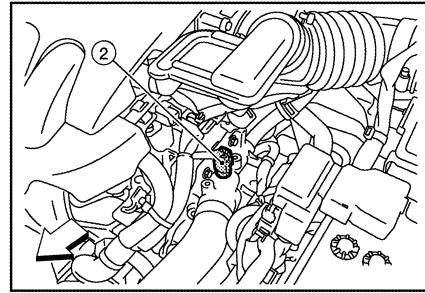
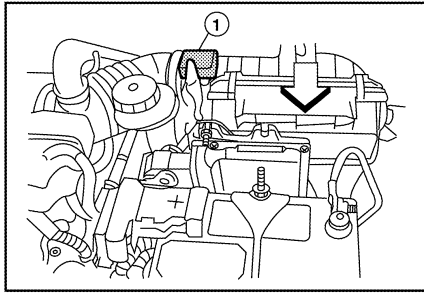
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|---|---|---|
| 1. Ignition coil (with power transistor) and spark plug | 2. Intake valve timing control solenoid valve | 3. Fuel injector |
| 4. Cooling fan motor-1 | 5. Knock sensor | 6. Camshaft position sensor (PHASE) |
| 7. Tumble control valve actuator | 8. Engine coolant temperature sensor | 9. Cooling fan motor-2 |
| 10. Refrigerant pressure sensor | 11. IPDM E/R | 12. ECM |
| 13. Mass air flow sensor (with intake air temperature sensor) | 14. Electric throttle control actuator (with built in throttle position sensor, throttle control motor) | 15. EVAP canister purge volume control solenoid valve |

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⇐ : Vehicle front

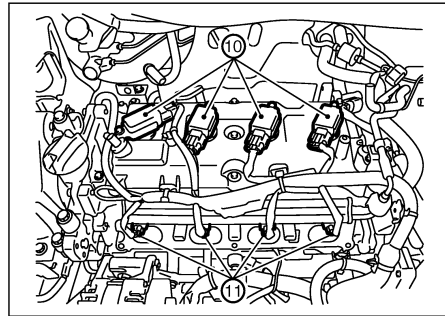
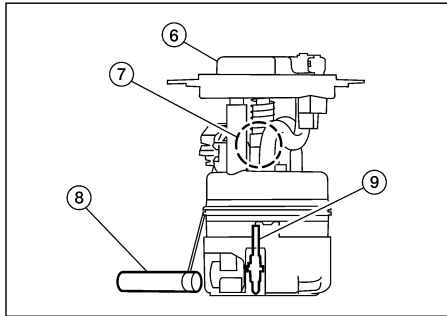
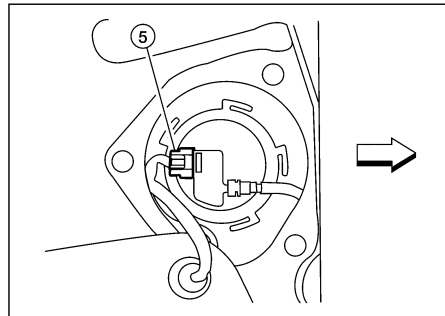
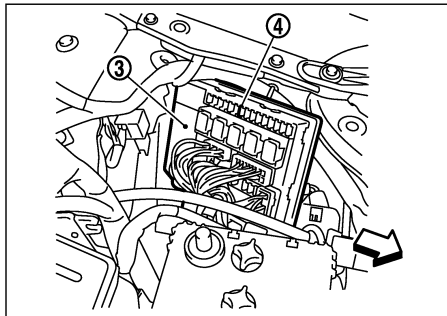
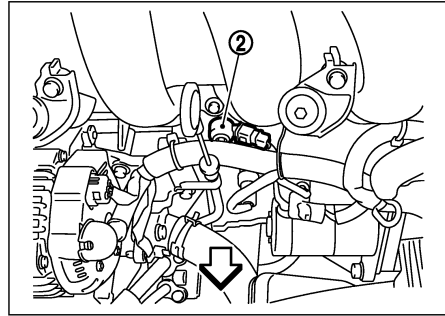
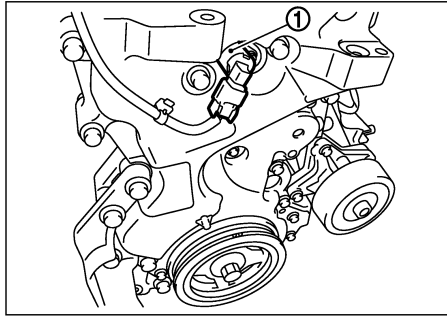
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|---|--|--|
| 1. Mass air flow sensor
(with intake air temperature sensor) | 2. Engine coolant temperature sensor | 3. Electric throttle control actuator
(with built in throttle position sensor,
throttle control motor) |
| 4. PCV valve | 5. Cooling fan motor-1 harness connector | 6. Cooling fan motor-2 harness connector |
| 7. Radiator | 8. Refrigerant pressure sensor | |

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← : Vehicle front

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|--|---|---|
| 1. Intake valve timing control solenoid valve | 2. Knock sensor | 3. IPDM E/R |
| 4. Fuel pump fuse | 5. Fuel level sensor unit and fuel pump harness connector | 6. Fuel level sensor unit and fuel pump |
| 7. Fuel pressure regulator | 8. Fuel level sensor | 9. Fuel tank temperature sensor |
| 10. Ignition coil (with power transistor) and spark plug | | |

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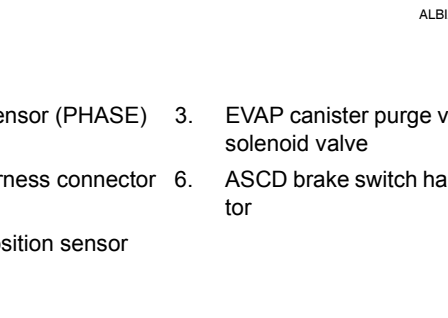
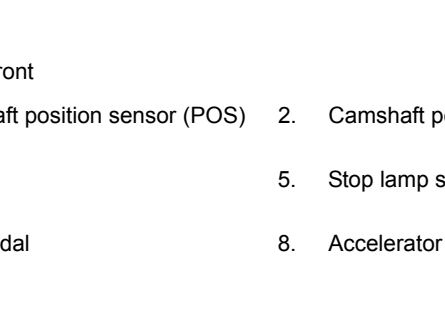
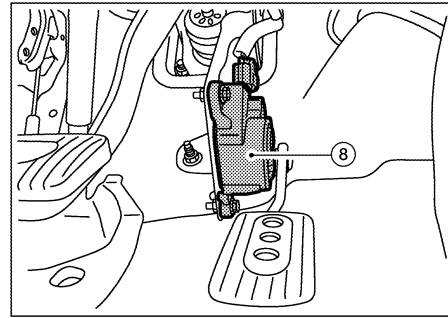
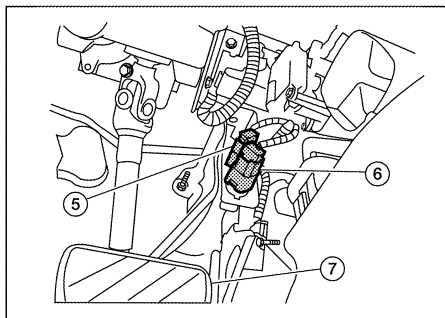
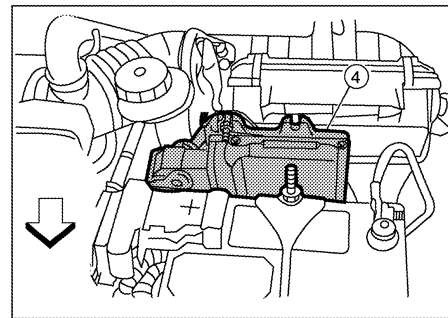
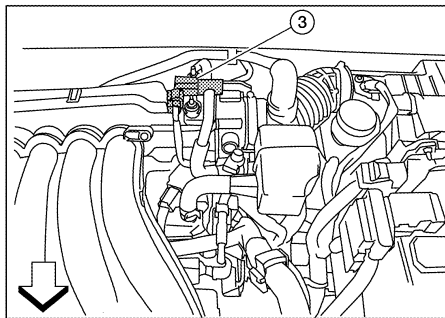
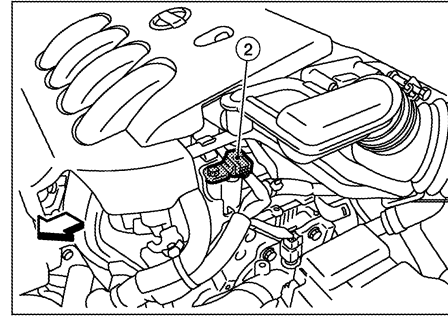
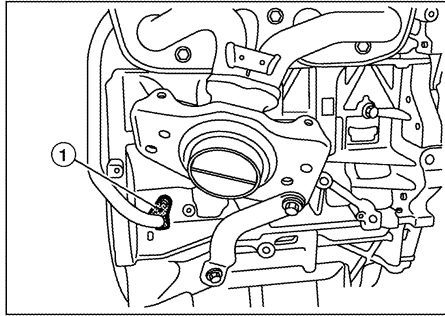
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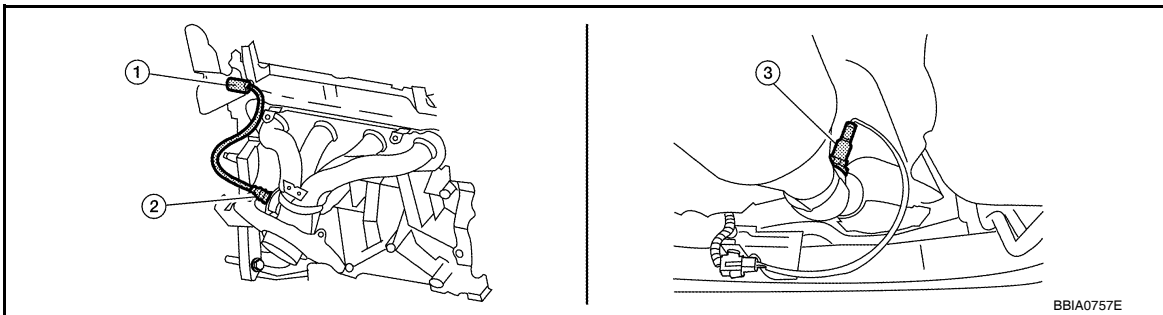
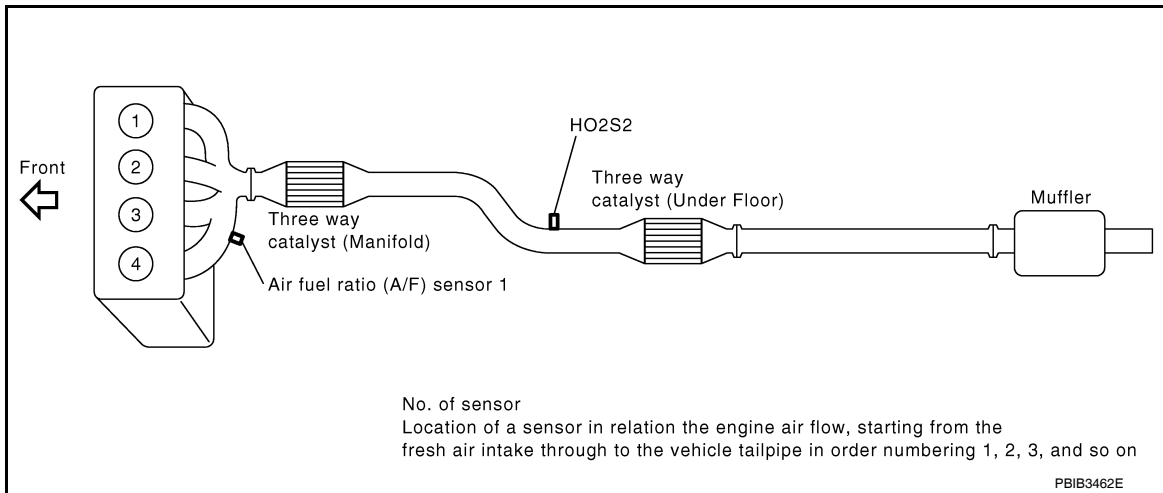
⇐: Vehicle front

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|-------------------------------------|---------------------------------------|--|
| 1. Crankshaft position sensor (POS) | 2. Camshaft position sensor (PHASE) | 3. EVAP canister purge volume control solenoid valve |
| 4. ECM | 5. Stop lamp switch harness connector | 6. ASCD brake switch harness connector |
| 7. Brake pedal | 8. Accelerator pedal position sensor | |

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

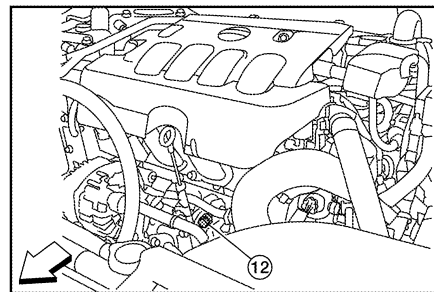
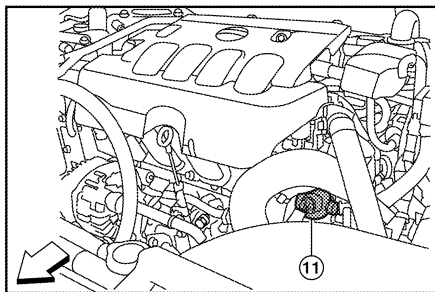
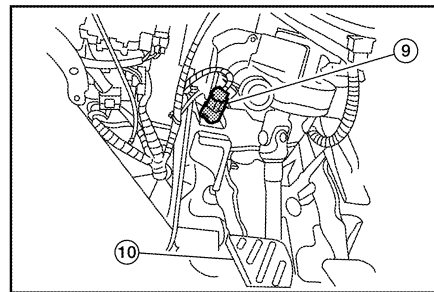
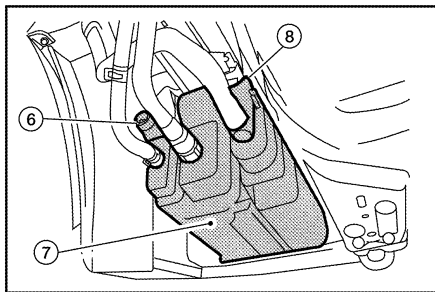
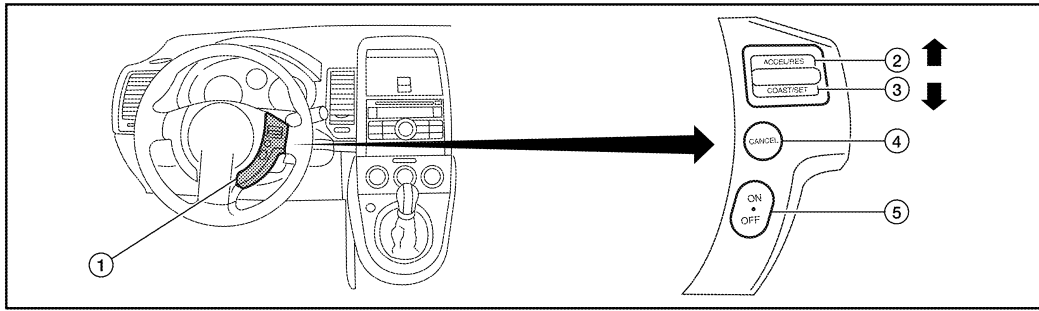


- 1. Air fuel ratio (A/F) sensor 1 harness
- 2. Air fuel ratio (A/F) sensor 1 connector
- 3. Heated oxygen sensor 2

TROUBLE DIAGNOSIS

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[MR20DE (FOR CALIFORNIA)]



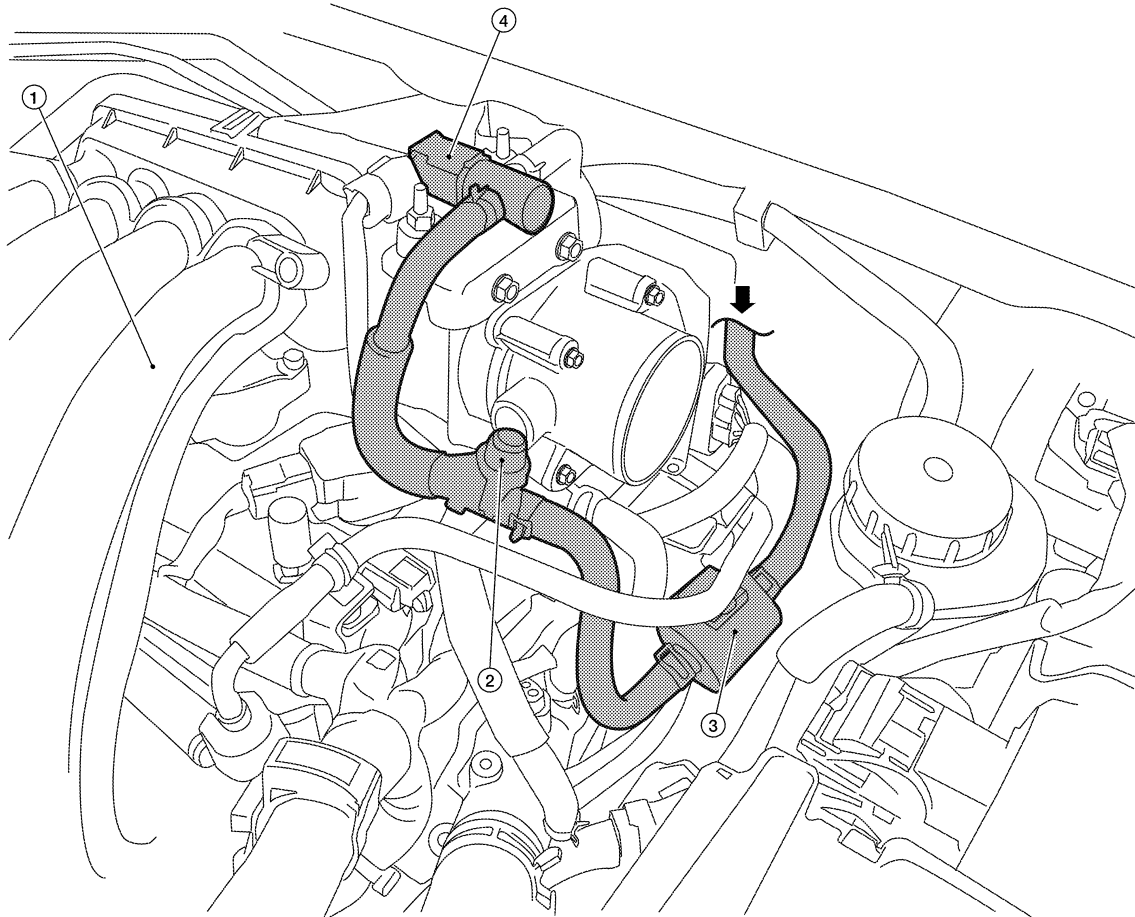
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|-------------------------|-------------------------------------|--|
| 1. ASCD steering switch | 2. RESUME/ACCELERATOR switch | 3. SET/COAST switch |
| 4. CANCEL switch | 5. MAIN switch | 6. EVAP control system pressure sensor |
| 7. EVAP canister | 8. EVAP canister vent control valve | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. Tumble control valve actuator | 12. Engine oil temperature sensor |

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Vacuum Hose Drawing

INFOID:00000006579753



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↔ : Vehicle front

← : From EVAP canister

1. Intake manifold

2. EVAP service port

3. EVAP purge resonator

4. EVAP canister purge volume control solenoid valve

NOTE:

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

Refer to [EC-34, "Schematic"](#) for Vacuum Control System.

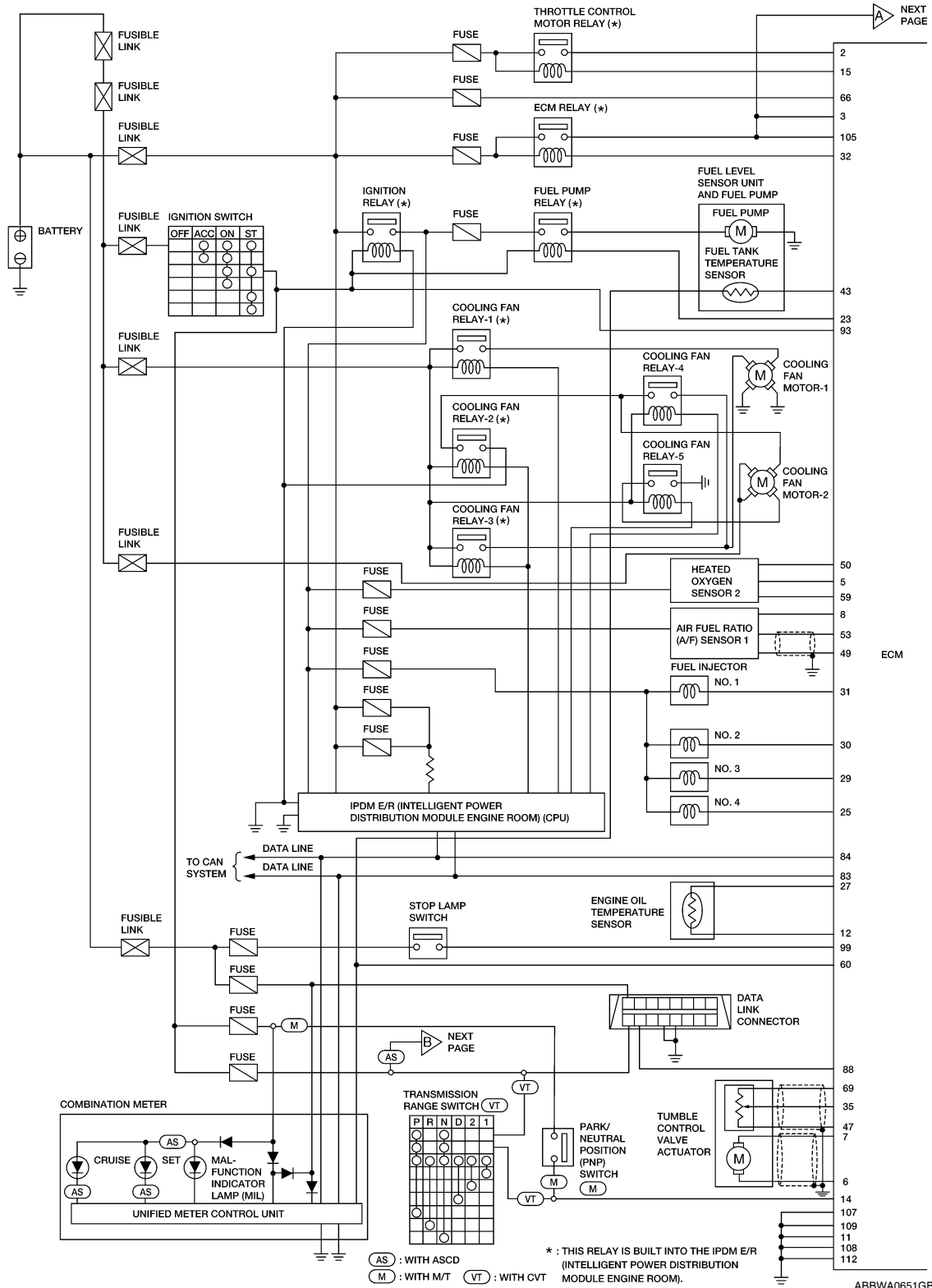
TROUBLE DIAGNOSIS

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[MR20DE (FOR CALIFORNIA)]

Circuit Diagram

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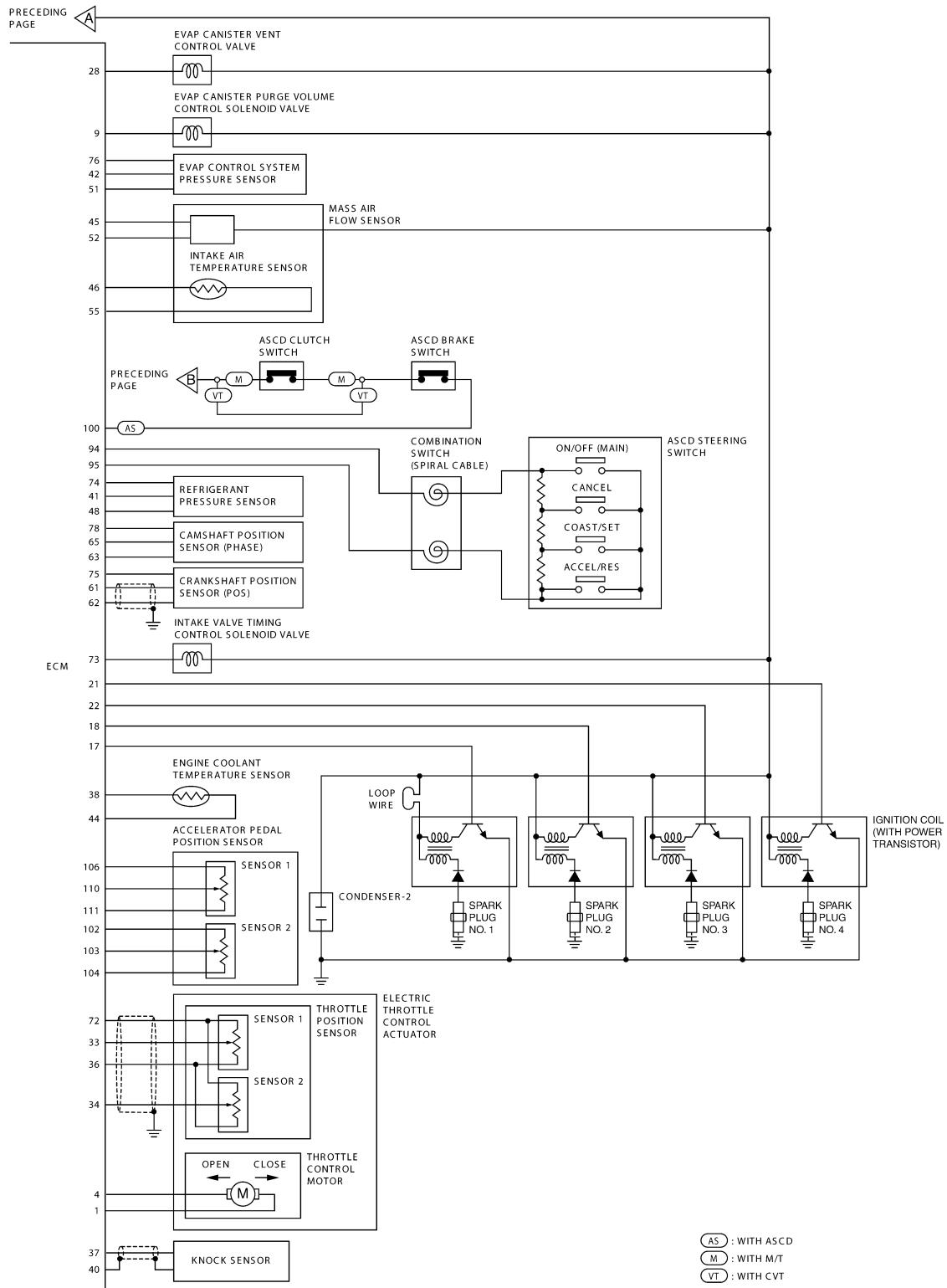


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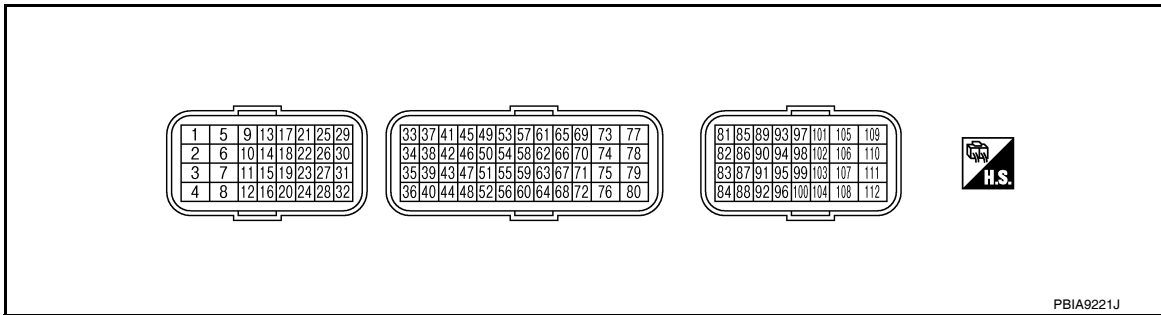
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[MR20DE (FOR CALIFORNIA)]

ECM Harness Connector Terminal Layout

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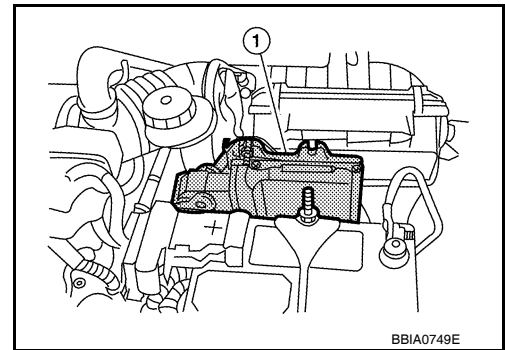
PBIA9221J

ECM Terminal and Reference Value

INFOID:000000006579756

PREPARATION

ECM (1) is located in the engine room left side near battery.



BBIA0749E

ECM INSPECTION TABLE

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

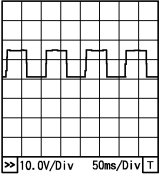
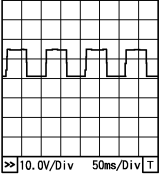
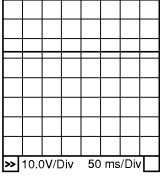
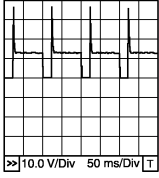
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	V	Throttle control motor (Open)	[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully depressed 	Approximately 3.2 V★ <small>5V/Div 1ms/Div</small> PBIA8150J
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
3	L/W	Tumble control valve motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
4	L/R	Throttle control motor (Close)	[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully released 	Approximately 1.8 V★ <small>5V/Div 1ms/Div</small> PBIA8149J

TROUBLE DIAGNOSIS

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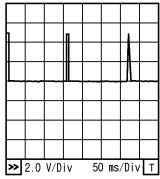
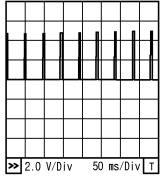
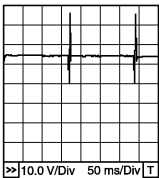
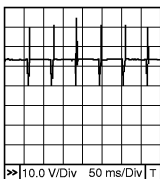
[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
5	B/W	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★ 
			[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped [Engine is running] <ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
6	R	Tumble control valve motor (Open)	[Ignition switch: ON → OFF] <ul style="list-style-type: none"> • For a few seconds after turning ignition switch ON 	0 V ↓ BATTERY VOLTAGE (11 - 14 V) ↓ 0 V
7	W	Tumble control valve motor (Close)	[Ignition switch: OFF → ON] <ul style="list-style-type: none"> • For a few seconds after turning ignition switch ON 	0 V ↓ BATTERY VOLTAGE (11 - 14 V) ↓ 0 V
8	BR/W	A/F sensor 1 heater	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed (More than 140 seconds after starting engine) 	Approximately 2.9 - 8.8 V★ 
9	W/B	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting. 	BATTERY VOLTAGE (11 - 14 V)★ 
			[Engine is running] <ul style="list-style-type: none"> • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine) 	Approximately 10 V★ 
11	B	ECM ground	[Engine is running] <ul style="list-style-type: none"> • Idle speed 	Body ground
12	GR	Sensor ground (Engine oil temperature sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	BR/R	PNP signal	[Ignition switch: ON] • Shift lever: P or N (CVT), Neutral (M/T)	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON] • Except above	Approximately 0 V
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V
17 18 21 22	V BR/Y G Y	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 4 Ignition signal No. 3	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	0 - 0.3 V★  <small>PBIA9265J</small>
			[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm.	0.2 - 0.5 V★  <small>PBIA9266J</small>
23	B/O	Fuel pump relay	[Ignition switch: ON] • For 1 second after turning ignition switch ON	0 - 1.0 V
			[Engine is running] [Ignition switch: ON] • More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14 V)
25 29 30 31	R O GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIB0529E</small>
			[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIA4943J</small>
27	P	Engine oil temperature sensor	[Engine is running]	Approximately 0 - 4.8 V Output voltage varies with engine coolant temperature.
28	L/Y	EVAP canister vent control valve	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

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[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
33	G	Throttle position sensor 1	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34	W	Throttle position sensor 2	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
35	L/G	Tumble control valve position sensor	[Engine is running] • Engine coolant temperature: Between 5°C (41°F) and 45°C (113°F) • Engine speed: Less than 3,200 rpm • Accelerator pedal: Fully released	Less than 1.2 V
			[Engine is running] • Engine coolant temperature: Between 5°C (41°F) and 45°C (113°F) • Accelerator pedal: Slightly depressed	More than 2.9 V
36	B	Sensor ground (Throttle position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
37	W	Knock sensor	[Engine is running] • Idle speed	Approximately 2.5 V
38	P	Engine coolant temperature sensor	[Engine is running]	Approximately 0 - 4.8 V Output voltage varies with engine coolant temperature.
40	GR	Sensor ground (Knock sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
41	L	Refrigerant pressure sensor	[Engine is running] • Warm-up condition • Both A/C switch and blower fan switch: ON (Compressor operates.)	1.0 - 4.0 V
42	R/Y	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8 V
43	G/O	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8 V Output voltage varies with fuel tank temperature
44	GR	Sensor ground (Engine coolant temperature sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

TROUBLE DIAGNOSIS

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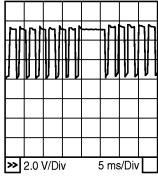
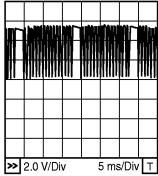

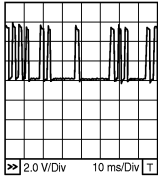
[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	A
45	V	Mass air flow sensor	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.2 V	EC
			[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	1.5 - 1.8 V	C
46	BR/Y	Intake air temperature sensor	[Engine is running]	Approximately 0 - 4.8 V Output voltage varies with intake air temperature.	D
47	L/R	Sensor ground (Tumble control valve position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	E
48	R/G	Sensor ground (Refrigerant pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	F
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.	G
50	G	Heated oxygen sensor 2	[Engine is running] • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0 V	H
51	V/R	Sensor ground (EVAP control system pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	I
52	B/W	Sensor ground (Mass air flow sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	J
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V	K
55	O	Sensor ground (Intake air temperature sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	L
59	B/Y	Sensor ground (Heated oxygen sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	M
60	B	Sensor ground (Fuel tank temperature sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	N

TROUBLE DIAGNOSIS

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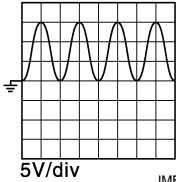
[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
61	W	Crankshaft position sensor (POS)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle.</p>	<p>Approximately 4.0 V★</p>  <p style="text-align: right; font-size: small;">PBIB2998E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed: 2,000 rpm 	<p>Approximately 4.0 V★</p>  <p style="text-align: right; font-size: small;">PBIB2999E</p>
62	R	Sensor ground [Crankshaft position sensor (POS)]	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	<p>Approximately 0 V</p>
63	B/R	Sensor ground [Camshaft position sensor (PHASE)]	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	<p>Approximately 0 V</p>
65	R	Camshaft position sensor (PHASE)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle.</p>	<p>1.0 - 2.0 V★</p>  <p style="text-align: right; font-size: small;">PBIB2986E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed: 2,000 rpm. 	<p>1.0 - 2.0 V★</p>  <p style="text-align: right; font-size: small;">PBIB2987E</p>
66	Y/R	Power supply for ECM (Back-up)	<p>[Ignition switch: OFF]</p>	<p>BATTERY VOLTAGE (11 - 14 V)</p>
69	LG/B	Sensor power supply (Tumble control valve posi- tion sensor)	<p>[Ignition switch: ON]</p>	<p>Approximately 5 V</p>
72	R	Sensor power supply (Throttle position sensor)	<p>[Ignition switch: ON]</p>	<p>Approximately 5 V</p>

TROUBLE DIAGNOSIS

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[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
73	Y/R	Intake valve timing control solenoid valve	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	BATTERY VOLTAGE (11 - 14 V)
			[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • When revving engine up to 2,000 rpm quickly 	7 - 10 V★  <small>5V/div JMBIA1638GB</small>
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
78	G/Y	Sensor power supply [Camshaft position sensor (PHASE)]	[Ignition switch: ON]	Approximately 5 V
83	P	CAN communication line	—	—
84	L	CAN communication line	—	—
88	P/L	DATA link connector	—	—
93	B/R	Ignition switch	[Ignition switch: OFF]	0 V
			[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
94	L/Y	ASCD steering switch	[Ignition switch: ON] <ul style="list-style-type: none"> • ASCD steering switch: OFF 	Approximately 4 V
			[Ignition switch: ON] <ul style="list-style-type: none"> • MAIN switch: Pressed 	Approximately 0 V
			[Ignition switch: ON] <ul style="list-style-type: none"> • CANCEL switch: Pressed 	Approximately 1 V
			[Ignition switch: ON] <ul style="list-style-type: none"> • RESUME/ACCELERATE switch: Pressed 	Approximately 3 V
			[Ignition switch: ON] <ul style="list-style-type: none"> • SET/COAST switch: Pressed 	Approximately 2 V
95	B/Y	Sensor ground (ASCD steering switch)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
99	R/G	Stop lamp switch	[Ignition switch: OFF] <ul style="list-style-type: none"> • Brake pedal: Fully released 	Approximately 0 V
			[Ignition switch: OFF] <ul style="list-style-type: none"> • Brake pedal: Slightly depressed 	BATTERY VOLTAGE (11 - 14 V)
100	G/B	ASCD brake switch	[Ignition switch: ON] <ul style="list-style-type: none"> • Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T) 	Approximately 0 V
			[Ignition switch: ON] <ul style="list-style-type: none"> • Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T) 	BATTERY VOLTAGE (11 - 14 V)

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	[Ignition switch: ON]	Approximately 5 V
103	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	B/P	Sensor ground (Accelerator pedal position sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
106	O	Sensor power supply (Accelerator pedal position sensor 1)	[Ignition switch: ON]	Approximately 5 V
107 108 109	B B B	ECM ground	[Engine is running] • Idle speed	Body ground
110	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	B/W	Sensor ground (Accelerator pedal position sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
112	B	ECM ground	[Engine is running] • Idle speed	Body ground

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

CONSULT-III Function (ENGINE)

INFOID:000000006579757

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-III unit.
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.
Active Test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function Test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
DTC & SRT Confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
Ecu Identification	ECM part number can be read.

*: 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

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

WORK SUPPORT MODE

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 specified 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 the coefficient of self-learning control value
EVAP SYSTEM CLOSE	Close the EVAP canister vent control valve in order to make EVAP system close under the following conditions. <ul style="list-style-type: none"> • IGN SW "ON" • Engine not running • Ambient temperature is above 0°C (32°F). • No vacuum and no high pressure in EVAP system • Fuel tank temp. 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-III will discontinue it and display appropriate instruction. NOTE: When starting engine, CONSULT-III may display "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", even in using charged battery.	When detecting EVAP vapor leak point of EVAP system
TARGET IDLE RPM ADJ*	Idle condition	When setting target idle speed
TARGET IGN TIM ADJ*	Idle condition	When adjusting target ignition timing
VIN REGISTRATION	In this mode, VIN is registered in ECM.	When registering VIN in ECM
CLSD THL POS LEARN	Ignition on and engine stopped.	When learning the throttle valve closed position

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

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC and 1st trip DTC, refer to [EC-59. "Emission-related Diagnostic Information"](#).

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.

How to Erase DTC and 1st Trip DTC

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 CVT related items (see Emission-related Diagnostic Information), skip step 1.
1. Erase DTC in TCM. Refer to [CVT-5. "DTC No. Index"](#).
 2. Select "ENGINE" with CONSULT-III.
 3. Select "SELF-DIAG RESULTS".
 4. Touch "ERASE". (DTC in ECM will be erased.)

Freeze Frame Data and 1st Trip Freeze Frame Data

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Freeze frame data item*	Description
DIAG TROUBLE CODE	<ul style="list-style-type: none"> The engine control component part/control system has a trouble code, it is displayed as DTC.
FUEL SYS-B1	<ul style="list-style-type: none"> "Fuel injection system status" at the moment a malfunction is detected is displayed. One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enrichment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	<ul style="list-style-type: none"> The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	<ul style="list-style-type: none"> "Long-term fuel trim" at the moment a malfunction is detected is displayed. 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 [%]	<ul style="list-style-type: none"> "Short-term fuel trim" at the moment a malfunction is detected is displayed. The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH-P/S [%]	<ul style="list-style-type: none"> The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> The intake air temperature at the moment a malfunction is detected is displayed.
FUEL SYS-B2	<ul style="list-style-type: none"> These items are displayed but are not applicable to this model.
L-FUEL TRM-B2 [%]	
S-FUEL TRM-B2 [%]	
INT MANI PRES [kPa]	
COMBUST CONDITION	

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

DATA MONITOR MODE

Monitored Item

Monitored item [Unit]	Description	Remarks
ENG SPEED [rpm]	<ul style="list-style-type: none"> Indicates the engine speed computed from the signals of the crankshaft position sensor (POS) and camshaft position sensor (PHASE). 	<ul style="list-style-type: none"> Accuracy becomes poor if engine speed drops below the idle rpm. If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1 [V]	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor is displayed. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in "SPEC".
B/FUEL SCHDL [ms]	<ul style="list-style-type: none"> "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	<ul style="list-style-type: none"> When engine is running specification range is indicated in "SPEC".
A/F ALPHA-B1 [%]	<ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in "SPEC". This data also includes the data for the air/fuel ratio learning control.

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Monitored item [Unit]	Description	Remarks	
COOLANT TEMP/S [°C] or [°F]	<ul style="list-style-type: none"> The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed. 	<ul style="list-style-type: none"> 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
A/F SEN1 (B1) [V]	<ul style="list-style-type: none"> The A/F signal computed from the input signal of the A/F sensor 1 is displayed. 		EC
HO2S2 (B1) [V]	<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 2 is displayed. 		C
HO2S2 MNTR(B1) [RICH/LEAN]	<ul style="list-style-type: none"> Display of heated oxygen sensor 2 signal: 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. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. 	D
VHCL SPEED SE [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal is displayed. 		E
BATTERY VOLT [V]	<ul style="list-style-type: none"> The power supply voltage of ECM is displayed. 		F
ACCEL SEN 1 [V]	<ul style="list-style-type: none"> The accelerator pedal position sensor signal voltage is displayed. 	<ul style="list-style-type: none"> ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal. 	F
ACCEL SEN 2 [V]			G
TP SEN 1-B1 [V]	<ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. 	<ul style="list-style-type: none"> TP SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal. 	H
TP SEN 2-B1 [V]			H
FUEL T/TMP SE [°C] or [°F]	<ul style="list-style-type: none"> The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed. 		I
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated. 		J
EVAP SYS PRES [V]	<ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. 		J
FUEL LEVEL SE [V]	<ul style="list-style-type: none"> The signal voltage of the fuel level sensor is displayed. 		K
START SIGNAL [ON/OFF]	<ul style="list-style-type: none"> Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage. 	<ul style="list-style-type: none"> After starting the engine, [OFF] is displayed regardless of the starter signal. 	L
CLSD THL POS [ON/OFF]	<ul style="list-style-type: none"> Indicates idle position [ON/OFF] computed by the ECM according to the accelerator pedal position sensor signal. 		L
AIR COND SIG [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal. 		M
P/N POSI SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position (PNP) signal. 		N
PW/ST SIGNAL [ON/OFF]	<ul style="list-style-type: none"> [ON/OFF] condition of the power steering system (determined by the signal sent from EPS control unit) is indicated. 		O
LOAD SIGNAL [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and lighting switch are OFF. 		P
IGNITION SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch. 		
HEATER FAN SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the heater fan switch signal. 		

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Monitored item [Unit]	Description	Remarks
BRAKE SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the stop lamp switch signal. 	
INJ PULSE-B1 [msec]	<ul style="list-style-type: none"> Indicates the actual fuel injection pulse width compensated by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain computed value is indicated.
IGN TIMING [BTDC]	<ul style="list-style-type: none"> Indicates the ignition timing computed by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
CAL/LD VALUE [%]	<ul style="list-style-type: none"> "Calculated load value" indicates the value of the current airflow divided by peak airflow. 	
MASS AIRFLOW [g/s]	<ul style="list-style-type: none"> Indicates the mass airflow computed by ECM according to the signal voltage of the mass air flow sensor. 	
PURG VOL C/V [%]	<ul style="list-style-type: none"> Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 	
INT/V TIM(B1) [°CA]	<ul style="list-style-type: none"> Indicates [°CA] of intake camshaft advanced angle. 	
INT/V SOL(B1) [%]	<ul style="list-style-type: none"> The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signal) is indicated. The advance angle becomes larger as the value increases. 	
AIR COND RLY [ON/OFF]	<ul style="list-style-type: none"> The air conditioner relay control condition (determined by ECM according to the input signals) is indicated. 	
FUEL PUMP RLY [ON/OFF]	<ul style="list-style-type: none"> Indicates the fuel pump relay control condition determined by ECM according to the input signals. 	
VENT CONT/V [ON/OFF]	<ul style="list-style-type: none"> The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON: Closed OFF: Open 	
THRTL RELAY [ON/OFF]	<ul style="list-style-type: none"> Indicates the throttle control motor relay control condition determined by the ECM according to the input signals. 	
COOLING FAN [HI/MID/LOW/OFF]	<ul style="list-style-type: none"> Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI: High speed operation MID: Middle speed operation LOW: Low speed operation OFF: Stop 	
HO2S2 HTR (B1) [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals. 	
I/P PULLY SPD [rpm]	<ul style="list-style-type: none"> Indicates the engine speed computed from the input speed sensor signal. 	
VEHICLE SPEED [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from TCM is displayed. 	
IDL A/V LEARN [YET/CMPLT]	<ul style="list-style-type: none"> Display the condition of idle air volume learning YET: Idle Air Volume Learning has not been performed yet. CMPLT: Idle Air Volume Learning has already been performed successfully. 	
TRVL AFTER MIL [km] or [mile]	<ul style="list-style-type: none"> Distance traveled while MIL is activated. 	
A/F S1 HTR(B1) [%]	<ul style="list-style-type: none"> Indicates A/F sensor 1 heater control value computed by ECM according to the input signals. The current flow to the heater becomes larger as the value increases. 	

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Monitored item [Unit]	Description	Remarks
AC PRESS SEN [V]	<ul style="list-style-type: none"> The signal voltage from the refrigerant pressure sensor is displayed. 	
VHCL SPEED SE [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from TCM is displayed. 	
SET VHCL SPD [km/h] or [mph]	<ul style="list-style-type: none"> The preset vehicle speed is displayed. 	
MAIN SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from MAIN switch signal. 	
CANCEL SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from CANCEL switch signal. 	
RESUME/ACC SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from RESUME/ACCELERATE switch signal. 	
SET SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from SET/COAST switch signal. 	
BRAKE SW1 [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ASCD brake switch signal. 	
BRAKE SW2 [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of stop lamp switch signal. 	
VHCL SPD CUT [NON/CUT]	<ul style="list-style-type: none"> Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed increased to excessively high compared with the ASCD set speed, and ASCD operation is cut off. 	
LO SPEED CUT [NON/CUT]	<ul style="list-style-type: none"> 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. 	
AT OD MONITOR [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of CVT according to the input signal from the TCM. 	<ul style="list-style-type: none"> For M/T models always "OFF" is displayed
AT OD CANCEL [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of CVT cancel signal sent from the TCM. 	<ul style="list-style-type: none"> For M/T models always "OFF" is displayed
CRUISE LAMP [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals. 	
SET LAMP [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals. 	
A/F ADJ-B1	<ul style="list-style-type: none"> Indicates the correction factor stored in ECM. The factor is calculated from the difference between the target air/fuel ratio stored in ECM and the air/fuel ratio calculated from air fuel ratio (A/F) sensor 1 signal. 	
SWRL CONT S/V [ON/OFF]	<ul style="list-style-type: none"> The control condition of the tumble control valve (determined by ECM according to the input signals) is indicated. ON: Closed OFF: Open 	
TUMBLE POS SEN [V]	<ul style="list-style-type: none"> The tumble control valve position sensor signal voltage is displayed. 	
ENG OIL TEMP [°C] or [°F]	<ul style="list-style-type: none"> The engine oil temperature (determined by the signal voltage of the engine oil temperature sensor) is displayed. 	
HO2 S2 DIAG1 (B1) [INCMP/CMPLT]	<ul style="list-style-type: none"> Indicates DTC P0139 self-diagnosis (delayed response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	

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Monitored item [Unit]	Description	Remarks
HO2 S2 DIAG2 (B1) [INCMP/CMPLT]	<ul style="list-style-type: none"> Indicates DTC P0139 self-diagnosis (slow response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
A/F SEN1 DIAG1(B1) [INCMP/CMPLT]	<ul style="list-style-type: none"> Indicates DTC P015A or P015B self-diagnosis condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
A/F SEN1 DIAG2(B1) [INCMP/CMPLT]	<ul style="list-style-type: none"> Indicates DTC P014C or P014D self-diagnosis condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
A/F SEN1 DIAG3(B1) [ABSNT/PRSNT]	<ul style="list-style-type: none"> Indicates DTC P014C, P014D, P015A or P015B self-diagnosis condition. ABSNT: The vehicle condition is not within the diagnosis range. PRSNT: The vehicle condition is within the diagnosis range. 	
THRTL STK CNT B1	<p>NOTE: The item is indicated, but not used.</p>	

NOTE:

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

ACTIVE TEST MODE

Test Item

Test Item	Condition	Judgment	Check Item (Remedy)
FUEL INJECTION	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Fuel injector Air fuel ratio (A/F) sensor 1
IGNITION TIMING	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Perform Idle Air Volume Learning.
POWER BALANCE	<ul style="list-style-type: none"> Engine: After warming up, idle the engine. A/C switch OFF Shift lever: P or N (CVT), Neutral (M/T) Cut off each fuel injector signal one at a time using CONSULT-III. 	Engine runs rough or dies.	<ul style="list-style-type: none"> Harness and connectors Compression Fuel injector Power transistor Spark plug Ignition coil
COOLING FAN*	<ul style="list-style-type: none"> Ignition switch: ON Turn the cooling fan "LOW", "MID", "HI" and "OFF" with CONSULT-III. 	Cooling fan moves and stops.	<ul style="list-style-type: none"> Harness and connectors Cooling fan relay Cooling fan motor
ENG COOLANT TEMP	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Engine coolant temperature sensor Fuel injector
FUEL PUMP RELAY	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT-III and listen to operating sound. 	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> Harness and connectors Fuel pump relay

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Test Item	Condition	Judgment	Check Item (Remedy)
PURG VOL CONT/V	<ul style="list-style-type: none"> • Engine: After warming up, run engine at 1,500 rpm. • Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> • Harness and connectors • EVAP canister purge volume control solenoid valve
FUEL/T TEMP SEN	<ul style="list-style-type: none"> • Change the fuel tank temperature using CONSULT-III. 		
VENT CONTROL/V	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) • Turn solenoid valve "ON" and "OFF" with the CONSULT-III and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> • Harness and connectors • EVAP canister vent control valve
V/T ASSIGN ANGLE	<ul style="list-style-type: none"> • Engine: Return to the original trouble condition • Change intake valve timing using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> • Harness and connectors • Intake valve timing control solenoid valve
TUMBLE CONTROL VALVE	<ul style="list-style-type: none"> • Ignition switch: ON • Turn tumble control valve "ON" and "OFF" with CONSULT-III and listen to operating sound. 	Tumble control valve motor makes an operating sound.	<ul style="list-style-type: none"> • Harness and connectors • Tumble control valve motor

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

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

- For items whose SRT codes are set, "CMPLT" is displayed on the CONSULT-III 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

How to display permanent DTC status

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

NOTE:

Permanent DTCs stored in ECM memory are displayed on the CONSULT-III screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).

CAUTION:

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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”.

PERMANENT DTC & SRT CONFIRMATION : PERMANENT DTC STATUS

CAUTION:
Turn ignition switch from ON to OFF twice to update the information on the status screen.

PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D
XXXX	INCOMP	INCOMP
XXXX	CMPLT	INCOMP
XXXX	INCOMP	CMPLT
XXXX	CMPLT	INCOMP
XXXX	INCOMP	INCOMP
XXXX	INCOMP	INCOMP

The previous trip information is displayed.

JSBIA0062GB

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.

DTC WORK SUPPORT Mode

Test mode	Test item	Corresponding DTC No.	Reference page
EVAPORATIVE SYSTEM	PURG FLOW P0441	P0441	EC-331
	EVP SML LEAK P0442/P1442*	P0455	EC-387
	EVP V/S LEAK P0456/P1456*	P0442	EC-336
		P0456	EC-394
	PURG VOL CN/V P1444	P0443	EC-343
A/F SEN1	A/F SEN1 (B1) P1276	P0130	EC-224
	A/F SEN1 (B1) P1278/P1279	—	—
HO2S2	HO2S2 (B1) P0139	P0139	EC-255
	HO2S2 (B1) P1146	P0138	EC-246
	HO2S2 (B1) P1147	P0137	EC-239

*: DTC P1442 and P1456 does not apply to B16 models but appears in DTC Work Support Mode screens.

Generic Scan Tool (GST) Function

INFOID:000000006579758

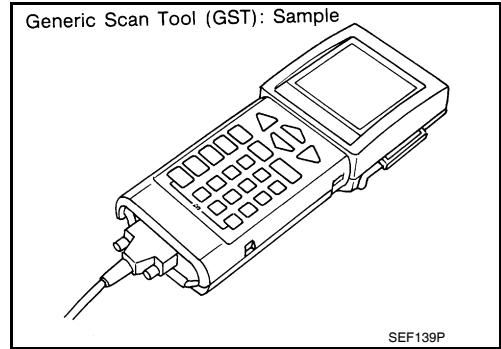
DESCRIPTION

TROUBLE DIAGNOSIS

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Generic Scan Tool (OBDII scan tool) complying with SAE J1978/ISO 15031-4 has 8 different functions explained below. ISO15765-4 is used as the protocol. The name GST or Generic Scan Tool is used in this service manual.



FUNCTION

Diagnostic test mode		Function
Service \$01	READINESS TESTS	This diagnostic service gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
Service \$02	(FREEZE DATA)	This diagnostic service gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-130, "CONSULT-III Function (ENGINE)" .
Service \$03	DTCs	This diagnostic service gains access to emission-related power train trouble codes which were stored by ECM.
Service \$04	CLEAR DIAG INFO	This diagnostic service can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> • Clear number of diagnostic trouble codes (Service \$01) • Clear diagnostic trouble codes (Service \$03) • Clear trouble code for freeze frame data (Service \$01) • Clear freeze frame data (Service \$02) • Reset status of system monitoring test (Service \$01) • Clear on board monitoring test results (Service \$06 and \$07)
Service \$06	(ON BOARD TESTS)	This diagnostic service accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
Service \$07	(ON BOARD TESTS)	This diagnostic service enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
Service \$08	—	This diagnostic service can close EVAP system in ignition switch ON position (Engine stopped). When this diagnostic service is performed, EVAP canister vent control valve can be closed. In the following conditions, this diagnostic service cannot function. <ul style="list-style-type: none"> • Low ambient temperature • Low battery voltage • Engine running • Ignition switch OFF • Low fuel temperature • Too much pressure is applied to EVAP system
Service \$09	(CALIBRATION ID)	This diagnostic service enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.
Service \$0A*	PERMANENT DTCs	This diagnostic service gains access to permanent DTCs which were stored by ECM.

NOTE:

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

INSPECTION PROCEDURE

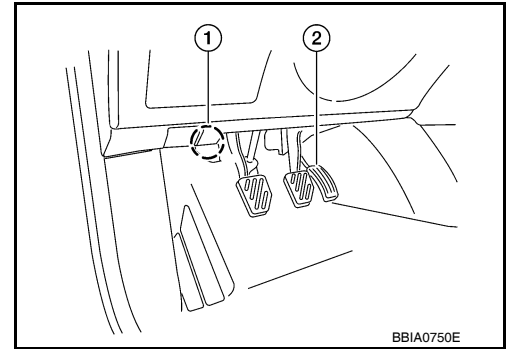
1. Turn ignition switch OFF.

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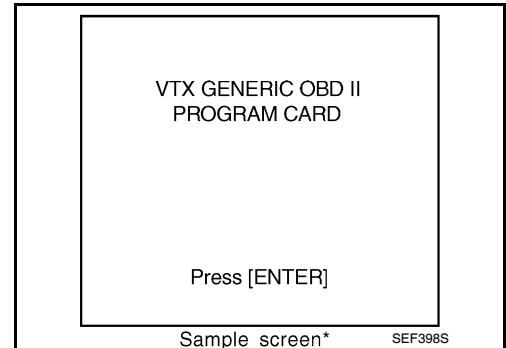
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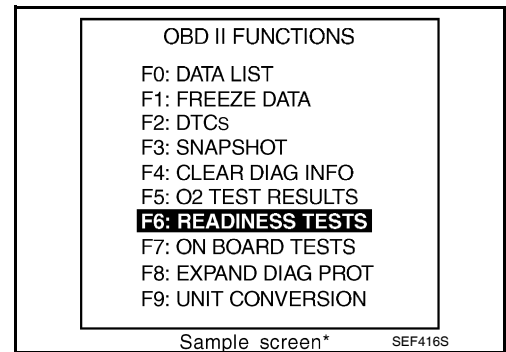
2. Connect GST to data link connector (1).
 - Accelerator pedal (2)



3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.
(*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic service according to each service procedure.
For further information, see the GST Operation Manual of the tool maker.



CONSULT-III Reference Value in Data Monitor

INFOID:000000006579759

Remarks:

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

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

i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition	Specification
ENG SPEED	• Run engine and compare CONSULT-III value with the tachometer indication.	Almost the same speed as the tachometer indication.
MAS A/F SE-B1	See EC-145 .	
B/FUEL SCHDL	See EC-145 .	
A/F ALPHA-B1	See EC-145 .	
COOLAN 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

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Monitor Item	Condition		Specification
HO2S2 (B1)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)			LEAN ↔ RICH
VHCL SPEED SE	<ul style="list-style-type: none"> • Turn drive wheels and compare CONSULT-III value with the speedometer indication. 		Almost the same speed as the speedometer indication.
BATTERY VOLT	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) 		11 - 14 V
ACCEL SEN 1	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) 	Accelerator pedal: Fully released	0.6 - 0.9 V
ACCEL SEN 2*		Accelerator pedal: Fully depressed	4.0 - 4.8 V
EVAP SYS PRES	<ul style="list-style-type: none"> • Ignition switch: ON 		Approx. 1.8 - 4.8 V
TP SEN 1-B1	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T) 	Accelerator pedal: Fully released	More than 0.36 V
TP SEN 2-B1*		Accelerator pedal: Fully depressed	Less than 4.75 V
START SIGNAL	<ul style="list-style-type: none"> • Ignition switch: ON → START → ON 		OFF → ON → OFF
CLSD THL POS	<ul style="list-style-type: none"> • Ignition switch: ON 	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF
AIR COND SIG	<ul style="list-style-type: none"> • Engine: After warming up, idle the engine 	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	<ul style="list-style-type: none"> • Ignition switch: ON 	Shift lever: P or N (CVT), Neutral (M/T)	ON
		Shift lever: Except above	OFF
PW/ST SIGNAL	<ul style="list-style-type: none"> • Engine: After warming up, idle the engine 	Steering wheel: Not being turned	OFF
		Steering wheel: Being turned	ON
LOAD SIGNAL	<ul style="list-style-type: none"> • Ignition switch: ON 	Rear window defogger switch: ON and/or Lighting switch: 2nd	ON
		Rear window defogger switch and lighting switch: OFF	OFF
IGNITION SW	<ul style="list-style-type: none"> • Ignition switch: ON → OFF → ON 		ON → OFF → ON
HEATER FAN SW	<ul style="list-style-type: none"> • Ignition switch: ON 	Heater fan: Operating	ON
		Heater fan: Not operating	OFF
BRAKE SW	<ul style="list-style-type: none"> • Ignition switch: ON 	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	<ul style="list-style-type: none"> • Engine: After warming up • Air conditioner switch: OFF • Shift lever: P or N (CVT), Neutral (M/T) • No load 	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	<ul style="list-style-type: none"> • Engine: After warming up • Air conditioner switch: OFF • Shift lever: P or N (CVT), Neutral (M/T) • No load 	Idle	1° - 11° BTDC
		2,000 rpm	25° - 45° BTDC
CAL/LD VALUE	<ul style="list-style-type: none"> • Engine: After warming up • Air conditioner switch: OFF • Shift lever: P or N (CVT), Neutral (M/T) • No load 	Idle	10% - 35%
		2,500 rpm	10% - 35%

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[MR20DE (FOR CALIFORNIA)]

Monitor Item	Condition		Specification
MASS AIRFLOW	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: P or N (CVT), Neutral (M/T) No load 	Idle	1.0 - 4.0 g/s
		2,500 rpm	2.0 - 10.0 g/s
PURG VOL C/V	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: P or N (CVT), Neutral (M/T) No load 	Idle (Accelerator pedal is not depressed even slightly, after engine starting)	0%
		2,000 rpm	0 - 50%
INT/V TIM (B1)	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: P or N (CVT), Neutral (M/T) No load 	Idle	-5° - 5°C
		When revving engine up to 2,000 rpm quickly	Approx. 0° - 40°C
INT/V SOL (B1)	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: P or N (CVT), Neutral (M/T) No load 	Idle	0% - 2%
		When revving engine up to 2,000 rpm quickly	Approx. 0% - 90%
AIR COND RLY	<ul style="list-style-type: none"> Engine: After warming up, idle the engine 	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
FUEL PUMP RLY	<ul style="list-style-type: none"> For 1 second after turning ignition switch ON Engine running or cranking 		ON
		<ul style="list-style-type: none"> Except above conditions 	OFF
VENT CONT/V	<ul style="list-style-type: none"> Ignition switch: ON 		OFF
THRTL RELAY	<ul style="list-style-type: none"> Ignition switch: ON 		ON
COOLING FAN	<ul style="list-style-type: none"> Engine: After warming up, idle the engine Air conditioner switch: OFF 	Engine coolant temperature: 97°C (207°F) or less	OFF
		Engine coolant temperature: Between 98°C (208°F) and 99°C (210°F)	LOW
		Engine coolant temperature: Between 100°C (212°F) and 104°C (219°F)	MIDDLE
		Engine coolant temperature: 105°C (221°F) or more	HIGH
HO2S2 HTR (B1)	<ul style="list-style-type: none"> Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		ON
		<ul style="list-style-type: none"> Engine speed: Above 3,600 rpm 	OFF
I/P PULLY SPD	<ul style="list-style-type: none"> Vehicle speed: More than 20 km/h (12 MPH) 		Almost the same speed as the tachometer indication
VEHICLE SPEED	<ul style="list-style-type: none"> Turn drive wheels and compare CONSULT-III value with the speedometer indication. 		Almost the same speed as the speedometer indication
TRVL AFTER MIL	<ul style="list-style-type: none"> Ignition switch: ON 	Vehicle has traveled after MIL has turned ON.	0 - 65,535 km (0 - 40,723 mile)
A/F S1 HTR (B1)	<ul style="list-style-type: none"> Engine: After warming up, idle the engine (More than 140 seconds after starting engine) 		4 - 100%
AC PRESS SEN	<ul style="list-style-type: none"> Engine: Idle Air conditioner switch: ON (Compressor operates) 		1.0 - 4.0 V
VHCL SPEED SE	<ul style="list-style-type: none"> Turn drive wheels and compare speedometer indication with the CONSULT-III value. 		Almost the same speed as the speedometer indication

TROUBLE DIAGNOSIS

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Monitor Item	Condition	Specification
SET VHCL SPD	• Engine: Running	ASCD: Operating The preset vehicle speed is displayed.
MAIN SW	• Ignition switch: ON	MAIN switch: Pressed ON
		MAIN switch: Released OFF
CANCEL SW	• Ignition switch: ON	CANCEL switch: Pressed ON
		CANCEL switch: Released OFF
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: Pressed ON
		RESUME/ACCELERATE switch: Released OFF
SET SW	• Ignition switch: ON	SET/COAST switch: Pressed ON
		SET/COAST switch: Released OFF
BRAKE SW1	• Ignition switch: ON	• Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T) ON
		• Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T) OFF
BRAKE SW2	• Ignition switch: ON	Brake pedal: Fully released OFF
		Brake pedal: Slightly depressed ON
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at the 1st time → at the 2nd time ON → OFF
SET LAMP	• MAIN switch: ON • Vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating ON
		ASCD: Not operating OFF
A/F ADJ-B1	• Engine: Running	-0.330 – 0.330
SWRL CONT S/V	• Engine coolant temperature: Between 5°C (41°F) and 45°C (113°F) • Engine speed: Less than 3,200 rpm	Accelerator pedal: Fully released ON
		Accelerator pedal: Slightly depressed OFF
TUMBLE POS SEN	• Engine coolant temperature: Between 5°C (41°F) and 45°C (113°F) • Engine speed: Less than 3,200 rpm	Accelerator pedal: Fully released Less than 1.2 V
		Accelerator pedal: Slightly depressed More than 2.9 V
ENG OIL TEMP	• Engine: After warming up	More than 70°C (158°F)
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed response) is incomplete. INCMP	
	DTC P0139 self-diagnosis (delayed response) is complete. CMLPT	
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow response) is incomplete. INCMP	
	DTC P0139 self-diagnosis (slow response) is complete. CMLPT	
A/F SEN1 DIAG1 (B1)	DTC P015A and P015B self-diagnosis is incomplete. INCMP	
	DTC P015A and P015B self-diagnosis is complete. CMLPT	
A/F SEN1 DIAG2 (B1)	DTC P014C and P014D self-diagnosis is incomplete. INCMP	
	DTC P014C and P014D self-diagnosis is complete. CMLPT	
A/F SEN1 DIAG3 (B1)	The vehicle condition is not within the diagnosis range of DTC P014C, P014D, P015A or P015B. ABSNT	
	The vehicle condition is within the diagnosis range of DTC P014C, P014D, P015A or P015B. PRSNT	
THRTL STK CNT B1	NOTE: The item is indicated, but not used.	—

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*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

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[MR20DE (FOR CALIFORNIA)]

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

INFOID:000000006579760

The specification (SP) value indicates the tolerance of the value that is displayed in "SPEC" of "DATA MONITOR" mode with CONSULT-III during normal operation of the Engine Control System. When the value in "SPEC" of "DATA MONITOR" mode is within the SP value, the Engine Control System is confirmed OK. When the value in "SPEC" of "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 light the MIL.

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

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

Testing Condition

INFOID:000000006579761

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm², 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
 - CVT models: After the engine is warmed up to normal operating temperature, drive vehicle until "ATF TEMP SEN" (fluid temperature sensor signal) indicates less than 0.9V.
 - M/T models: After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
- Electrical load: Not applied
 - Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.
- Engine speed: Idle

Inspection Procedure

INFOID:000000006579762

NOTE:

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

1. Perform [EC-92, "Basic Inspection"](#).
2. Confirm that the testing conditions indicated above are met.
3. Select "B/FUEL SCHDL", "A/F ALPHA-B1" and "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode with CONSULT-III.
4. Make sure that monitor items are within the SP value.
5. If NG, go to [EC-145, "Diagnosis Procedure"](#).

Diagnosis Procedure

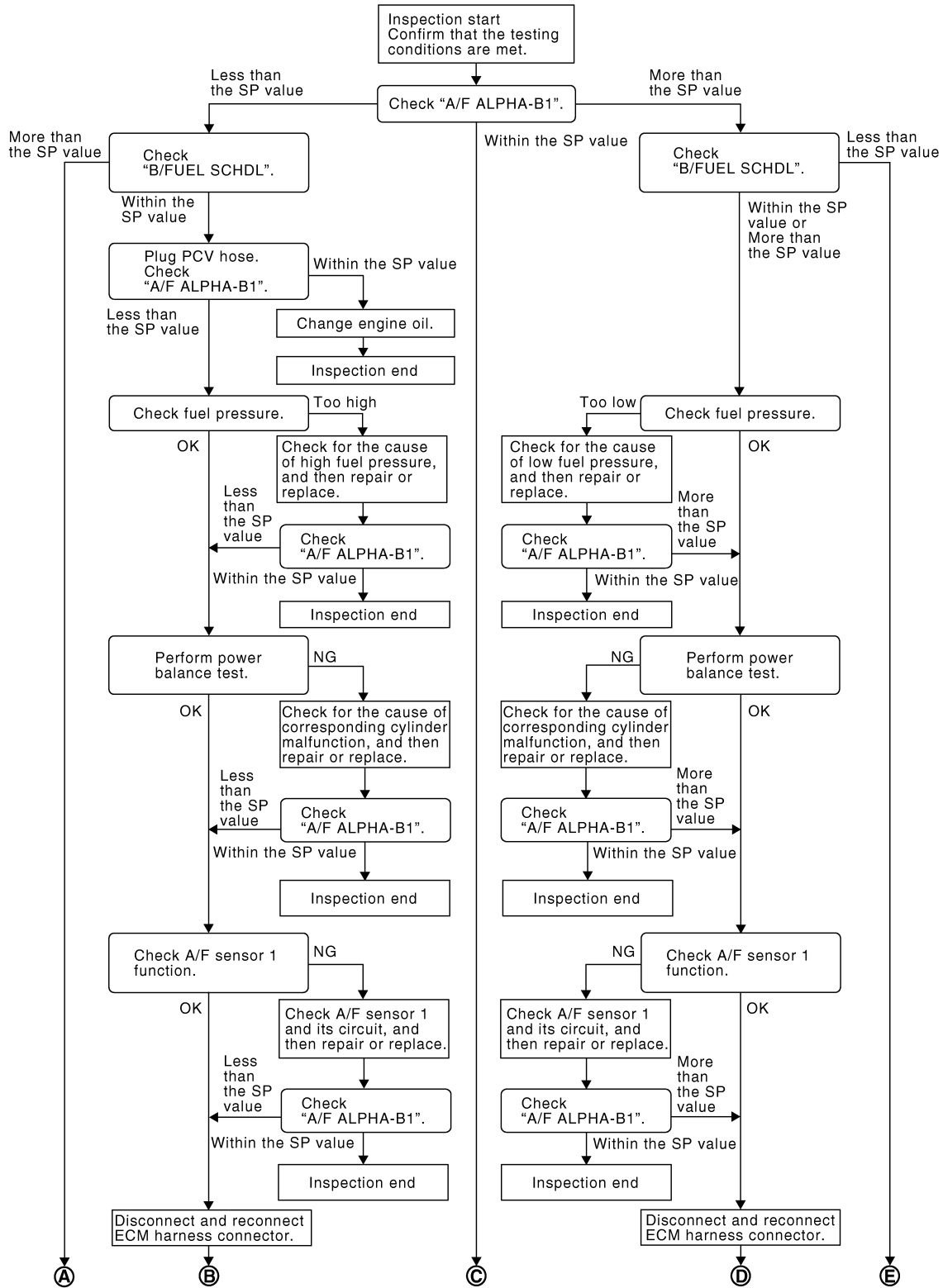
INFOID:000000006579763

OVERALL SEQUENCE

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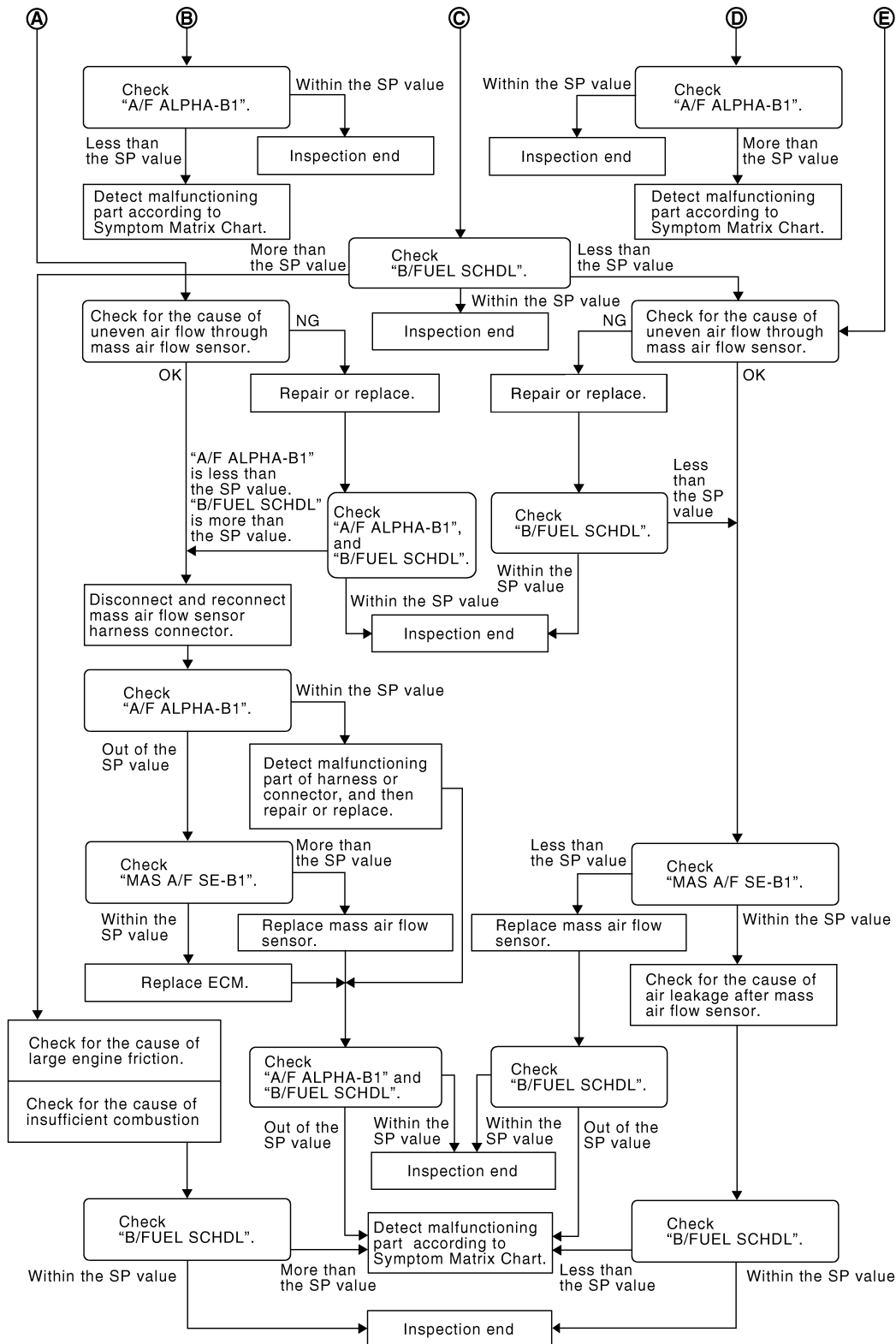


PBIB2318E

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

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PBIB3213E

DETAILED PROCEDURE

1. CHECK "A/F ALPHA-B1"

1. Start engine.
2. Confirm that the testing conditions are met. Refer to [EC-145, "Testing Condition"](#).
3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

NOTE:

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

OK or NG

- OK >> GO TO 17.
NG (Less than the SP value)>>GO TO 2.
NG (More than the SP value)>>GO TO 3.

2.CHECK "B/FUEL SCHDL"

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

OK or NG

- OK >> GO TO 4.
NG (More than the SP value)>>GO TO 19.

3.CHECK "B/FUEL SCHDL"

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

OK or NG

- OK >> GO TO 6.
NG (More than the SP value)>>GO TO 6.
NG (Less than the SP value)>>GO TO 25.

4.CHECK "A/F ALPHA-B1"

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

OK or NG

- OK >> GO TO 5.
NG >> GO TO 6.

5.CHANGE ENGINE OIL

1. Stop the engine.
2. Change engine oil. Refer to [LU-7, "Changing 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 condition.

>> **INSPECTION END**

6.CHECK FUEL PRESSURE

Check fuel pressure. (Refer to [EC-100, "Fuel Pressure Check"](#).)

OK or NG

- OK >> GO TO 9.
NG (Fuel pressure is too high)>>Replace fuel pressure regulator, refer to [EC-100, "Fuel Pressure Check"](#).
GO TO 8.
NG (Fuel pressure is too low)>>GO TO 7.

7.DETECT MALFUNCTIONING PART

1. Check the following.
 - Clogged and bent fuel hose and fuel tube
 - Clogged fuel filter
 - Fuel pump and its circuit (Refer to [EC-549](#).)
2. If NG, repair or replace the malfunctioning part. (Refer to [EC-100, "Fuel Pressure Check"](#).)
If OK, replace fuel pressure regulator. Refer to [EC-100, "Fuel Pressure Check"](#).

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

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>> GO TO 8.

8. CHECK "A/F ALPHA-B1"

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

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 9.

9. PERFORM POWER BALANCE TEST

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Make sure that the each cylinder produces a momentary engine speed drop.

OK or NG

- OK >> GO TO 12.
NG >> GO TO 10.

10. DETECT MALFUNCTIONING PART

1. Check the following.
 - Ignition coil and its circuit (Refer to [EC-554.](#))
 - Fuel injector and its circuit (Refer to [EC-544.](#))
 - Intake air leakage
 - Low compression pressure (Refer to [EM-65. "On-Vehicle Service".](#))
2. If NG, repair or replace the malfunctioning part.
If OK, replace fuel injector. (It may be caused by leakage from fuel injector or clogging.) Refer to [EM-36. "Removal and Installation".](#)

>> GO TO 11.

11. CHECK "A/F ALPHA-B1"

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

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 12.

12. CHECK A/F SENSOR 1 FUNCTION

Perform all DTC Confirmation Procedure related with A/F sensor 1.

- For DTC P0130, refer to [EC-224. "DTC Confirmation Procedure".](#)
- For DTC P0131, refer to [EC-229. "DTC Confirmation Procedure".](#)
- For DTC P0132, refer to [EC-234. "DTC Confirmation Procedure".](#)
- For DTC P014C, P014D, P015A, P015B, refer to [EC-265. "DTC Confirmation Procedure".](#)
- For DTC P2A00, refer to [EC-524. "DTC Confirmation Procedure".](#)

OK or NG

- OK >> GO TO 15.
NG >> GO TO 13.

13. CHECK A/F SENSOR 1 CIRCUIT

Perform Diagnostic Procedure according to corresponding DTC.

>> GO TO 14.

14. CHECK "A/F ALPHA-B1"

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

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

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OK or NG

OK >> **INSPECTION END**
NG >> GO TO 15.

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"

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

OK or NG

OK >> **INSPECTION END**
NG >> Detect malfunctioning part according to [EC-110, "Symptom Matrix Chart"](#).

17. CHECK "B/FUEL SCHDL"

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

OK or NG

OK >> **INSPECTION END**
NG (More than the SP value) >> GO TO 18.
NG (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 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

OK or NG

OK >> GO TO 21.
NG >> Repair or replace malfunctioning part, and then GO TO 20.

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

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

OK or NG

OK >> **INSPECTION END**
NG ("B/FUEL SCHDL" is more, "A/F ALPHA-B1" is less than the SP value) >> GO TO 21.

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

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1. Stop the engine.
2. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for damage and then reconnect it again.

>> GO TO 22.

22.CHECK "A/F ALPHA-B1"

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

OK or NG

- OK >> 1. Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to [EC-185](#).
2. GO TO 29.
- NG >> GO TO 23.

23.CHECK "MAS A/F SE-B1"

Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

OK or NG

- OK >> GO TO 24.
- NG (More than the SP value)>>Replace mass air flow sensor (refer to [EM-23](#)), and then GO TO 29.

24.REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS(NATS) system and registration of all NVIS(NATS) ignition key IDs. Refer to [BL-171, "ECM Re-communicating Function"](#).
3. Perform [EC-98, "VIN Registration"](#).
4. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-99, "Idle Air Volume Learning"](#).

>> GO TO 29.

25.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

OK or NG

- OK >> GO TO 27.
- NG >> Repair or replace malfunctioning part, and then GO TO 26.

26.CHECK "B/FUEL SCHDL"

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

OK or NG

- OK >> **INSPECTION END**
- NG (Less than the SP value)>>GO TO 27.

27.CHECK "MAS A/F SE-B1"

Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

OK or NG

- OK >> GO TO 28.
- NG (Less than the SP value)>>Replace mass air flow sensor (refer to [EM-23](#)), and then GO TO 30.

28.CHECK INTAKE SYSTEM

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

>> GO TO 30.

29. CHECK "A/F ALPHA-B1" AND "B/FUEL SCHDL"

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

OK or NG

OK >> **INSPECTION END**

NG >> Detect malfunctioning part according to [EC-110. "Symptom Matrix Chart"](#).

30. CHECK "B/FUEL SCHDL"

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

OK or NG

OK >> **INSPECTION END**

NG >> Detect malfunctioning part according to [EC-110. "Symptom Matrix Chart"](#).

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

Description

INFOID:000000006579764

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

Common Intermittent Incidents Report Situations

STEP in Work Flow	Situation
2	The CONSULT-III is used. The SELF-DIAG RESULTS screen shows time data other than 0 or [1t].
3 or 4	The symptom described by the customer does not recur.
5	(1st trip) DTC does not appear during the DTC Confirmation Procedure.
10	The Diagnostic Procedure for PXXXX does not indicate the malfunctioning area.

Diagnosis Procedure

INFOID:000000006579765

1.INSPECTION START

Erase (1st trip) DTCs.

Refer to [EC-59, "Emission-related Diagnostic Information"](#).

>> GO TO 2.

2.CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.

Refer to [EC-158, "Ground Inspection"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3.SEARCH FOR ELECTRICAL INCIDENT

Perform [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "INCIDENT SIMULATION TESTS".

OK or NG

OK >> GO TO 4.

NG >> Repair or replace.

4.CHECK CONNECTOR TERMINALS

Refer to [GI-23, "How to Check Terminal"](#), "HOW TO PROBE CONNECTORS", "How to Check Enlarged Contact Spring of Terminal".

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace connector.

POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

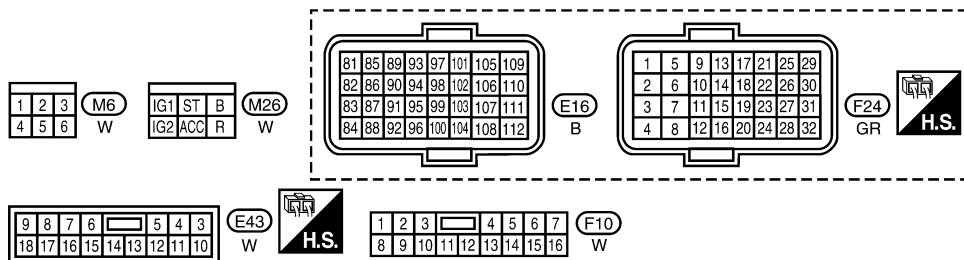
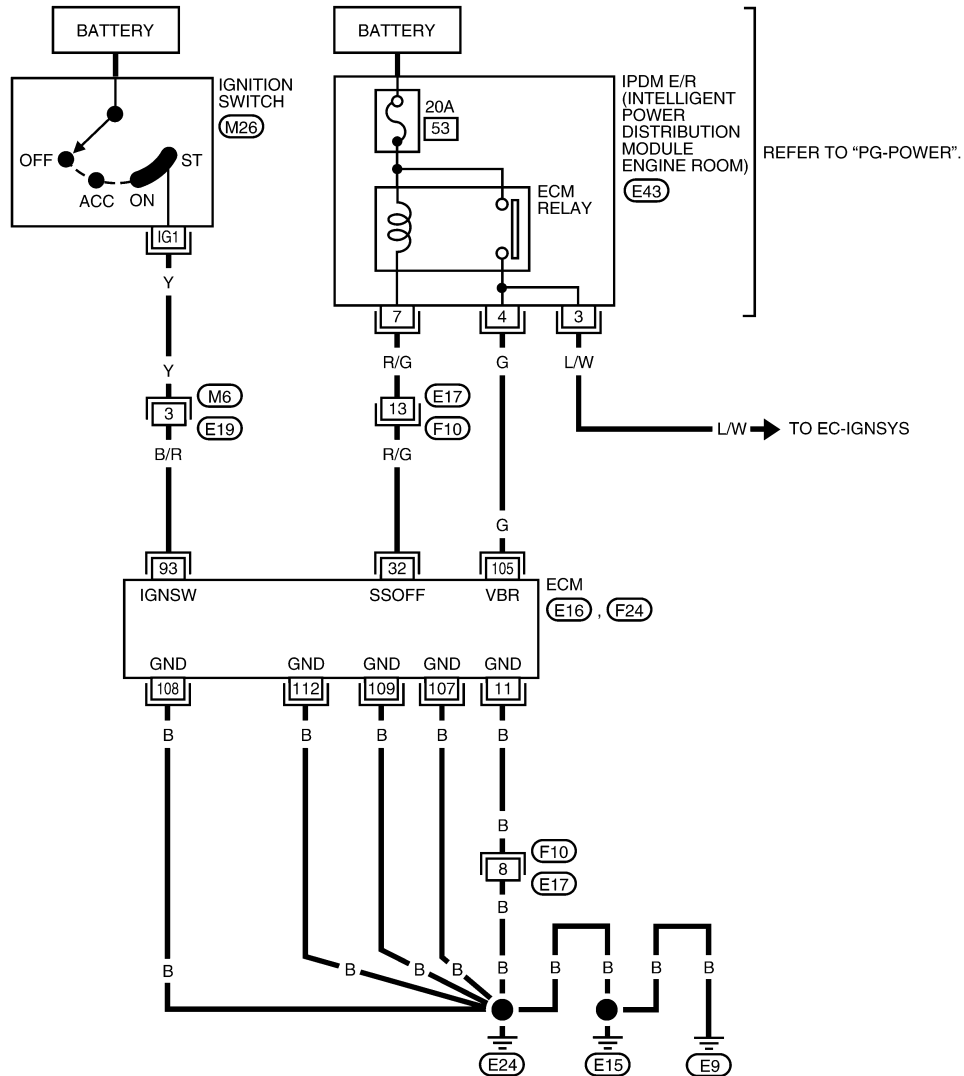
POWER SUPPLY AND GROUND CIRCUIT

Wiring Diagram

INFOID:000000006579766

EC-MAIN-01

— : DETECTABLE LINE FOR DTC
 - - : NON-DETECTABLE LINE FOR DTC



ABBWA0652GB

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

CAUTION:

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

POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
11	B	ECM ground	[Engine is running] • Idle speed	Body ground
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
93	B/R	Ignition switch	[Ignition switch: OFF]	0 V
			[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
107 108 109 112	B B B B	ECM ground	[Engine is running] • Idle speed	Body ground

Diagnosis Procedure

INFOID:000000006579767

1. INSPECTION START

Start engine.

Is engine running?

Yes or No

Yes >> GO TO 8.

No >> GO TO 2.

2. CHECK ECM POWER SUPPLY CIRCUIT-I

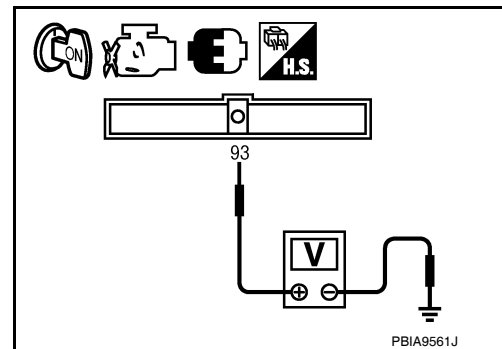
- Turn ignition switch OFF and then ON.
- Check voltage between ECM terminal 93 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 4.

NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M6, E19
- Harness for open or short between ECM and ignition switch

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

4. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.

POWER SUPPLY AND GROUND CIRCUIT

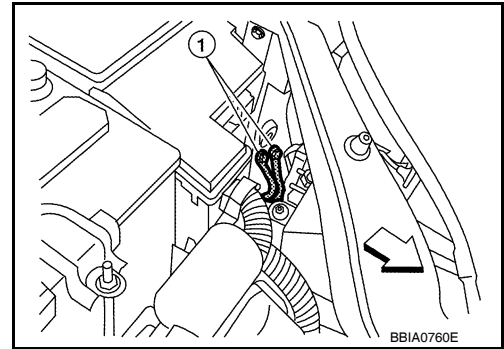
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace ground connections.



5. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

- Disconnect ECM harness connector.
- Check harness continuity between ECM terminals 11, 107, 108, 109, 112 and ground.
Refer to Wiring Diagram.

Continuity should exist.

- Also check harness for short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F10, E17
- Harness for open or short between ECM and ground

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

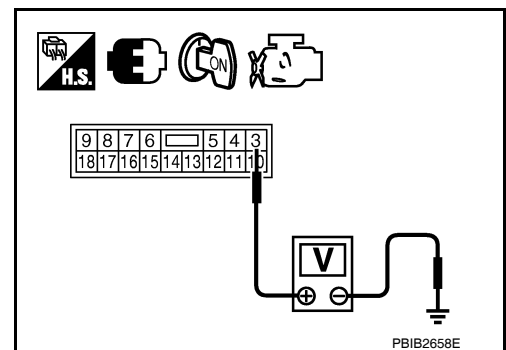
7. CHECK ECM POWER SUPPLY CIRCUIT-II

- Reconnect ECM harness connector.
- Turn ignition switch ON.
- Check voltage between IPDM E/R terminal 3 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> Go to [EC-554](#).
- NG >> GO TO 8.



8. CHECK ECM POWER SUPPLY CIRCUIT-III

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

POWER SUPPLY AND GROUND CIRCUIT

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Check voltage between ECM terminal 105 and ground with CONSULT-III or tester.

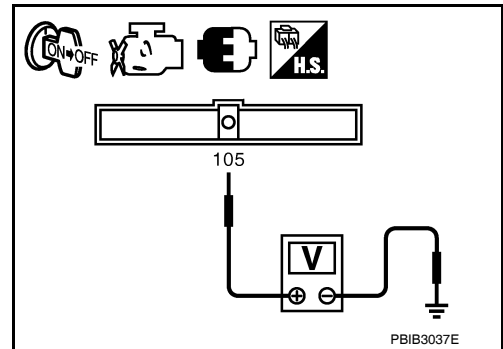
Voltage: After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0 V.

OK or NG

OK >> GO TO 14.

NG (Battery voltage does not exist.)>>GO TO 9.

NG (Battery voltage exists for more than a few seconds.)>>GO TO 11.



9. CHECK ECM POWER SUPPLY CIRCUIT-IV

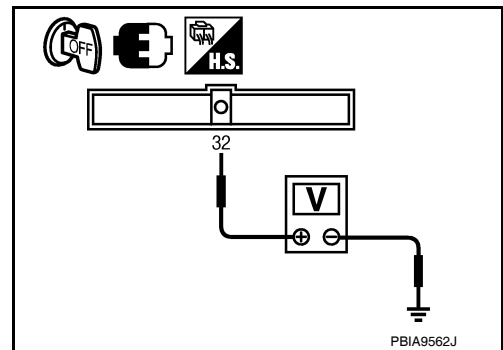
1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check voltage between ECM terminal 32 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 10.

NG >> GO TO 11.



10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between ECM terminal 105 and IPDM E/R terminal 4. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 17.

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

11. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between ECM terminal 32 and IPDM E/R terminal 7. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E7, F10
- Harness for open or short between ECM and IPDM E/R

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

POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

13. CHECK 20 A FUSE

1. Disconnect 20 A fuse from IPDM E/R.
2. Check 20 A fuse.

OK or NG

- OK >> GO TO 17.
NG >> Replace 20 A fuse.

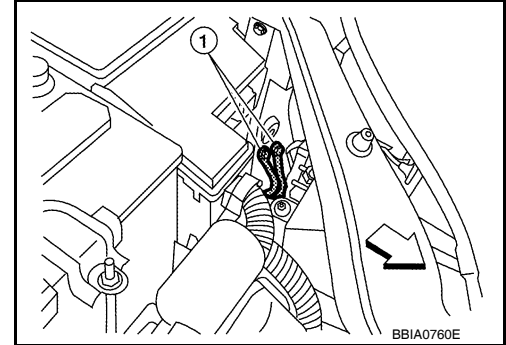
14. CHECK GROUND CONNECTIONS

Loosen and retighten ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).

- ↶ : Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 15.
NG >> Repair or replace ground connections.



15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 10, 11, 108 and ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 17.
NG >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F10, E17
- Harness for open or short between ECM and ground

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

17. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-28](#).
NG >> Repair open circuit or short to power in harness or connectors.

Ground Inspection

INFOID:000000006579768

Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.

Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.

When inspecting a ground connection follow these rules:

- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.
- Clean as required to assure good contact.

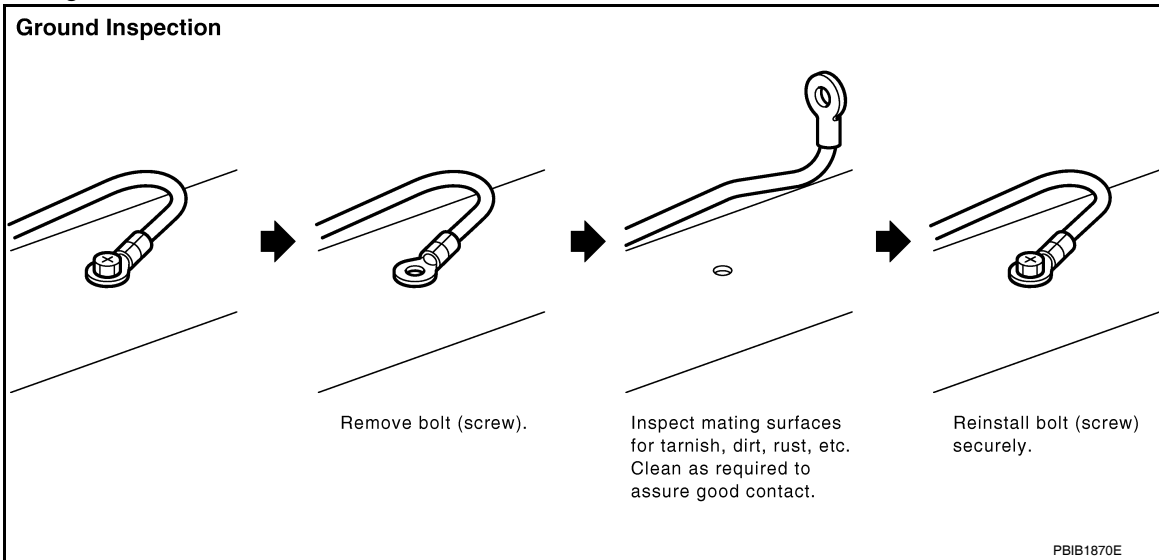
POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

- Reinstall bolt or screw securely.
- Inspect for “add-on” accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Make sure all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet make sure no ground wires have excess wire insulation.

For detailed ground distribution information, refer to [PG-30. "Ground Distribution"](#).



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DTC U0101 CAN COMMUNICATION LINE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC U0101 CAN COMMUNICATION LINE

Description

INFOID:000000006579769

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.

On Board Diagnosis Logic

INFOID:000000006579770

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0101 0101	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 style="list-style-type: none">• CAN communication line between TCM and ECM• CAN communication line is open or shorted.

DTC Confirmation Procedure

INFOID:000000006579771

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-161. "Diagnosis Procedure"](#).

DTC U0101 CAN COMMUNICATION LINE




< SERVICE INFORMATION >

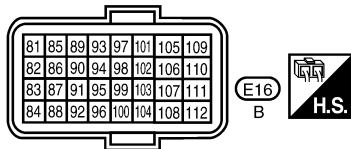
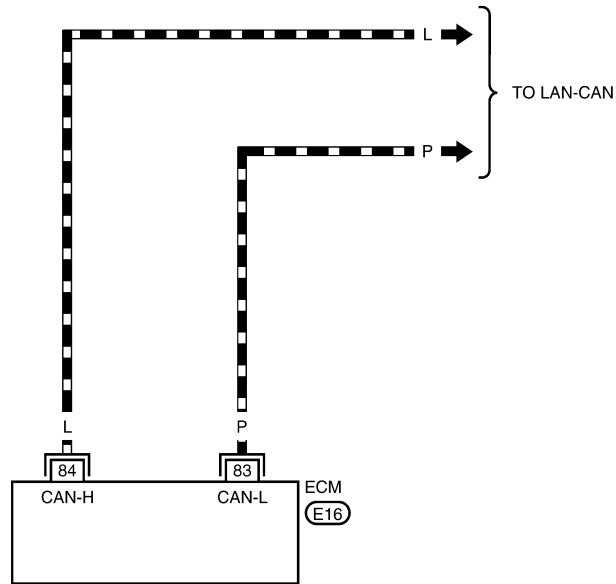
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006579772

EC-CAN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BBWA2870E

Diagnosis Procedure

INFOID:000000006579773

Go to [LAN-16, "Trouble Diagnosis Flow Chart"](#).

DTC U0140 CAN COMMUNICATION LINE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC U0140 CAN COMMUNICATION LINE

Description

INFOID:000000006579774

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.

On Board Diagnosis Logic

INFOID:000000006579775

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0140 0140	Lost communication with BCM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) with BCM for 2 seconds or more.	<ul style="list-style-type: none">• CAN communication line between BCM and ECM• CAN communication line is open or shorted.

DTC Confirmation Procedure

INFOID:000000006579776

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-163. "Diagnosis Procedure"](#).

DTC U0140 CAN COMMUNICATION LINE

< SERVICE INFORMATION >

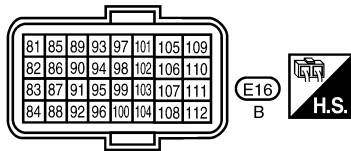
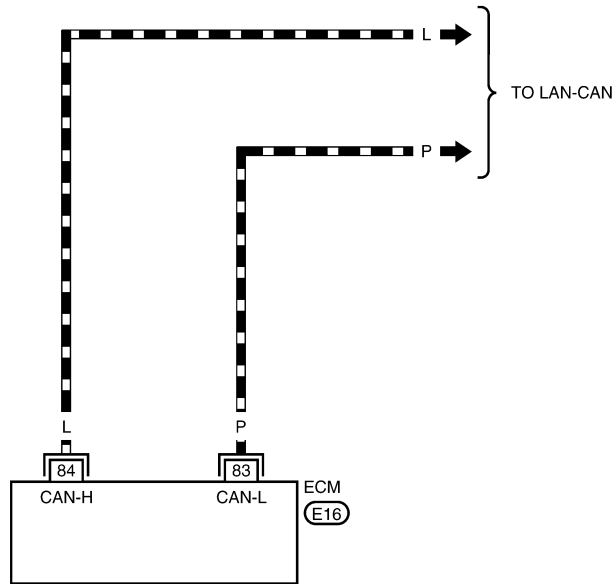
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006579777

EC-CAN-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ▬ : DATA LINE



BBWA2870E

Diagnosis Procedure

INFOID:000000006579778

Go to [LAN-16, "Trouble Diagnosis Flow Chart"](#).

DTC U1001 CAN COMMUNICATION LINE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC U1001 CAN COMMUNICATION LINE

Description

INFOID:000000006579779

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.

On Board Diagnosis Logic

INFOID:000000006579780

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1001 1001	CAN communication line	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission-related diagnosis) for 2 seconds or more.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted.)

DTC Confirmation Procedure

INFOID:000000006579781

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-165. "Diagnosis Procedure"](#).

DTC U1001 CAN COMMUNICATION LINE




< SERVICE INFORMATION >

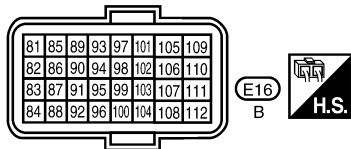
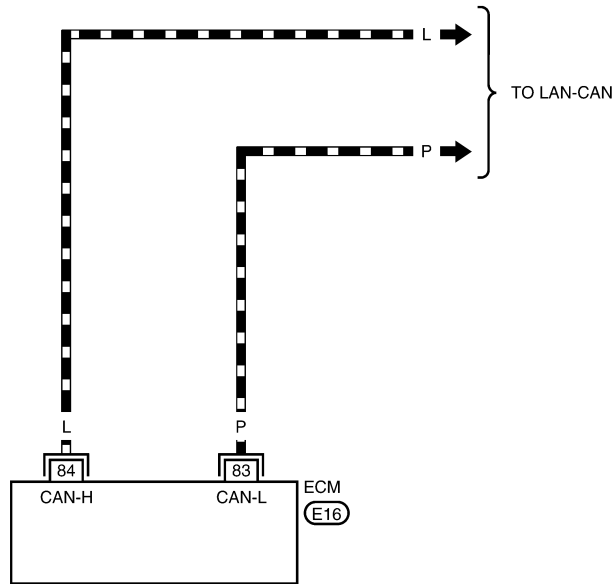
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006579782

EC-CAN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BBWA2870E

Diagnosis Procedure

INFOID:000000006579783

Go to [LAN-16, "Trouble Diagnosis Flow Chart"](#).

DTC P0011 IVT CONTROL

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0011 IVT CONTROL

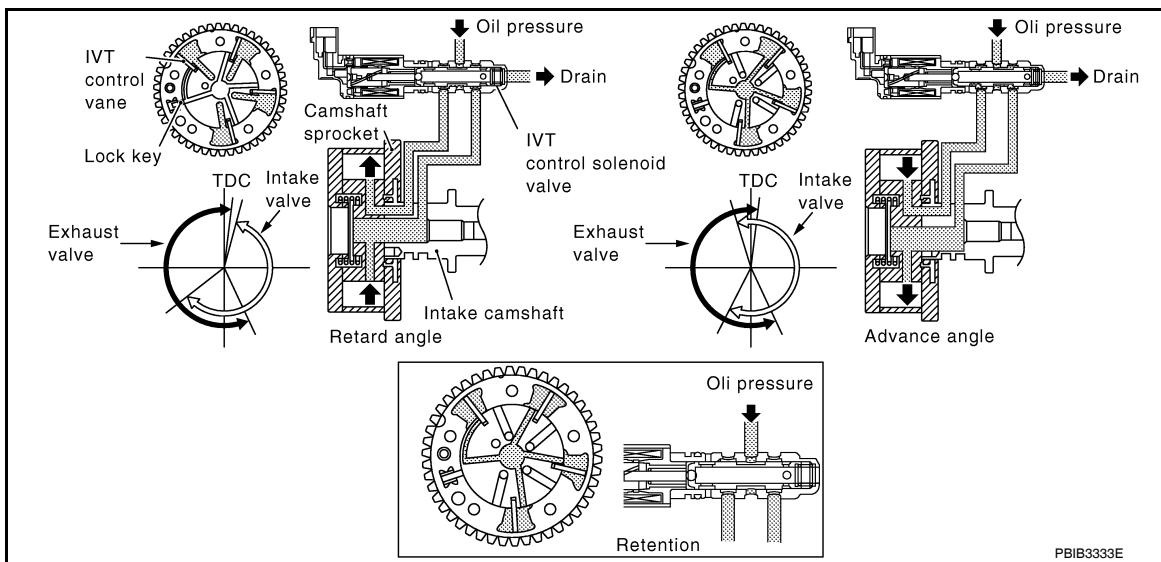
Description

INFOID:000000006579784

SYSTEM DESCRIPTION

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

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



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 control solenoid 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.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579785

Specification data are reference values.

Monitor item	Condition	Specification
INT/V TIM (B1)	Idle	-5° - 5°CA
	When revving engine up to 2,000 rpm quickly	Approx. 0° - 40°CA
INT/V SOL (B1)	Idle	0% - 2%
	When revving engine up to 2,000 rpm quickly	Approx. 0% - 90%

DTC P0011 IVT CONTROL

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

On Board Diagnosis Logic

INFOID:000000006579786

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011 0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	<ul style="list-style-type: none"> • Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Intake valve timing control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control

FAIL-SAFE MODE

ECM enters in fail-safe mode when the malfunction is detected.

Detected items	Engine operating condition in fail-safe mode
Intake valve timing control	The signal is not energized to the solenoid valve and the valve control does not function

DTC Confirmation Procedure

INFOID:000000006579787

CAUTION:

Always drive at a safe speed.

NOTE:

- If DTC P0011 is displayed with DTC P0075, first perform trouble diagnosis for DTC P0075. See [EC-181](#).
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10 V and 16 V at idle.

Ⓟ WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 10 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 4.25 msec
Shift lever	P or N position (CVT) Neutral position (M/T)

4. Let engine idle for 10 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-168. "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to next step.
7. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	1,200 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 65°C (149°F)
Shift lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

8. Check 1st trip DTC.

DTC P0011 IVT CONTROL

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

9. If 1st trip DTC is detected, go to [EC-168. "Diagnosis Procedure"](#).

 WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

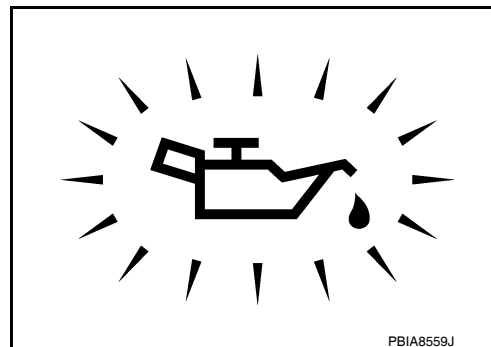
INFOID:000000006579788

1. CHECK OIL PRESSURE WARNING LAMP

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

OK or NG

- OK >> GO TO 2.
NG >> Go to [LU-6. "Inspection"](#).



2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-169. "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
NG >> Replace intake valve timing control solenoid valve. Refer to [EM-40](#).

3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-320. "Component Inspection"](#).

OK or NG

- OK >> GO TO 4.
NG >> Replace crankshaft position sensor (POS). Refer to [EM-80](#).

4. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-325. "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace camshaft position sensor (PHASE). Refer to [EM-50](#).

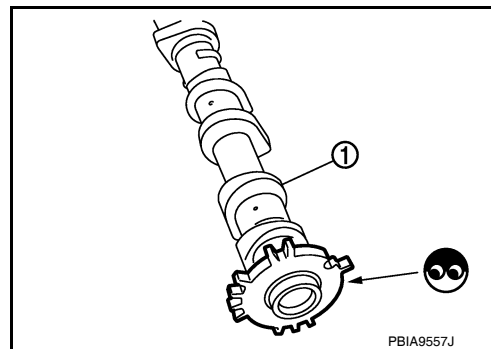
5. CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

OK or NG

- OK >> GO TO 6.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to [EM-50](#).



6. CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misaligned.

Are there any service records that may cause timing chain misaligned?

Yes or No

- Yes >> Check timing chain installation. Refer to [EM-40. "Component"](#).
No >> GO TO 7.

< SERVICE INFORMATION >

7. CHECK LUBRICATION CIRCUIT

Refer to [LU-5. "Lubrication Circuit"](#).

OK or NG

OK >> GO TO 8.

NG >> Clean lubrication line.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

For Wiring Diagram, refer to [EC-316. "Wiring Diagram"](#) for CKP sensor (POS) and [EC-322. "Wiring Diagram"](#) for CMP sensor (PHASE).

>> INSPECTION END

Component Inspection

INFOID:000000006579789

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve as follows.

Terminal	Resistance
1 and 2	6.7 - 7.7Ω [at 20°C (68°F)]
1 or 2 and ground	∞Ω (Continuity should not exist.)

If NG, replace intake valve timing control solenoid valve.

If OK, go to next step. Refer to [EM-40](#).

3. Remove intake valve timing control solenoid valve.
4. Provide 12 V DC between intake valve timing control solenoid valve terminals and then interrupt it. Make sure that the plunger moves as shown in the figure.

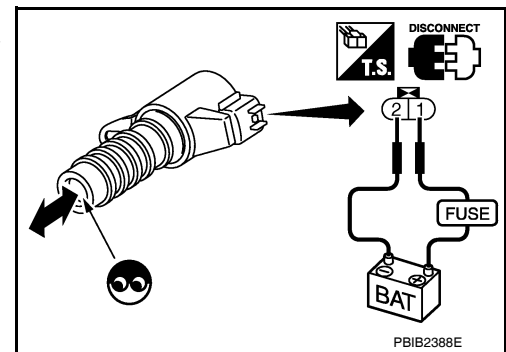
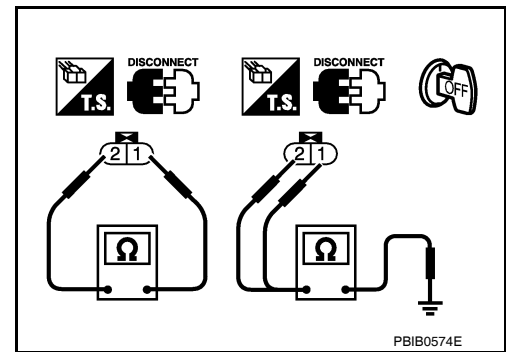
CAUTION:

Do not 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.

If NG, replace intake valve timing control solenoid valve. Refer to [EM-40](#).

NOTE:

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



DTC P0031, P0032 A/F SENSOR 1 HEATER

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0031, P0032 A/F SENSOR 1 HEATER

Description

INFOID:000000006579791

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Air fuel ratio (A/F) sensor 1 heater control	Air fuel ratio (A/F) sensor 1 heater
Mass air flow sensor	Amount of intake air		

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 at the specified range.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579792

Specification data are reference values.

Monitor item	Condition	Specification
A/F S1 HTR (B1)	• Engine: After warming up, idle the engine (More than 140 seconds after starting engine)	4 - 100%

On Board Diagnosis Logic

INFOID:000000006579793

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031 0031	Air fuel ratio (A/F) sensor 1 heater control circuit low	The current amperage in the air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. [An excessively low voltage signal is sent to ECM through the air fuel ratio (A/F) sensor 1 heater.]	• Harness or connectors [Air fuel ratio (A/F) sensor 1 heater circuit is open or shorted.] • Air fuel ratio (A/F) sensor 1 heater
P0032 0032	Air fuel ratio (A/F) sensor 1 heater control circuit high	The current amperage in the air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. [An excessively high voltage signal is sent to ECM through the air fuel ratio (A/F) sensor 1 heater.]	• Harness or connectors [Air fuel ratio (A/F) sensor 1 heater circuit is shorted.] • Air fuel ratio (A/F) sensor 1 heater

DTC Confirmation Procedure

INFOID:000000006579794

NOTE:

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

TESTING CONDITION:

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

1. Start engine and run it for at least 10 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-172, "Diagnosis Procedure"](#).

DTC P0031, P0032 A/F SENSOR 1 HEATER

< SERVICE INFORMATION >

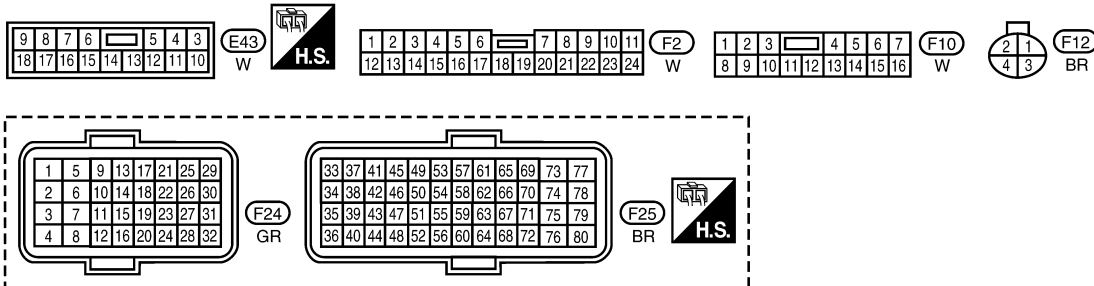
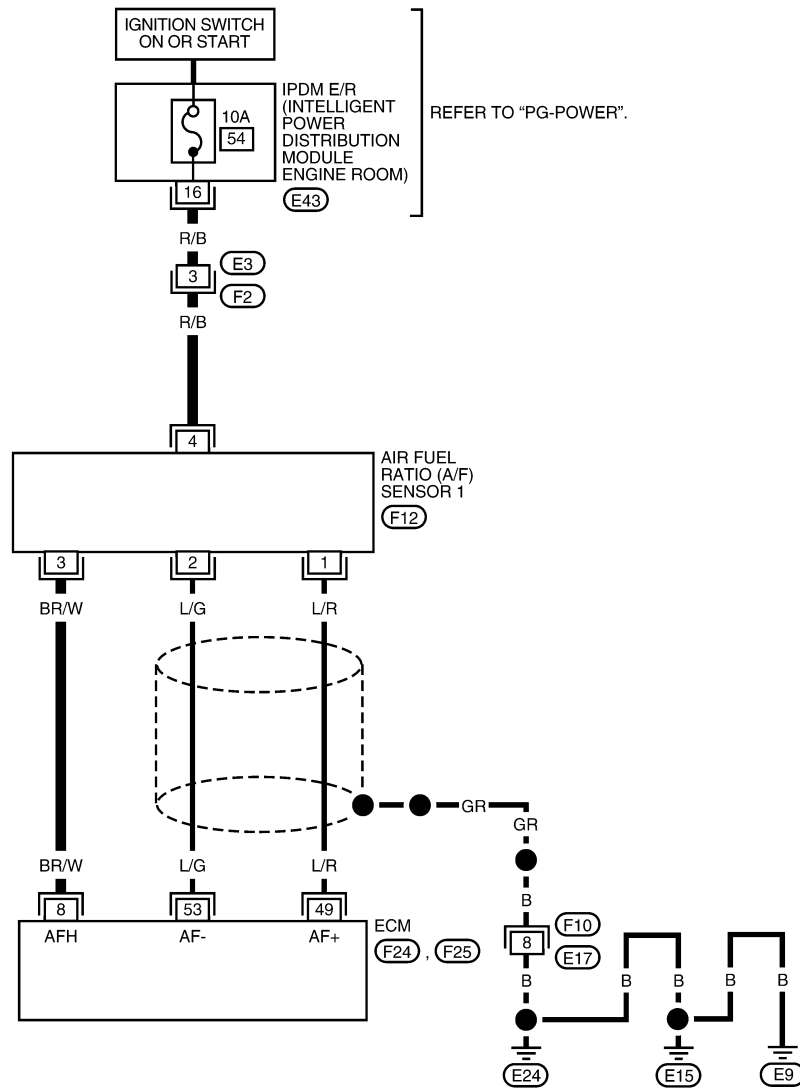
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006579795

Wiring Diagram

EC-A/FH-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0144GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

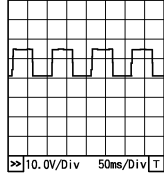
CAUTION:

DTC P0031, P0032 A/F SENSOR 1 HEATER

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBI A8148J
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

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

Diagnosis Procedure

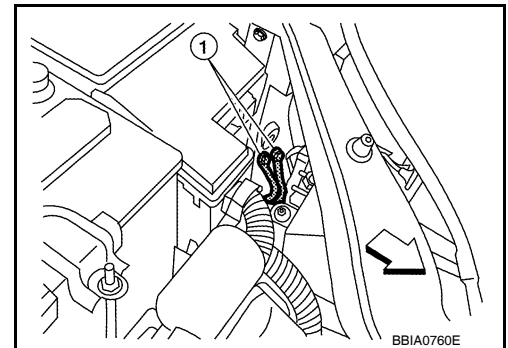
INFOID:000000006579796

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

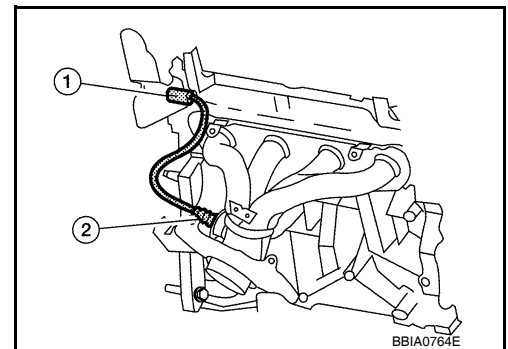
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



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

- Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).
 - Turn ignition switch ON.
- Air fuel ratio (A/F) sensor 1 (2)



DTC P0031, P0032 A/F SENSOR 1 HEATER

[MR20DE (FOR CALIFORNIA)]

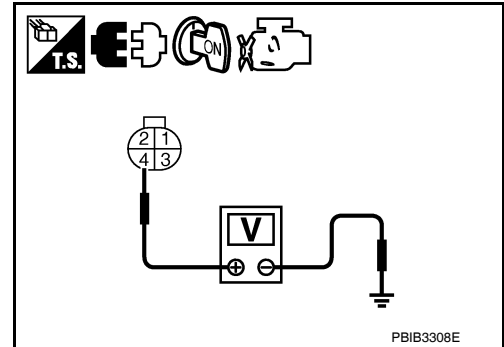
< SERVICE INFORMATION >

3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 HEATER OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 8 and A/F sensor 1 terminal 3. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK A/F SENSOR 1 HEATER

Refer to [EC-173](#). "Component Inspection".

OK or NG

- OK >> GO TO 6.
- NG >> Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

6. CHECK INTERMITTENT INCIDENT

Perform [EC-153](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006579797

AIR FUEL RATIO (A/F) SENSOR 1 HEATER

DTC P0031, P0032 A/F SENSOR 1 HEATER

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

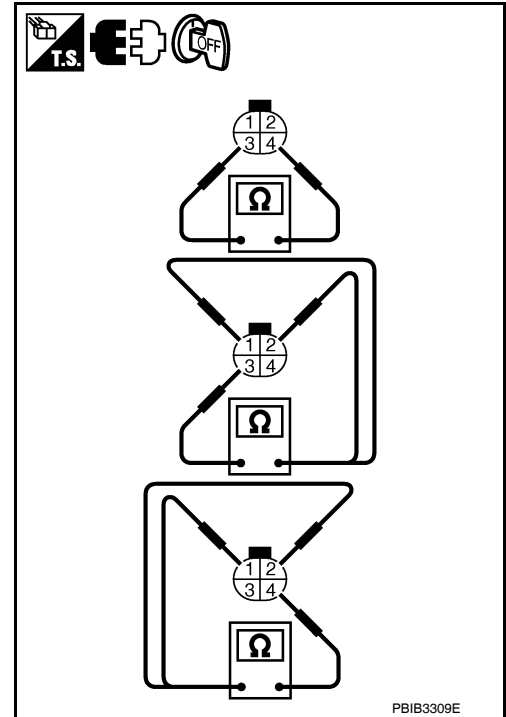
1. Check resistance between A/F sensor 1 terminals as follows.

Terminal No.	Resistance
3 and 4	1.8 - 2.44 Ω [at 25°C (77°F)]
3 and 1, 2	$\infty \Omega$
4 and 1, 2	(Continuity should not exist)

2. If NG, replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

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 Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



DTC P0037, P0038 HO2S2 HEATER

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0037, P0038 HO2S2 HEATER

Description

INFOID:000000006579799

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Crankshaft position sensor (POS)			
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

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.

OPERATION

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600	OFF
<ul style="list-style-type: none"> Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	ON

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579800

Specification data are reference values.

monitor item	Condition	Specification
HO2S2 HTR (B1)	<ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	ON
	<ul style="list-style-type: none"> Engine speed: Above 3,600 rpm 	OFF

On Board Diagnosis Logic

INFOID:000000006579801

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0037 0037	Heated oxygen sensor 2 heater 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 style="list-style-type: none"> Harness or connectors (Heated oxygen sensor 2 heater circuit is open or shorted.) Heated oxygen sensor 2 heater
P0038 0038	Heated oxygen sensor 2 heater 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 style="list-style-type: none"> Harness or connectors (Heated oxygen sensor 2 heater circuit is shorted.) Heated oxygen sensor 2 heater

DTC Confirmation Procedure

INFOID:000000006579802

NOTE:

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

TESTING CONDITION:

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

① WITH CONSULT-III

DTC P0037, P0038 HO2S2 HEATER

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-178. "Diagnosis Procedure"](#).

 WITH GST

Follow the procedure "WITH CONSULT-III" above.

DTC P0037, P0038 HO2S2 HEATER

< SERVICE INFORMATION >

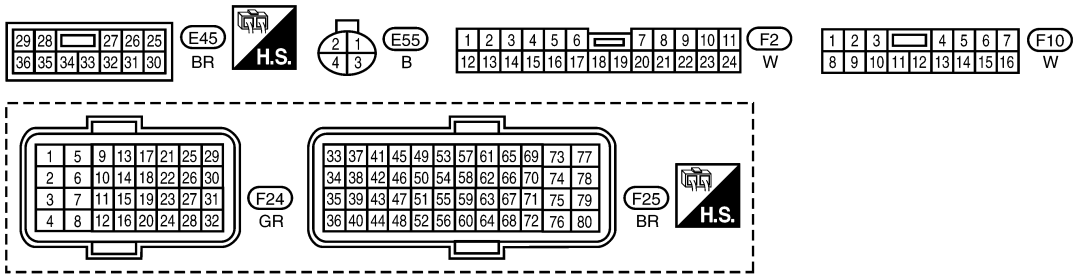
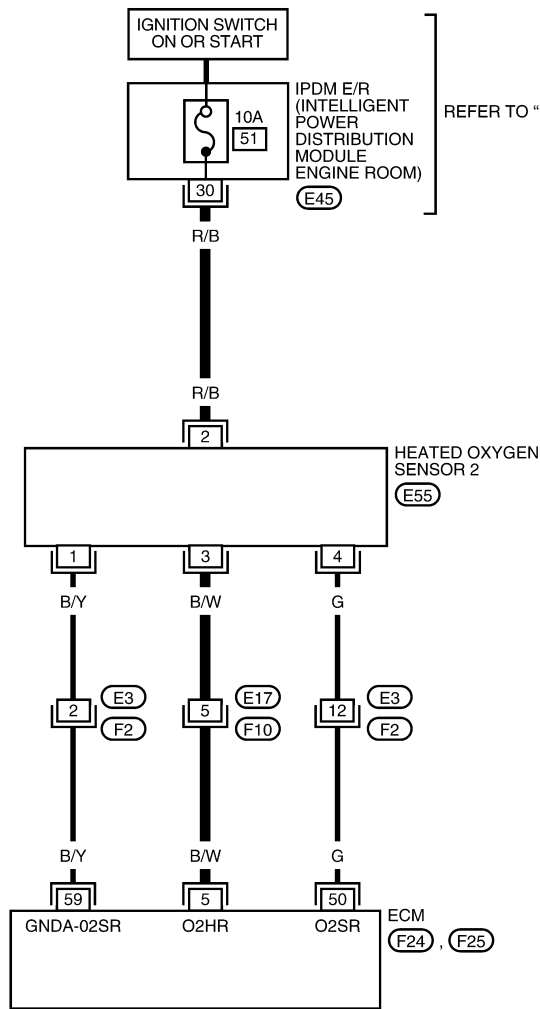
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006579803

Wiring Diagram

EC-HO2S2H-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0277GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

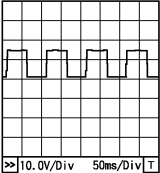
CAUTION:

DTC P0037, P0038 HO2S2 HEATER

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
5	B/W	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★  <small>PBIA8148J</small>
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
50	G	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> Revsing engine from idle to 3,000 rpm quickly after the following conditions are met. Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
59	B/Y	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed 	Approximately 0 V

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

Diagnosis Procedure

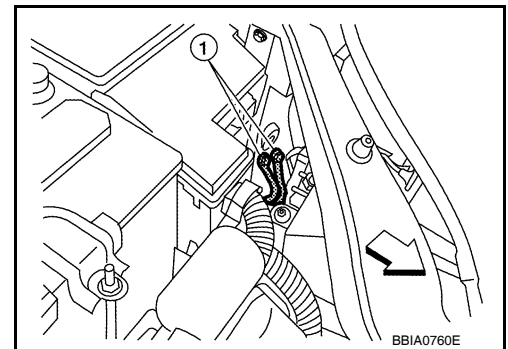
INFOID:000000006579804

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screw on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

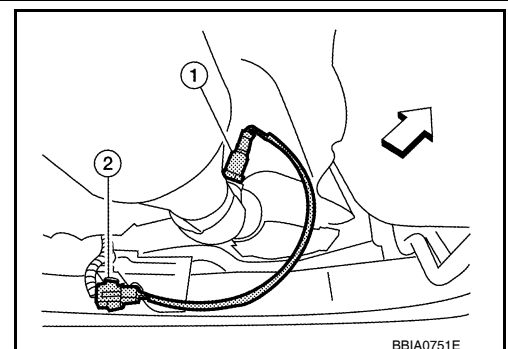
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK HO2S2 POWER SUPPLY CIRCUIT

- Disconnect heated oxygen sensor 2 harness connector (2).
- ↔ : Vehicle front
 - Heated oxygen sensor 2 (1)
- Turn ignition switch ON.



DTC P0037, P0038 HO2S2 HEATER

[MR20DE (FOR CALIFORNIA)]

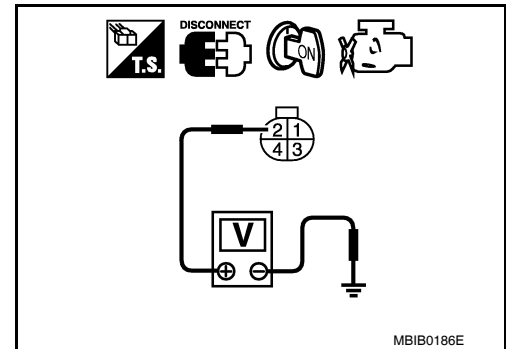
< SERVICE INFORMATION >

3. Check voltage between HO2S2 terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

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

4. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 5 and HO2S2 terminal 3. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between heated oxygen sensor 2 and ECM

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

6. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to [EC-179, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> Replace heated oxygen sensor 2. Refer to [EX-5](#).

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

HEATED OXYGEN SENSOR 2 HEATER

INFOID:000000006579805

DTC P0037, P0038 HO2S2 HEATER

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

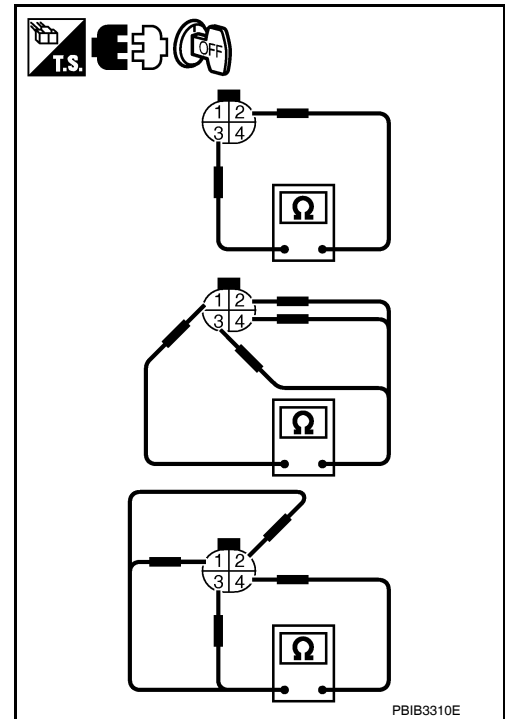
1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
2 and 3	3.4 - 4.4 Ω [at 25°C (77°F)]
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	

2. If NG, replace heated oxygen sensor 2. Refer to [EX-5](#).

CAUTION:

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



PBIB3310E

DTC P0075 IVT CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0075 IVT CONTROL SOLENOID VALVE

Component Description

INFOID:000000006579807

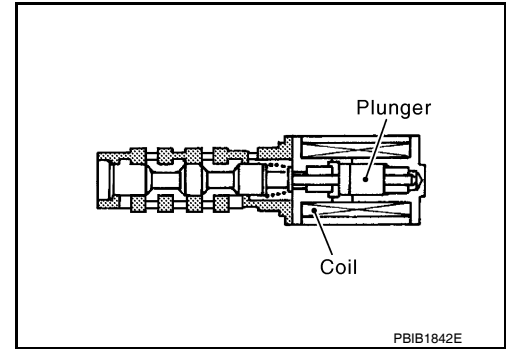
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579808

Specification data are reference values.

Monitor item	Condition	Specification
INT/V SOL (B1)	<ul style="list-style-type: none">Engine: After warming upAir conditioner switch: OFFShift lever: P or N (CVT), Neutral (M/T)No load Idle	0% - 2%
	When revving engine up to 2,000 rpm quickly	Approx. 0% - 90%

On Board Diagnosis Logic

INFOID:000000006579809

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0075 0075	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	<ul style="list-style-type: none">Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.)Intake valve timing control solenoid valve

DTC Confirmation Procedure

INFOID:000000006579810

NOTE:

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

1. Start engine and let it idle for 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-183. "Diagnosis Procedure"](#).

DTC P0075 IVT CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

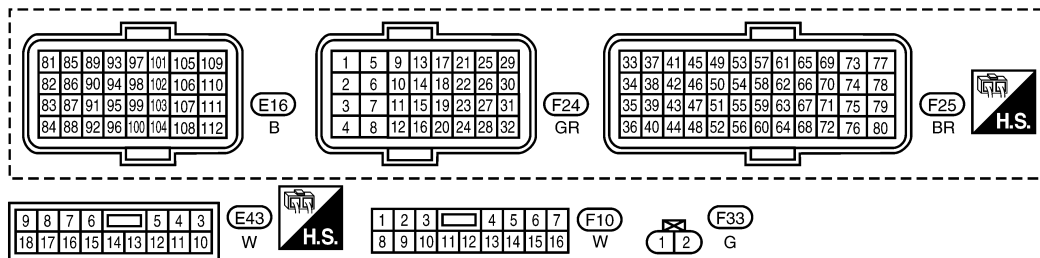
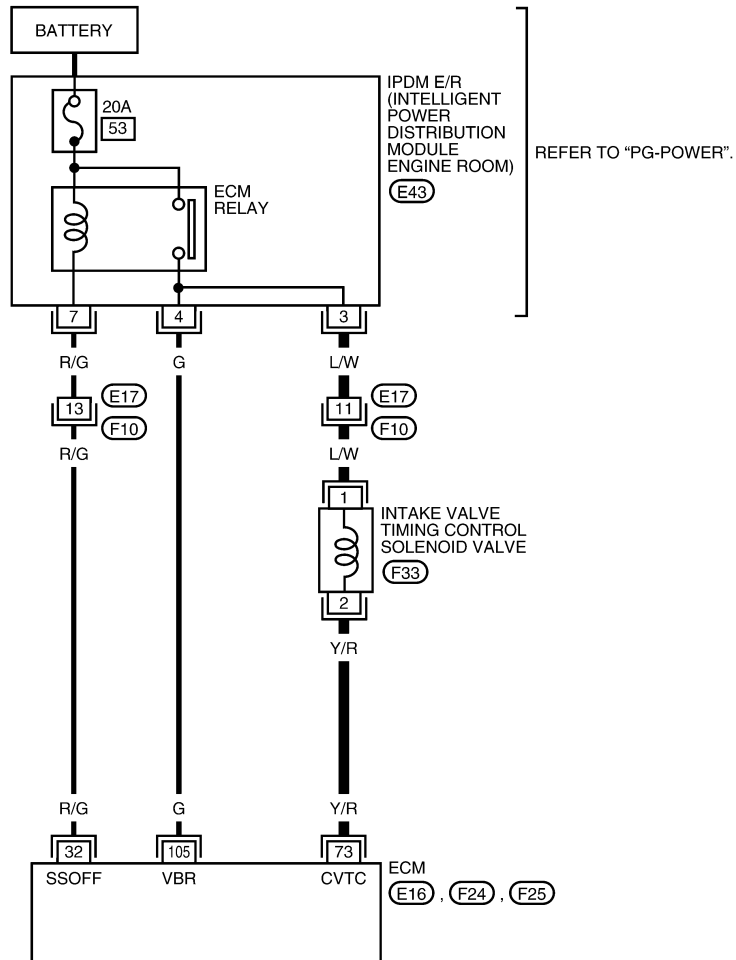
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006579811

Wiring Diagram

EC-IVC-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0653GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

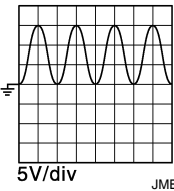
CAUTION:

DTC P0075 IVT CONTROL SOLENOID VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
73	Y/R	Intake valve timing control solenoid valve	[Engine is running] • Warm-up condition • Idle speed	BATTERY VOLTAGE (11 - 14 V)
			[Engine is running] • Warm-up condition • When revving engine up to 2,000 rpm quickly	7 - 10 V★ 
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

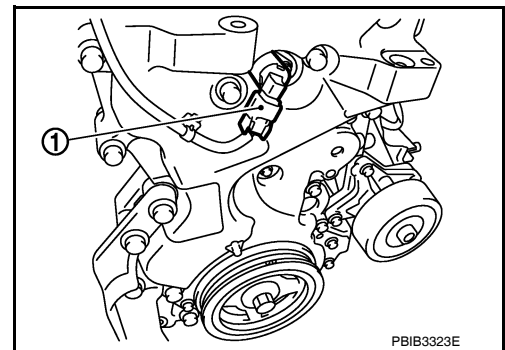
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006579812

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect intake valve timing control solenoid valve (1) harness connector.
- Turn ignition switch ON.

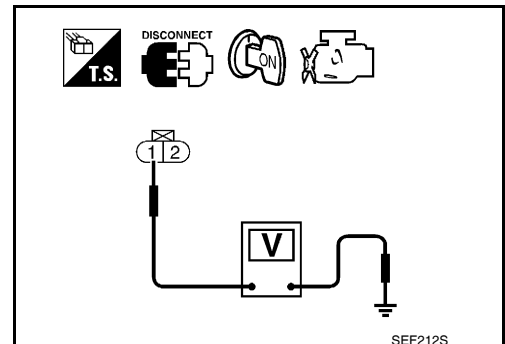


- Check voltage between intake valve timing control solenoid valve terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTION PART

Check the following.

DTC P0075 IVT CONTROL SOLENOID VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Harness connectors E17, F10
- Harness for open or short between intake valve timing control solenoid valve and IPDM E/R

>> Repair or replace harness or connectors.

3. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 73 and intake valve timing control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 4.

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

4. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-184, "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace intake valve timing control solenoid valve. Refer to [EM-40](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006579813

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve as follows.

Terminal	Resistance
1 and 2	6.7 - 7.7 Ω [at 20°C (68°F)]
1 or 2 and ground	$\infty\Omega$ (Continuity should not exist.)

If NG, replace intake valve timing control solenoid valve.

If OK, go to next step. Refer to [EM-40](#).

3. Remove intake valve timing control solenoid valve.
4. Provide 12 V DC between intake valve timing control solenoid valve terminals and then interrupt it. Make sure that the plunger moves as shown in the figure.

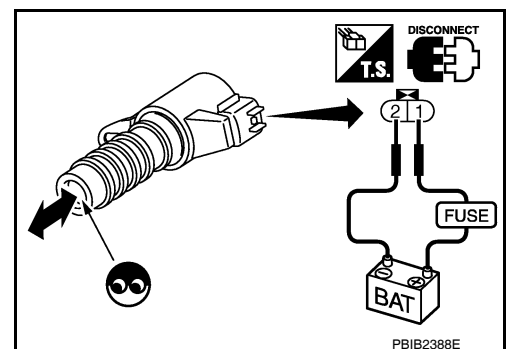
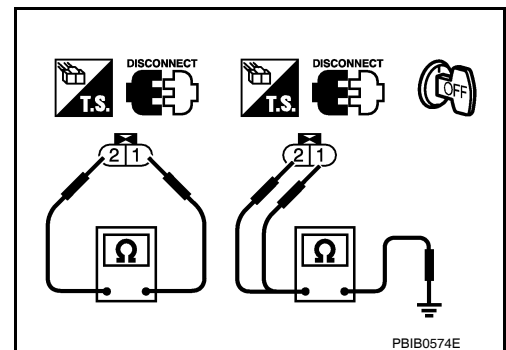
CAUTION:

Do not 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.

If NG, replace intake valve timing control solenoid valve. Refer to [EM-40](#).

NOTE:

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



DTC P0101 MAF SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

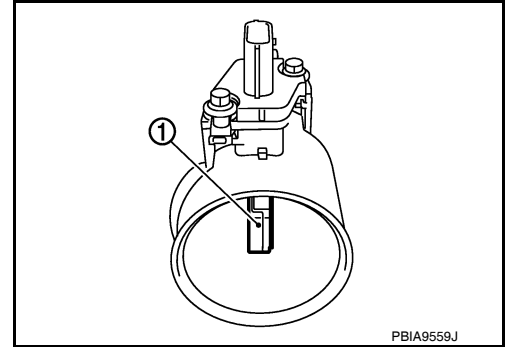
DTC P0101 MAF SENSOR

Component Description

INFOID:000000006579815

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579816

Specification data are reference values.

Monitor item	Condition	Specification
MAS A/F SE-B1	<ul style="list-style-type: none"> See EC-145. 	
CAL/LD VALUE	<ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	Idle 10% - 35%
		2,500 rpm 10% - 35%
MASS AIRFLOW	<ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	Idle 1.0 - 4.0 g/s
		2,500 rpm 4.0 - 10.0 g/s

On Board Diagnosis Logic

INFOID:000000006579817

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0101 0101	Mass air flow sensor circuit range/performance	<ul style="list-style-type: none"> A high voltage from the sensor is sent to ECM under light load driving condition. A low voltage from the sensor is sent to ECM under heavy load driving condition. 	<ul style="list-style-type: none"> Harness or connectors (Mass air flow sensor circuit is open or shorted.) Intake air leaks Mass air flow sensor EVAP control system pressure sensor Intake air temperature sensor

DTC Confirmation Procedure

INFOID:000000006579818

1. 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.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Start the engine and warm it up to normal operating temperature.
- Drive the vehicle for at least 5 seconds under the following conditions:

CAUTION:

Always drive vehicle at safe speed.

DTC P0101 MAF SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Selector lever	Suitable position
Vehicle speed	40 km/h (25 MPH) or more

3. Check 1st trip DTC.

Is 1st trip DTC detected?

YES >> Proceed to [EC-188, "Diagnosis Procedure"](#).
NO >> INSPECTION END

DTC P0101 MAF SENSOR

[MR20DE (FOR CALIFORNIA)]

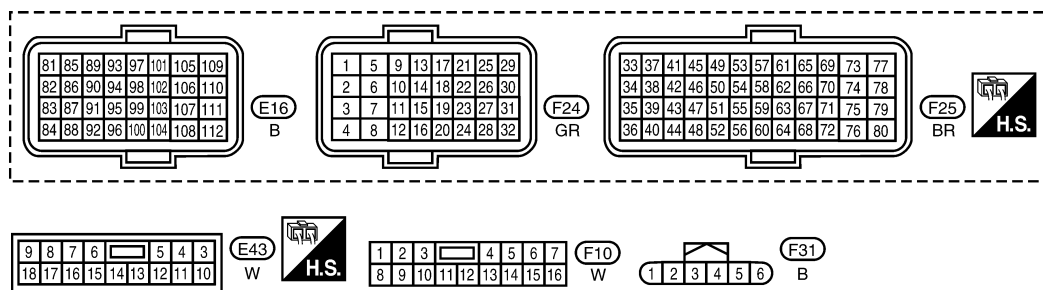
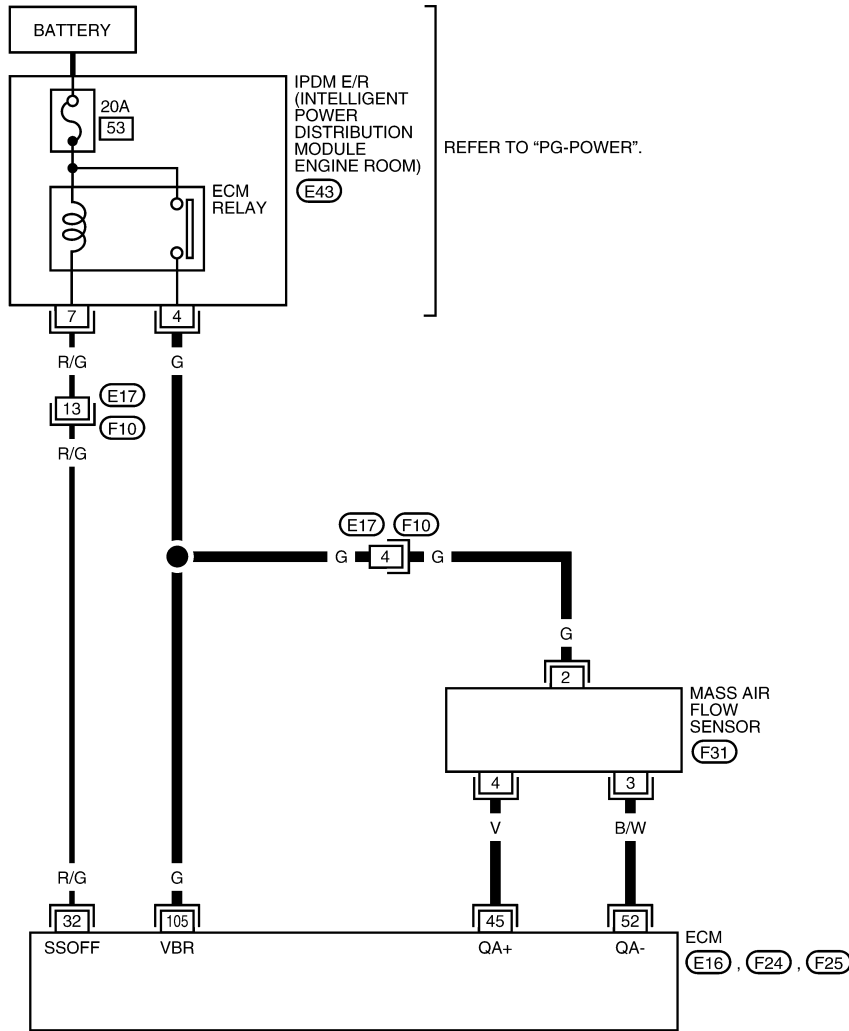
< SERVICE INFORMATION >

INFOID:000000006579820

Wiring Diagram

EC-MAFS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0281GB

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

CAUTION:

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

DTC P0101 MAF SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
45	V	Mass air flow sensor	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.2 V
			[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	1.5 - 1.8 V
52	B/W	Sensor ground (Mass air flow sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006579821

1. CHECK INTAKE AIR LEAK

Check the following for connections.

- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

OK or NG

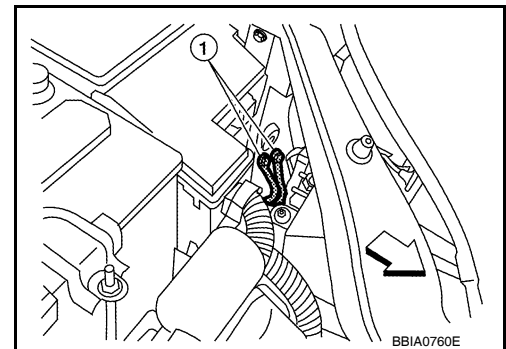
- OK >> GO TO 2.
- NG >> Reconnect the parts.

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screw on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ⇐ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace ground connections.



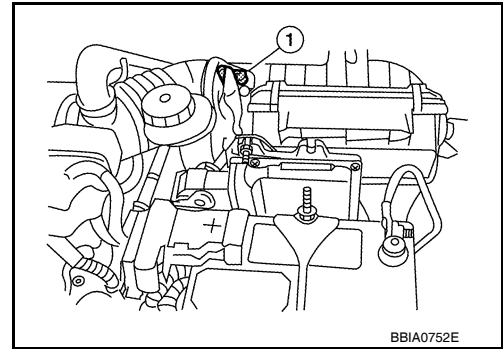
3. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

DTC P0101 MAF SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect mass air flow (MAF) sensor (1) harness connector.
2. Turn ignition switch ON.

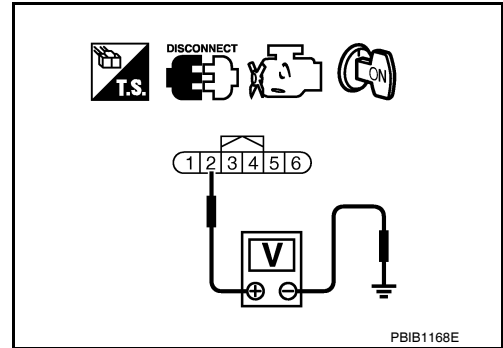


3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between mass air flow sensor and IPDM E/R
- Harness for open or short between mass air flow sensor and ECM

>> 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 harness continuity between MAF sensor terminal 3 and ECM terminal 52.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 45.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short or short to power in harness or connectors.

7. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-220, "Component Inspection"](#).

OK or NG

DTC P0101 MAF SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- OK >> GO TO 8.
NG >> Replace mas air flow sensor (with intake air temperature sensor). Refer to [EM-16](#).

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-371, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

9. CHECK MASS AIR FLOW SENSOR

Refer to [EC-190, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
NG >> Replace mass air flow sensor. Refer to [EM-16](#).

10. CHECK INTERMITTENT INCIDENT

Perform [EC-153](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006579822

MASS AIR FLOW SENSOR

Ⓟ WITH CONSULT-III

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

Condition	MAS A/F SE-B1 (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

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

5. If the voltage is out of specification, proceed the following.
 - a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
 - b. If NG, repair or replace malfunctioning part and perform step 2 to 4 again.
If OK, go to next step.
6. Turn ignition switch OFF.
7. Disconnect mass air flow sensor harness connector and reconnect it again.
8. Perform step 2 to 4 again.
9. If NG, clean or replace mass air flow sensor. Refer to [EM-16](#).

ⓧ WITHOUT CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.

DTC P0101 MAF SENSOR

[MR20DE (FOR CALIFORNIA)]

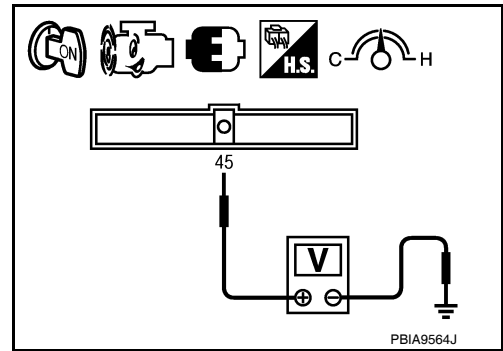
< SERVICE INFORMATION >

3. Check voltage between ECM terminal 45 (Mass air flow sensor signal) and ground.

Condition	Voltage (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

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

4. If the voltage is out of specification, proceed the following.
- Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
 - If NG, repair or replace malfunctioning part and perform step 2 and 3 again. If OK, go to next step.
5. Turn ignition switch OFF.
6. Disconnect mass air flow sensor harness connector and reconnect it again.
7. Perform step 2 and 3 again.
8. If NG, clean or replace mass air flow sensor. Refer to [EM-16](#).



DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

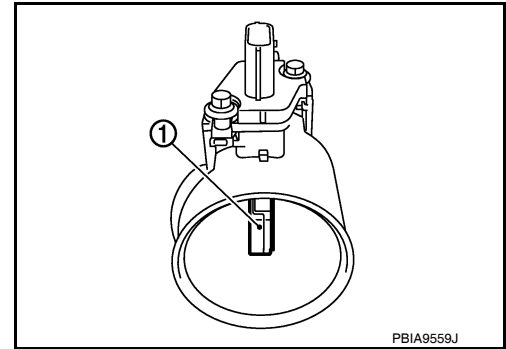
DTC P0102, P0103 MAF SENSOR

Component Description

INFOID:000000006579824

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.



PBIA9559J

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579825

Specification data are reference values.

Monitor item	Condition		Specification
MAS A/F SE-B1	See EC-145 .		
CAL/LD VALUE	<ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	<ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	Idle	1.0 - 4.0 g/s
		2,500 rpm	4.0 - 10.0 g/s

On Board Diagnosis Logic

INFOID:000000006579826

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102 0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (Mass air flow sensor circuit is open or shorted.) Intake air leaks Mass air flow sensor
P0103 0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (Mass air flow sensor circuit is open or shorted.) Mass air flow sensor

FAIL-SAFE MODE

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

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

DTC Confirmation Procedure

INFOID:000000006579827

NOTE:

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

DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

PROCEDURE FOR DTC P0102

1. Start engine and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-195. "Diagnosis Procedure"](#).

PROCEDURE FOR DTC P0103

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-195. "Diagnosis Procedure"](#).
If DTC is not detected, go to next step.
4. Start engine and wait at least 5 seconds
5. Check DTC.
6. If DTC is detected, go to [EC-195. "Diagnosis Procedure"](#).

A

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DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

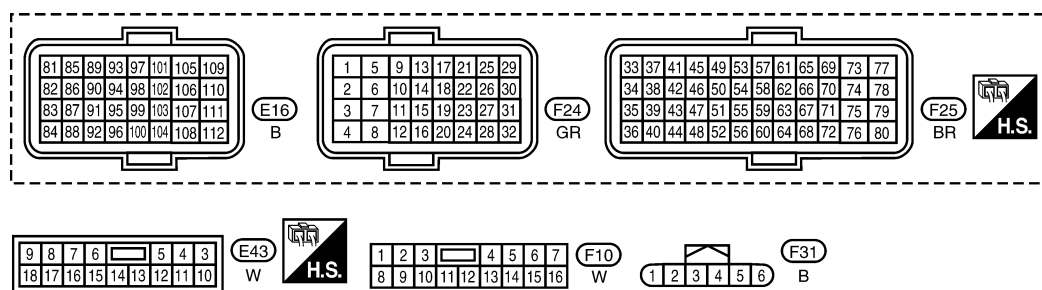
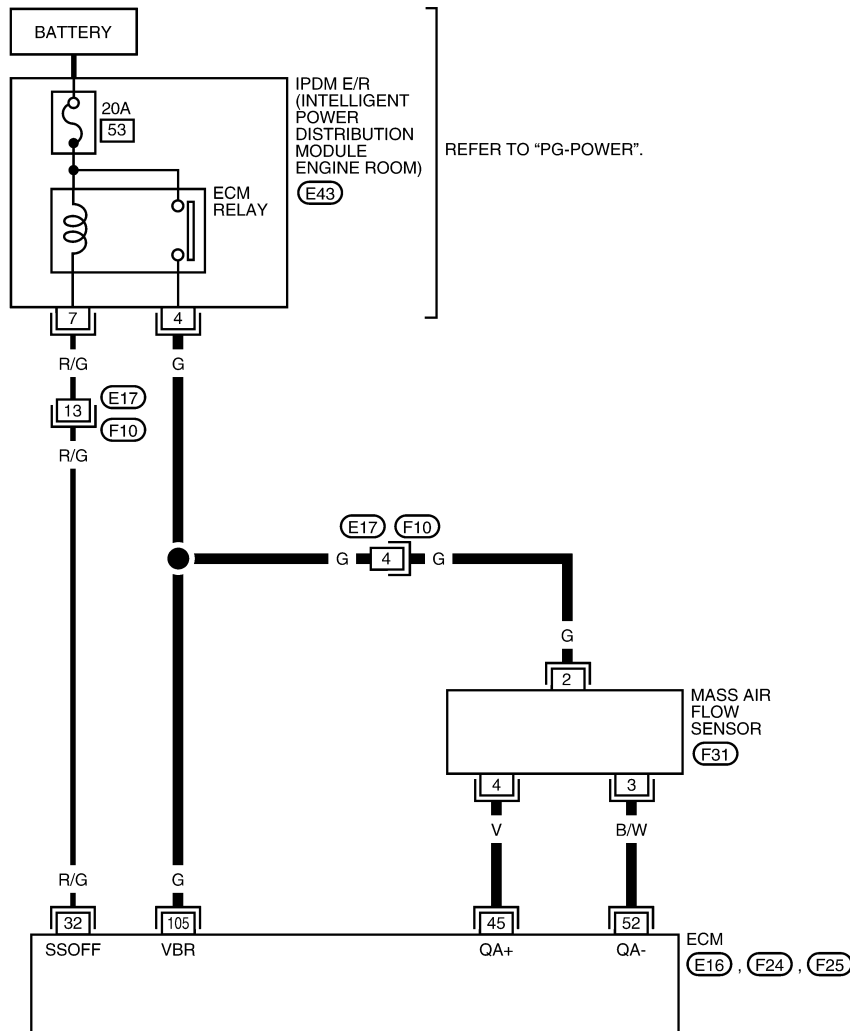
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006579828

Wiring Diagram

EC-MAFS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0281GB

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

CAUTION:

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

DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
45	V	Mass air flow sensor	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.2 V
			[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	1.5 - 1.8 V
52	B/W	Sensor ground (Mass air flow sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006579829

1. INSPECTION START

Which malfunction (P0102 or P0103) is duplicated?

P0102 or P0103

- P0102 >> GO TO 2.
- P0103 >> GO TO 3.

2. CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

OK or NG

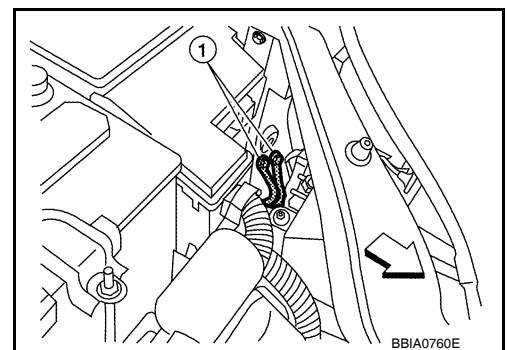
- OK >> GO TO 3.
- NG >> Reconnect the parts.

3. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ⇐ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace ground connections.



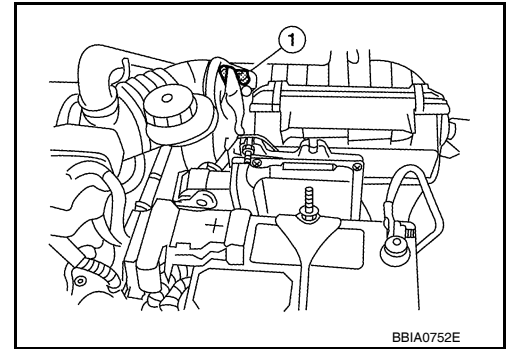
4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

DTC P0102, P0103 MAF SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect mass air flow (MAF) sensor (1) harness connector.
2. Turn ignition switch ON.

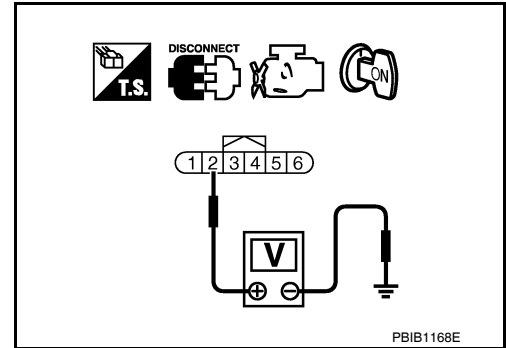


3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- 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.

6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 52.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 45.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to [EC-197, "Component Inspection"](#).

OK or NG

DTC P0102, P0103 MAF SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- OK >> GO TO 9.
- NG >> Replace mass air flow sensor. Refer to [EM-16](#).

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006579830

MASS AIR FLOW SENSOR

Ⓟ WITH CONSULT-III

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

Condition	MAS A/F SE-B1 (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

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

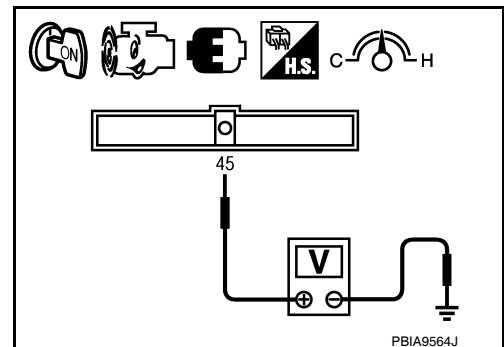
5. If the voltage is out of specification, proceed the following.
 - a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
 - b. If NG, repair or replace malfunctioning part and perform step 2 to 4 again. If OK, go to next step.
6. Turn ignition switch OFF.
7. Disconnect mass air flow sensor harness connector and reconnect it again.
8. Perform step 2 to 4 again.
9. If NG, clean or replace mass air flow sensor. Refer to [EM-16](#).

ⓧ WITHOUT CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 45 (Mass air flow sensor signal) and ground.

Condition	Voltage (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

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



DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

4. If the voltage is out of specification, proceed the following.
 - a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
 - b. If NG, repair or replace malfunctioning part and perform step 2 and 3 again.
If OK, go to next step.
5. Turn ignition switch OFF.
6. Disconnect mass air flow sensor harness connector and reconnect it again.
7. Perform step 2 and 3 again.
8. If NG, clean or replace mass air flow sensor. Refer to [EM-16](#).

DTC P0112, P0113 IAT SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

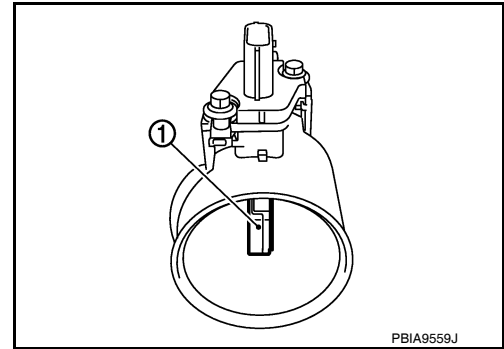
DTC P0112, P0113 IAT SENSOR

Component Description

INFOID:000000006579832

The intake air temperature sensor is built-into mass air flow sensor (1). 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.



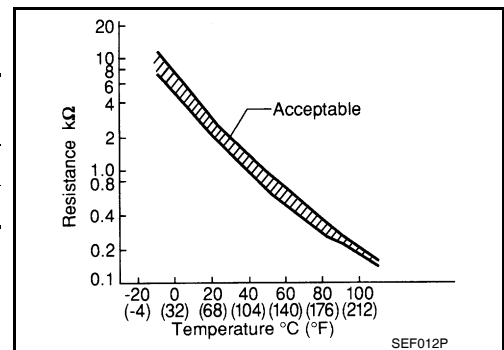
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Intake air temperature °C (°F)]	Voltage* (V)	Resistance (kΩ)
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: This data is reference value and is measured between ECM terminal 46 (Intake air temperature sensor) and ground.

CAUTION:

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



On Board Diagnosis Logic

INFOID:000000006579833

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Intake air temperature sensor circuit is open or shorted.) • Intake air temperature sensor
P0113 0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006579834

NOTE:

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

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-200. "Diagnosis Procedure"](#).

DTC P0112, P0113 IAT SENSOR

< SERVICE INFORMATION >

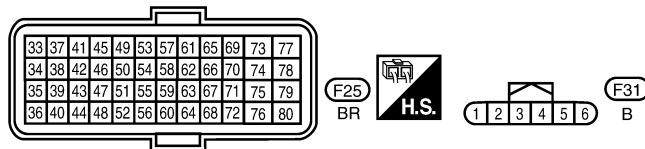
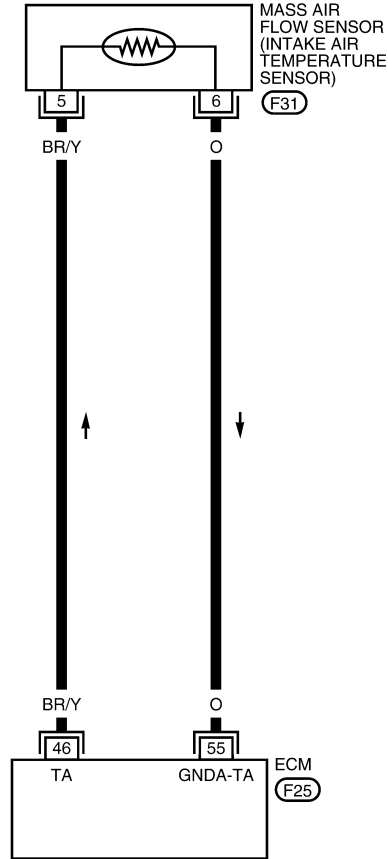
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006579835

EC-IATS-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA2875E

Diagnosis Procedure

INFOID:000000006579836

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0112, P0113 IAT SENSOR

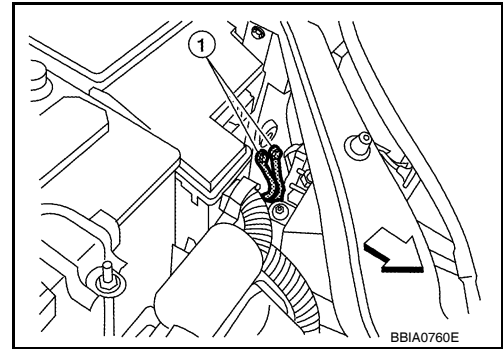
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

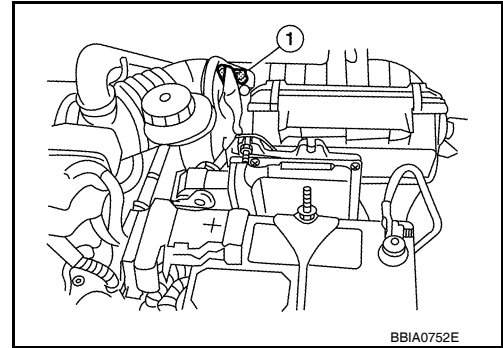
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- Disconnect mass air flow sensor (with intake air temperature sensor) (1) harness connector.
- Turn ignition switch ON.

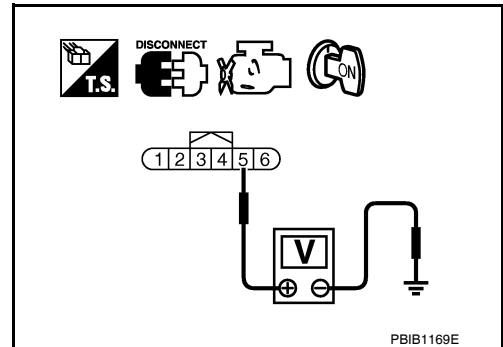


- Check voltage between mass air flow sensor terminal 5 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check harness continuity between mass air flow sensor terminal 6 and ECM terminal 55.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-202, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-16](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

DTC P0112, P0113 IAT SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

>> INSPECTION END

Component Inspection

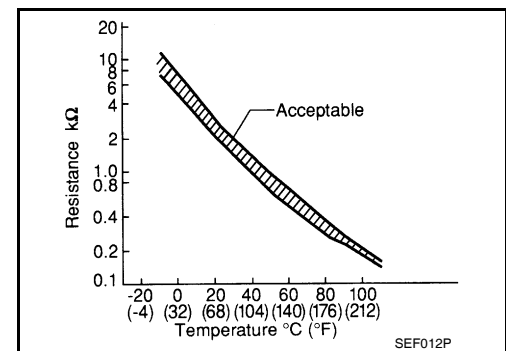
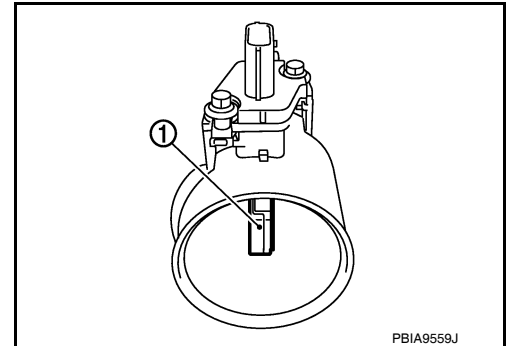
INFOID:000000006579837

INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between mass air flow sensor (1) terminals 5 and 6 under the following conditions.

Intake air temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200

2. If NG, replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-16](#).



DTC P0116 ECT SENSOR

[MR20DE (FOR CALIFORNIA)]

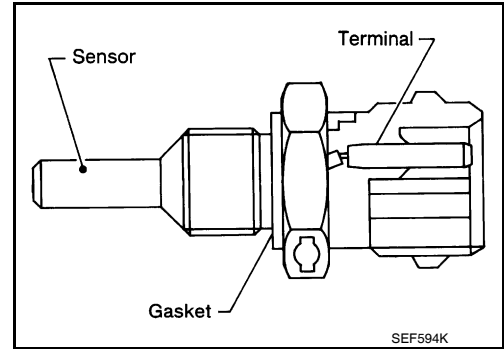
< SERVICE INFORMATION >

DTC P0116 ECT SENSOR

Component Description

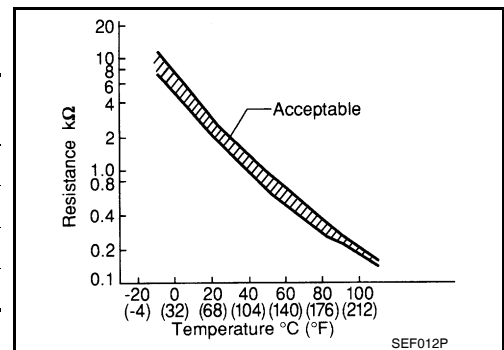
INFOID:000000006579839

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)]	Voltage* (V)	Resistance (kΩ)
-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



*: This data is reference value and is measured between ECM terminal 38 (Engine coolant temperature sensor) and ground.

CAUTION:

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

On Board Diagnosis Logic

INFOID:000000006579840

NOTE:

If DTC P0116 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117, P0118. Refer to [EC-206](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0116 0116	Engine coolant temperature sensor circuit range/performance	Engine coolant temperature signal from engine coolant temperature sensor does not fluctuate, even when some time has passed after starting the engine with pre-warming up condition.	<ul style="list-style-type: none"> • Harness or connectors (High or low resistance in the circuit) • Engine coolant temperature sensor

DTC Confirmation Procedure

INFOID:000000006579841

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, do not add fuel.

1. Start engine and warm it up to normal operating temperature.
2. Rev engine up to 2,000 rpm for more than 10 minutes.
3. Move the vehicle to a cool place, then stop engine and turn ignition switch OFF.
4. Check resistance between "fuel level sensor unit and fuel pump" terminals 4 and 5.
5. Soak the vehicle until the resistance between "fuel level sensor unit and fuel pump" terminals 4 and 5 becomes 0.5 kΩ higher than the value measured before soaking.

CAUTION:

Never turn ignition switch ON during soaking time.

DTC P0116 ECT SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

NOTE:

Soak time changes depending on ambient air temperature. It may take several hours.

6. Start engine and let it idle for 20 minutes.
7. Check 1st trip DTC.
8. If 1st trip DTC is detected, go to [EC-204, "Diagnosis Procedure"](#).

Diagnosis Procedure

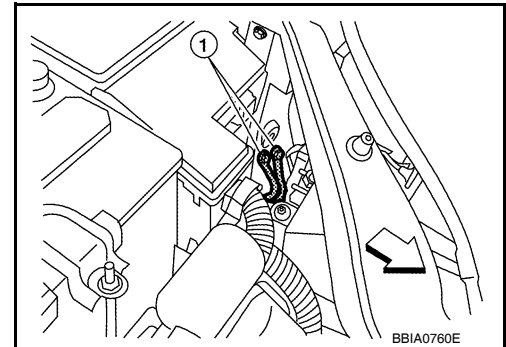
INFOID:000000006579842

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↵ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-204, "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace engine coolant temperature sensor. Refer to [.CO-24](#)

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

Refer to [EC-208, "Wiring Diagram"](#).

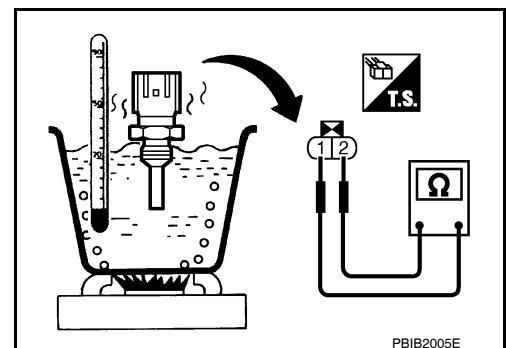
>> **INSPECTION END**

Component Inspection

INFOID:000000006579843

ENGINE COOLANT TEMPERATURE SENSOR

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



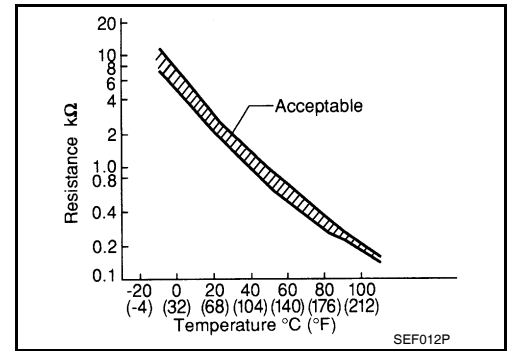
DTC P0116 ECT SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.37 - 2.63
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine coolant temperature sensor. Refer to [CO-24](#).



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DTC P0117, P0118 ECT SENSOR

< SERVICE INFORMATION >

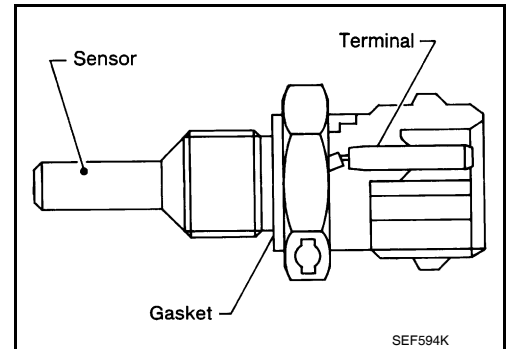
[MR20DE (FOR CALIFORNIA)]

DTC P0117, P0118 ECT SENSOR

Component Description

INFOID:000000006579845

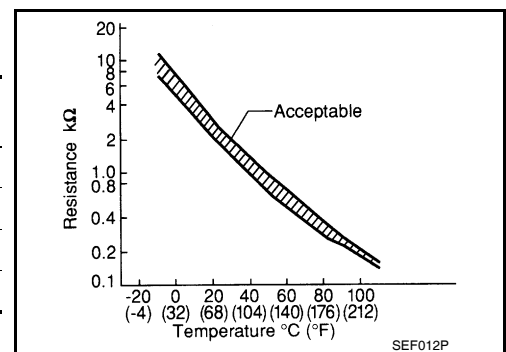
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The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



<Reference data>

Engine coolant temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
-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

*: This data is reference value and is measured between ECM terminal 38 (Engine coolant temperature sensor) and ground.



CAUTION:

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

On Board Diagnosis Logic

INFOID:000000006579846

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Engine coolant temperature sensor circuit is open or shorted.) • Engine coolant temperature sensor
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

FAIL-SAFE MODE

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

DTC P0117, P0118 ECT SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the following condition. CONSULT-III displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-III display)
	Just as ignition switch is turned ON or START	40°C (104°F)
	Approx 4 minutes or more after engine 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.		

DTC Confirmation Procedure

INFOID:000000006579847

NOTE:

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

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-208, "Diagnosis Procedure"](#).

DTC P0117, P0118 ECT SENSOR

< SERVICE INFORMATION >

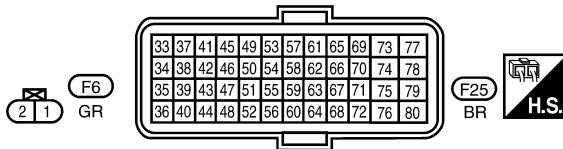
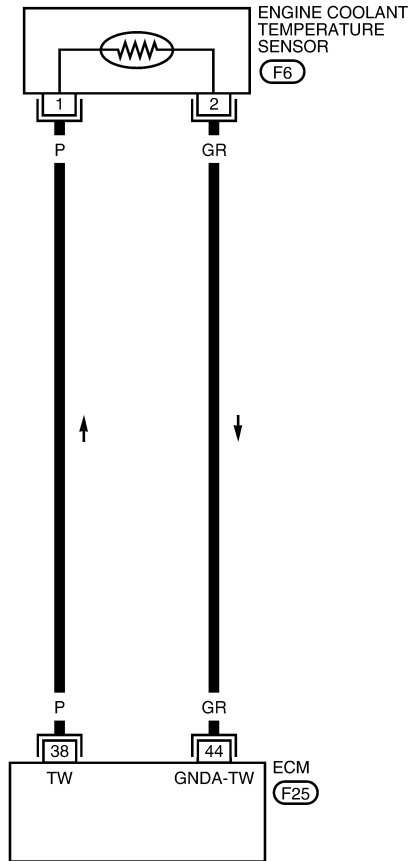
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006579848

EC-ECTS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Diagnosis Procedure

INFOID:000000006579849

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0117, P0118 ECT SENSOR

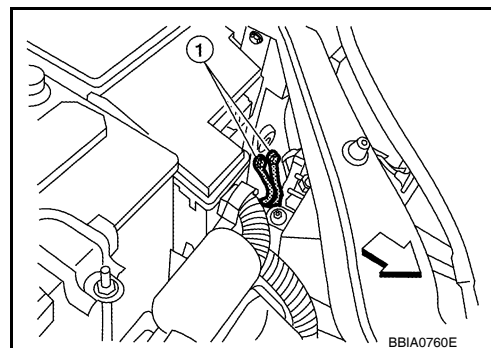
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

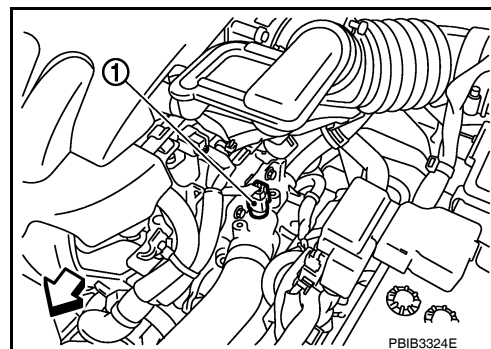
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

- Disconnect engine coolant temperature (ECT) sensor (1) harness connector.
- ↔: Vehicle front
- Turn ignition switch ON.

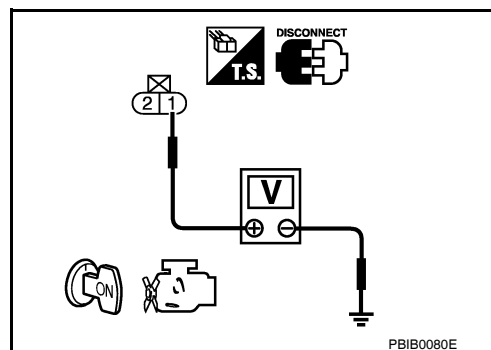


- Check voltage between ECT sensor terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check harness continuity between ECM terminal 44 and ECT sensor terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-210, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace engine coolant temperature sensor. Refer to [CO-24](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

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DTC P0117, P0118 ECT SENSOR

[MR20DE (FOR CALIFORNIA)]

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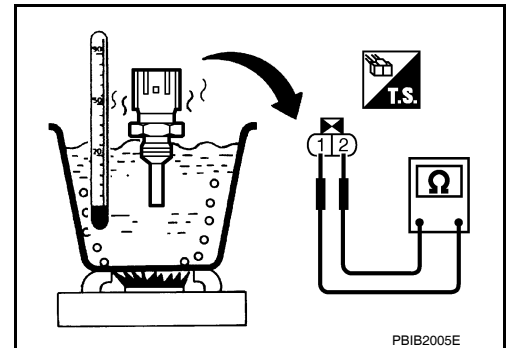
>> INSPECTION END

Component Inspection

INFOID:000000006579850

ENGINE COOLANT TEMPERATURE SENSOR

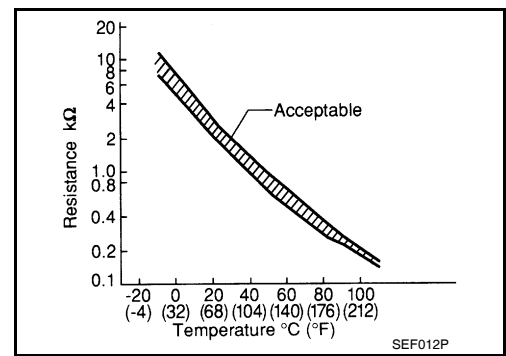
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



PBIB2005E

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.37 - 2.63
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine coolant temperature sensor. Refer to [CO-24](#).



SEF012P

DTC P0122, P0123 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

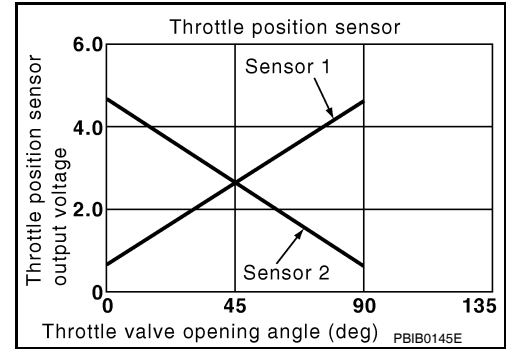
DTC P0122, P0123 TP SENSOR

Component Description

INFOID:000000006579852

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579853

Specification data are reference values.

Monitor item	Condition	Specification
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully released	More than 0.36 V
	Accelerator pedal: Fully depressed	Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:000000006579854

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P0122 or P0123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-422](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	• Harness or connectors (TP sensor 2 circuit is open or shorted.)
P0123 0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	• Electric throttle control actuator (TP sensor 2)

FAIL-SAFE MODE

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

Engine operation condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006579855

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-213, "Diagnosis Procedure"](#).

DTC P0122, P0123 TP SENSOR

< SERVICE INFORMATION >

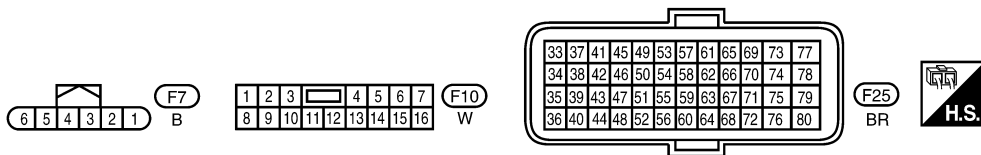
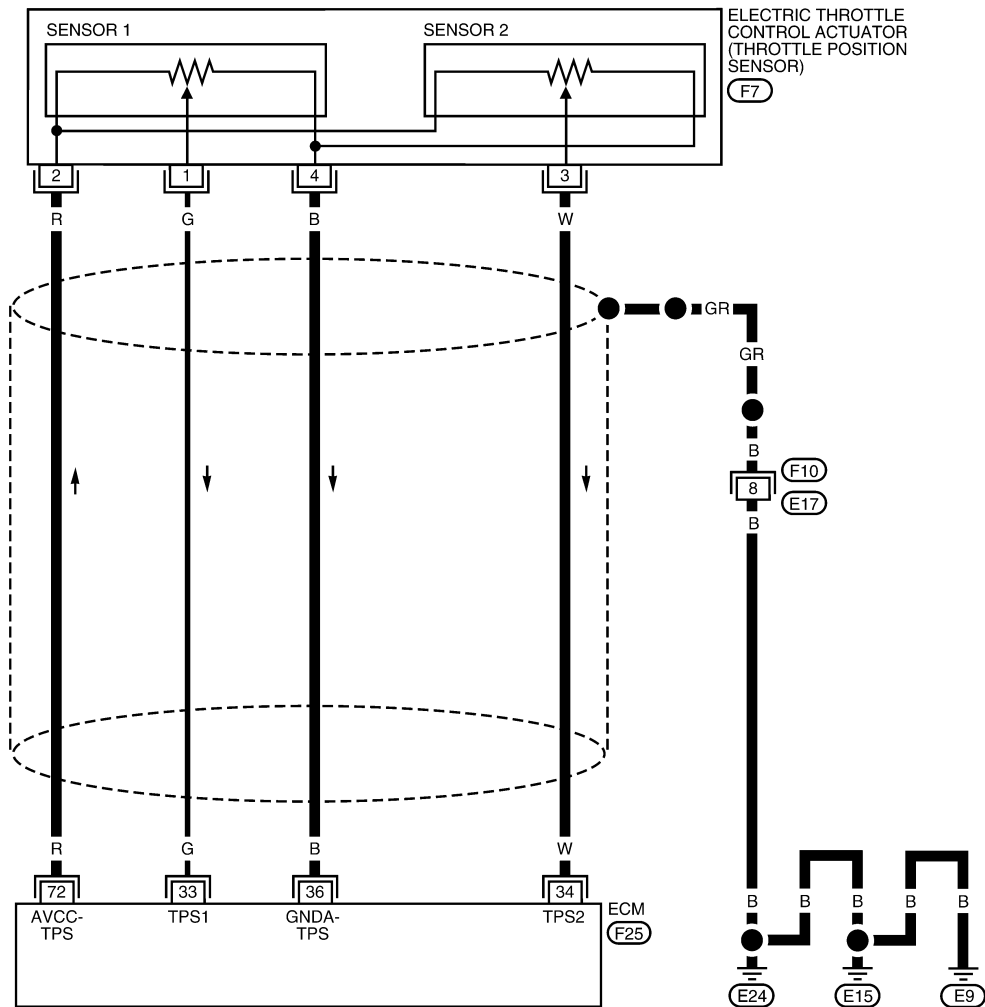
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006579856

Wiring Diagram

EC-TPS2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0145GB

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

CAUTION:

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

DTC P0122, P0123 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
33	G	Throttle position sensor 1	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34	W	Throttle position sensor 2	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
36	B	Sensor ground (Throttle position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
72	R	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

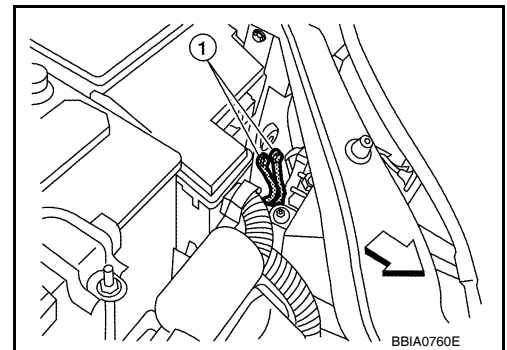
INFOID:000000006579857

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

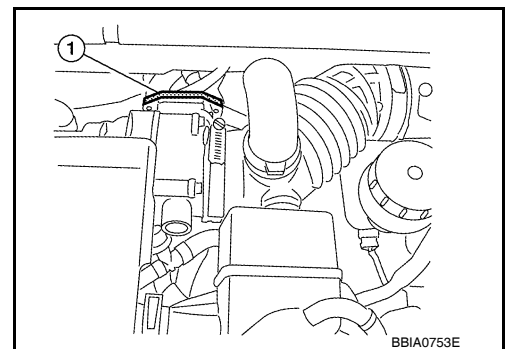
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

- Disconnect electric throttle control actuator (1) harness connector.
- Turn ignition switch ON.



DTC P0122, P0123 TP SENSOR

[MR20DE (FOR CALIFORNIA)]

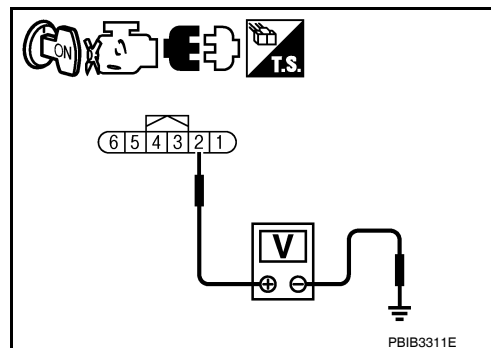
< SERVICE INFORMATION >

3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



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

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 4 and ECM terminal 36. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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

1. Check harness continuity between ECM terminal 34 and electric throttle control actuator terminal 3. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-214, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18, "Component"](#).

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006579858

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).
3. Turn ignition switch ON.

DTC P0122, P0123 TP SENSOR

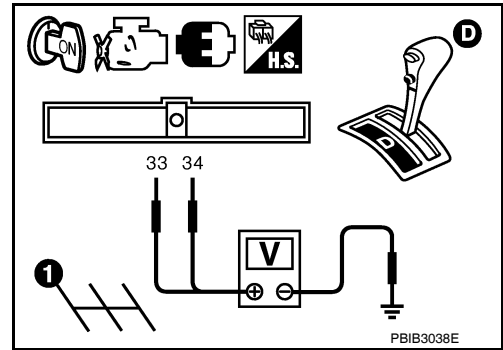
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Set shift lever to D position (CVT) or 1st position (M/T).
- Check voltage between ECM terminals 33 (TP sensor 1 signal), 34 (TP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
33 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
34 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V

- If NG, replace electric throttle control actuator and go to the next step. Refer to [EM-18](#).



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DTC P0125 ECT SENSOR

< SERVICE INFORMATION >

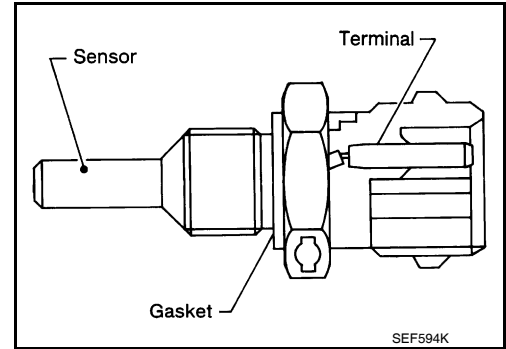
[MR20DE (FOR CALIFORNIA)]

DTC P0125 ECT SENSOR

Component Description

INFOID:000000006579860

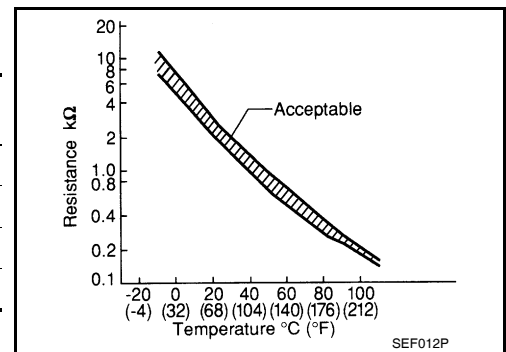
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The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



<Reference data>

Engine coolant temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
-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

*: This data is reference value and is measured between ECM terminal 38 (engine coolant temperature sensor) and ground.



CAUTION:

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

On Board Diagnosis Logic

INFOID:000000006579861

NOTE:

- If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-206](#).
- If DTC P0125 is displayed with P0116, first perform the trouble diagnosis for DTC P0116. Refer to [EC-203](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0125 0125	Insufficient engine coolant temperature for closed loop fuel control	<ul style="list-style-type: none"> • Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. • Engine coolant temperature is insufficient for closed loop fuel control. 	<ul style="list-style-type: none"> • Harness or connectors (High resistance in the circuit) • Engine coolant temperature sensor • Thermostat

DTC Confirmation Procedure

INFOID:000000006579862

CAUTION:

Be careful not to overheat engine.

NOTE:

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

Ⓟ WITH CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Check that "COOLAN TEMP/S" is above -4°C (25°F).
If it is above -4°C (25°F), the test result will be OK.

DTC P0125 ECT SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

If it is below -4°C (25°F), go to following step.

- Start engine and run it for 65 minutes at idle speed.
If "COOLAN TEMP/S" increases to more than -4°C (25°F) within 65 minutes, stop engine because the test result will be OK.
- Check 1st trip DTC.
- If 1st trip DTC is detected, go to [EC-217. "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

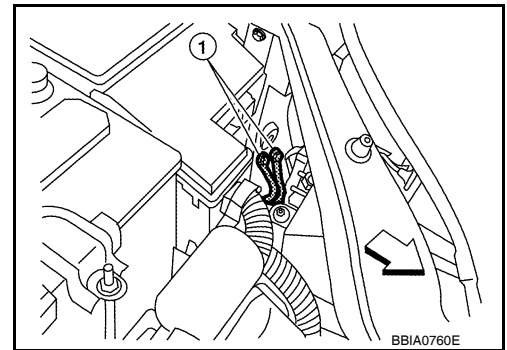
INFOID:000000006579863

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).
- \leftarrow : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-217. "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace engine coolant temperature sensor. Refer to [EM-66. "Component"](#).

3. CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace thermostat. Refer to [CO-22. "Removal and Installation"](#).

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

Refer to [EC-208. "Wiring Diagram"](#).

>> INSPECTION END

Component Inspection

INFOID:000000006579864

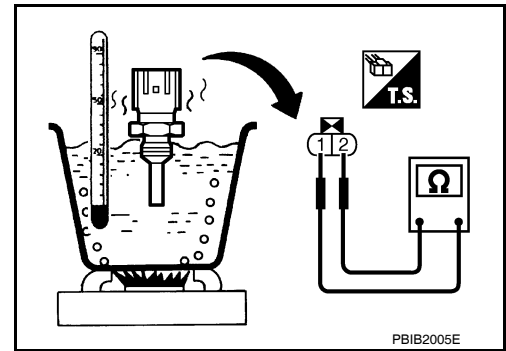
ENGINE COOLANT TEMPERATURE SENSOR

DTC P0125 ECT SENSOR

[MR20DE (FOR CALIFORNIA)]

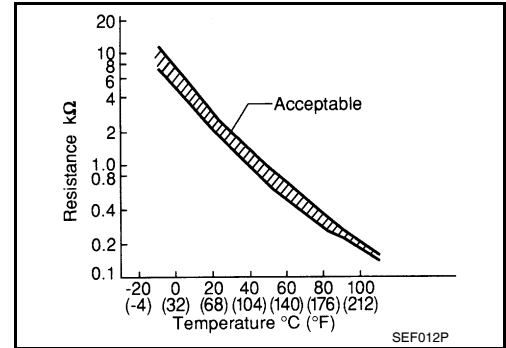
< SERVICE INFORMATION >

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.37 - 2.63
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine coolant temperature sensor. Refer to [CO-24](#).



DTC P0127 IAT SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

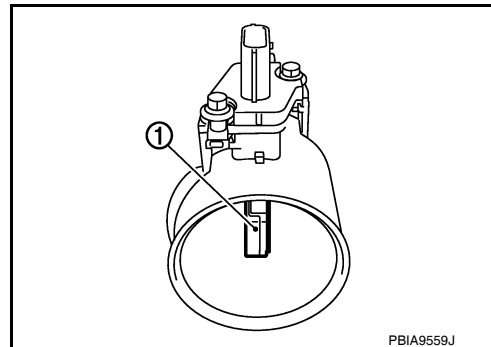
DTC P0127 IAT SENSOR

Component Description

INFOID:000000006579866

The intake air temperature sensor is built into mass air flow sensor (1). 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.



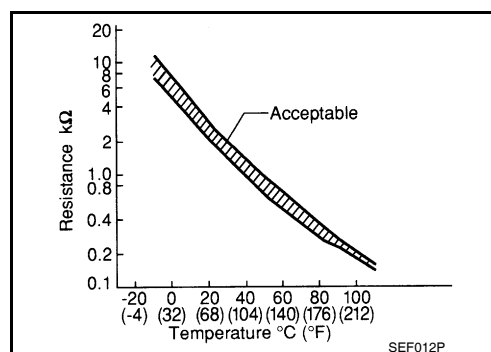
<Reference data>

Intake air temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: This data is reference value and is measured between ECM terminal 46 (Intake air temperature sensor) and ground.

CAUTION:

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



On Board Diagnosis Logic

INFOID:000000006579867

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0127 0127	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 style="list-style-type: none"> Harness or connectors (Intake temperature sensor circuit is open or shorted) Intake air temperature sensor

DTC Confirmation Procedure

INFOID:000000006579868

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

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

Ⓟ WITH CONSULT-III

1. Wait until engine coolant temperature is less than 96°C (205°F)
 - a. Turn ignition switch ON.
 - b. Select "DATA MONITOR" mode with CONSULT-III.
 - c. Check the engine coolant temperature.
 - d. If the engine coolant temperature is not less than 96°C (205°F), turn ignition switch OFF and cool down engine.
 - Perform the following steps before engine coolant temperature is above 96°C (205°F).

DTC P0127 IAT SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Turn ignition switch ON.
3. Select "DATA MONITOR" mode with CONSULT-III.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-220. "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "With CONSULT-III" above.

Diagnosis Procedure

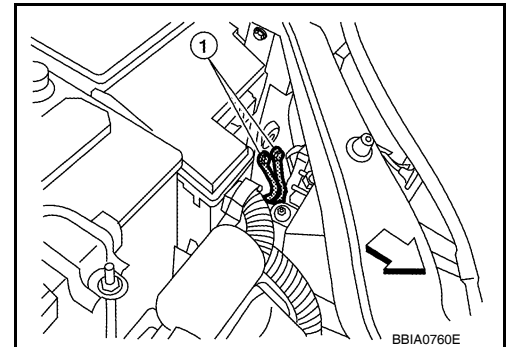
INFOID:000000006579869

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).
- ↶ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-220. "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-16](#).

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

Refer to [EC-200. "Wiring Diagram"](#).

>> **INSPECTION END**

Component Inspection

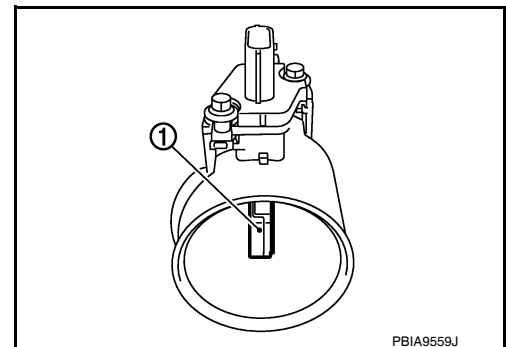
INFOID:000000006579870

INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between intake air temperature sensor (1) terminals 5 and 6 under the following conditions.

Intake air temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200

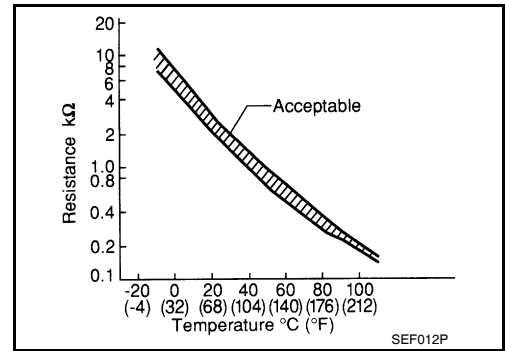
2. If NG, replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-16](#).



DTC P0127 IAT SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]



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DTC P0128 THERMOSTAT FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0128 THERMOSTAT FUNCTION

On Board Diagnosis Logic

INFOID:000000006579872

NOTE:

If DTC P0128 is displayed with DTC P0300, P0301, P0302, P0303 or P0304, first perform the trouble diagnosis for DTC P0300, P0301, P0302, P0303, P0304. Refer to [EC-304, "DTC Confirmation Procedure"](#).

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 stuck open.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0128 0128	Thermostat function	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	<ul style="list-style-type: none">• Thermostat• Leakage from sealing portion of thermostat• Engine coolant temperature sensor

DTC Confirmation Procedure

INFOID:000000006579873

Ⓜ WITH CONSULT-III

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

- For best results, perform at ambient temperature of -10°C (14°F) or higher.
- For best results, perform at engine coolant temperature of -10°C (14°F) to 52°C (126°F).
- Before performing the following procedure, do not fill with the fuel.

1. Turn A/C switch OFF.
2. Turn blower fan switch OFF.
3. Turn ignition switch ON.
4. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-III.
5. Check the indication of "COOLAN TEMP/S".
If it is below 52°C (126°F), go to following step.
If it is above 52°C (126°F), cool down the engine to less than 52°C (126°F). Then go to next steps.
6. Start engine.
7. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	More than 56 km/h (35 MPH)
---------------	----------------------------

If "COOLAN TEMP/S" increases to more than 71°C (160°F) within 10 minutes, turn ignition switch OFF because the test result will be OK.

8. Check 1st trip DTC.
9. If 1st trip DTC is detected, go to [EC-222, "Diagnosis Procedure"](#).

Ⓜ WITH GST

Follow the procedure "With CONSULT-III" above.

Diagnosis Procedure

INFOID:000000006579874

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-210, "Component Inspection"](#).

OK or NG

- OK >> GO TO 2.
- NG >> Replace engine coolant temperature sensor. Refer to [CO-24](#).

2. CHECK THERMOSTAT

DTC P0128 THERMOSTAT FUNCTION

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Refer to [CO-21, "Component"](#).

OK or NG

OK >> **INSPECTION END**

NG >> Replace thermostat. Refer to [CO-22, "Removal and Installation"](#).

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DTC P0130 A/F SENSOR 1

< SERVICE INFORMATION >

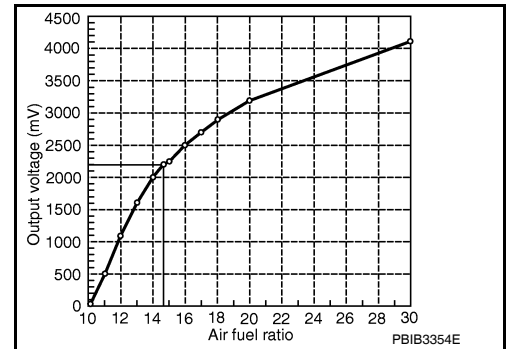
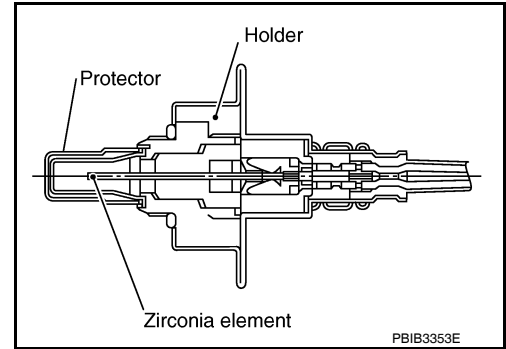
[MR20DE (FOR CALIFORNIA)]

DTC P0130 A/F SENSOR 1

Component Description

INFOID:000000006579876

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 λ 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 about 800°C (1,472°F).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579877

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1)	<ul style="list-style-type: none"> Engine: After warming up Maintaining engine speed at 2,000 rpm 	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006579878

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal fluctuates according to fuel feedback control.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0130 0130	Air fuel ratio (A/F) sensor 1 circuit	A) The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in the range other than approx. 2.2 V.	<ul style="list-style-type: none"> Harness or connectors [Air fuel ratio (A/F) sensor 1 circuit is open or shorted.] Air fuel ratio (A/F) sensor 1
		B) The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.	

DTC Confirmation Procedure

INFOID:000000006579879

Perform PROCEDURE FOR MALFUNCTION A first.

If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.

NOTE:

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

TESTING CONDITION:

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

PROCEDURE FOR MALFUNCTION A

WITH CONSULT-III

DTC P0130 A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Start engine and warm it up to normal operating temperature.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Let engine idle for 2 minutes.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-227, "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "With CONSULT-III" above.

PROCEDURE FOR MALFUNCTION B

CAUTION:

Always drive vehicle at a safe speed.

WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
3. Check "A/F SEN1 (B1)" indication.
If the indication is constantly approx. 2.2 V and does not fluctuates, go to [EC-227, "Diagnosis Procedure"](#).
If the indication fluctuates around 2.2 V, go to next step.
4. Select "A/F SEN1 (B1) P1276 " (for P0130) of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. Touch "START".
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-III screen.

ENG SPEED	1,000 - 3,200 rpm
VHCL SPEED SE	More than 64 km/h (40 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Shift lever	D position (CVT) 5th position (M/T)

If "TESTING" is not displayed after 20 seconds, retry from step 2.

7. Release accelerator pedal fully.

NOTE:

Never apply brake during releasing the accelerator pedal.

8. Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", retry from step 6.
9. Make sure that "OK" is displayed after touching "ON-BOARD DIAGNOSIS".
If "NG" is displayed, go to [EC-227, "Diagnosis Procedure"](#).

Overall Function Check

INFOID:000000006579880

PROCEDURE MALFUNCTION B

Use this procedure to check the overall function of the A/F sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in the suitable gear position.
3. Set shift lever to D position (CVT) or 5th position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (31 MPH).
NOTE:
Never apply brake during releasing the accelerator pedal.
4. Repeat steps 2 and 3 for five times.
5. Stop the vehicle and turn ignition switch OFF.
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 and 3 for five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no 1st trip DTC is displayed.
If 1st trip DTC is displayed, go to [EC-227, "Diagnosis Procedure"](#).

DTC P0130 A/F SENSOR 1

< SERVICE INFORMATION >

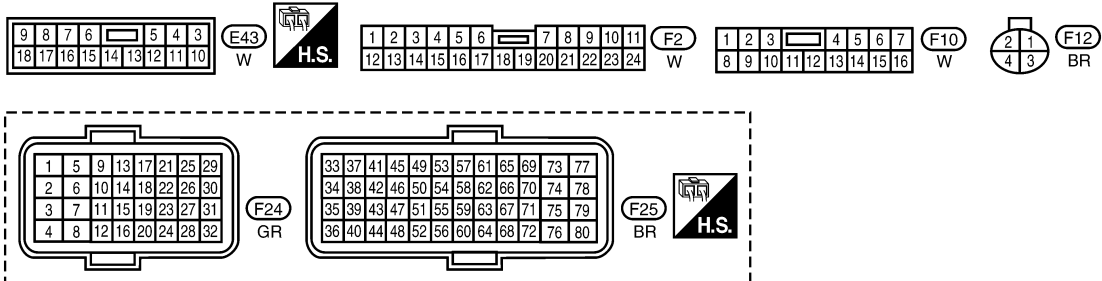
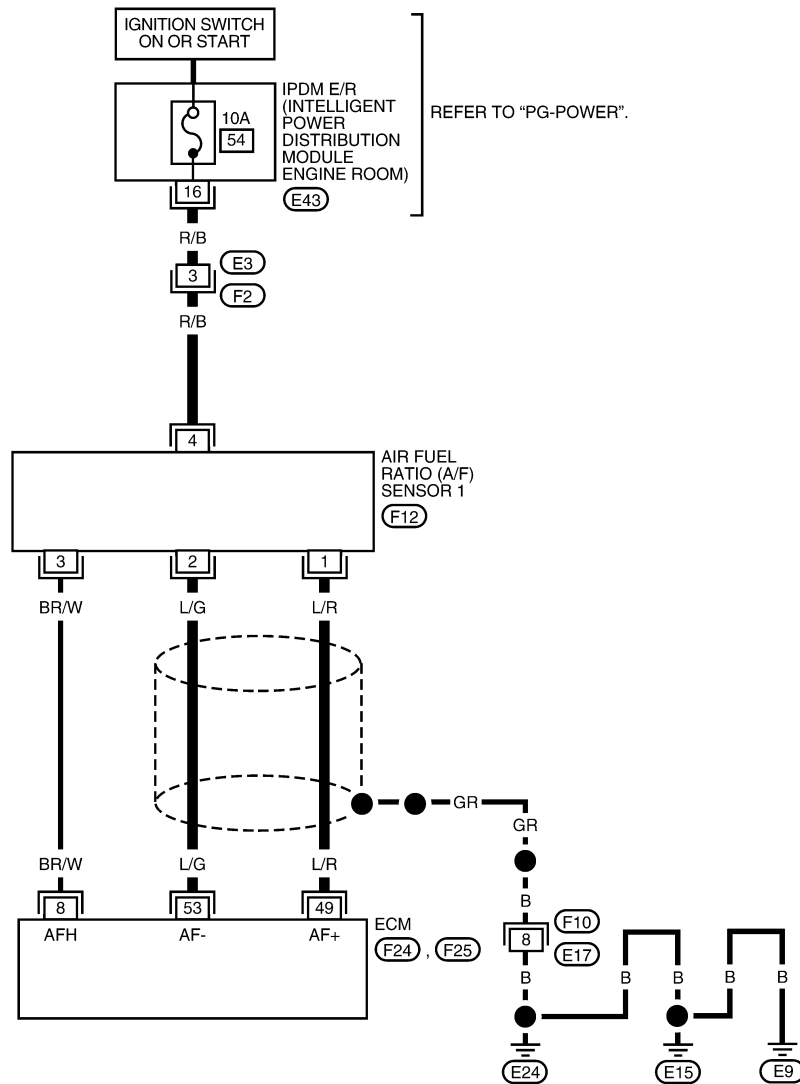
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006579881

Wiring Diagram

EC-A/F-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0146GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

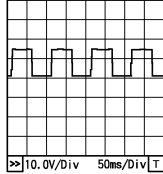
CAUTION:

DTC P0130 A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBI A8148J
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

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

Diagnosis Procedure

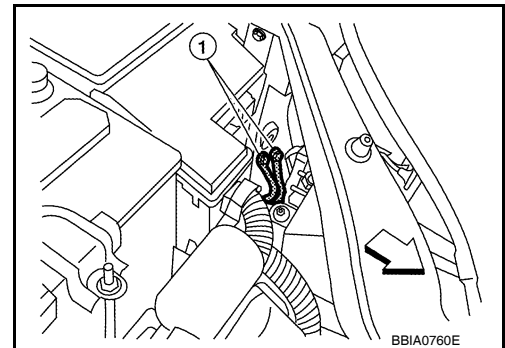
INFOID:000000006579882

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

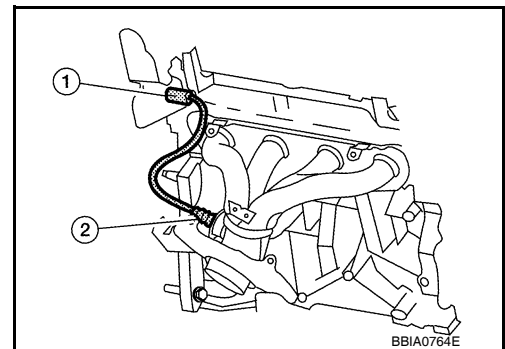
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



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

- Disconnect A/F sensor 1 harness connector (1).
- Turn ignition switch ON.



DTC P0130 A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

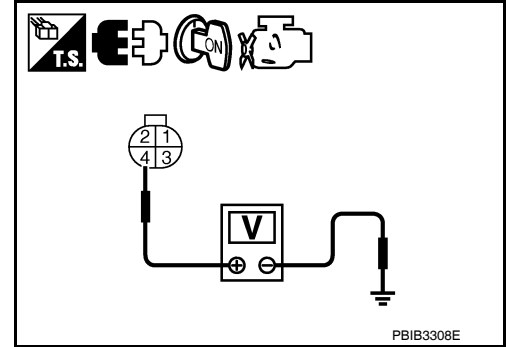
< SERVICE INFORMATION >

3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-153](#).

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

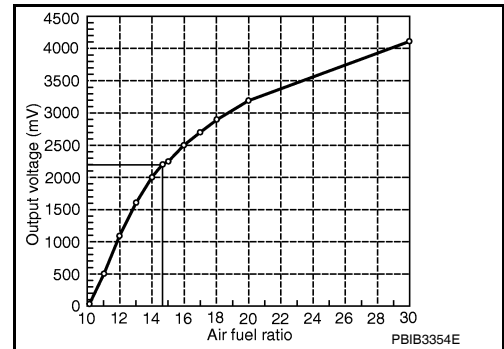
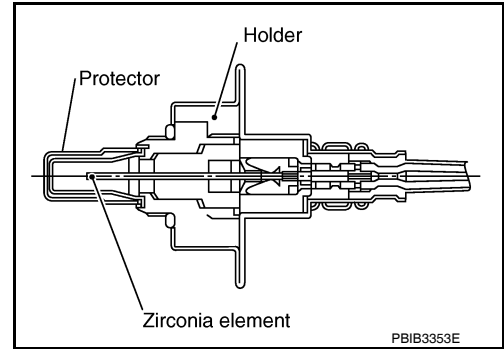
>> INSPECTION END

DTC P0131 A/F SENSOR 1

Component Description

INFOID:000000006579884

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 λ 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 about 800°C (1,472°F).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579885

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1)	<ul style="list-style-type: none"> Engine: After warming up Maintaining engine speed at 2,000 rpm 	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006579886

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately low.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0131 0131	Air fuel ratio (A/F) sensor 1 circuit low voltage	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 0 V.	<ul style="list-style-type: none"> Harness or connectors [Air fuel ratio (A/F) sensor circuit is open or shorted.] Air fuel ratio (A/F) sensor 1

DTC Confirmation Procedure

INFOID:000000006579887

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
3. Check "A/F SEN1 (B1)" indication.
If the indication is constantly approx. 0 V, go to [EC-232. "Diagnosis Procedure"](#).

DTC P0131 A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

If the indication is not constantly approx. 0 V, go to next step.

4. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
5. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.
6. Maintain the following conditions for about 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
Shift lever	Suitable position

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 4, return to step 4.

7. Check 1st trip DTC.
8. If 1st trip DTC is displayed, go to [EC-232. "Diagnosis Procedure"](#).

 WITH GST

Follow the procedure "WITH CONSULT-III" above.

DTC P0131 A/F SENSOR 1

< SERVICE INFORMATION >

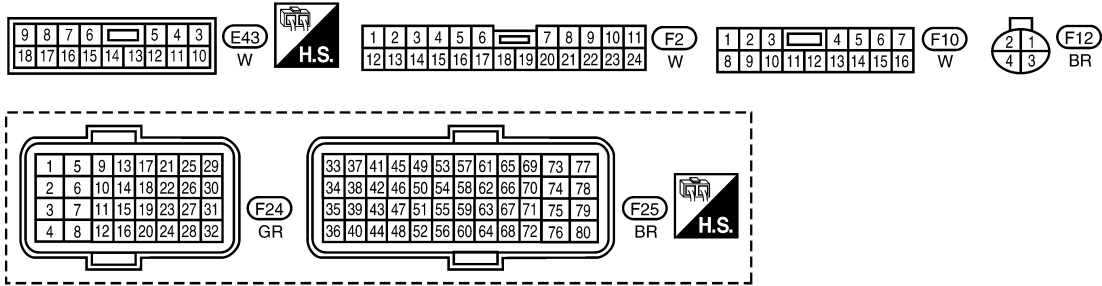
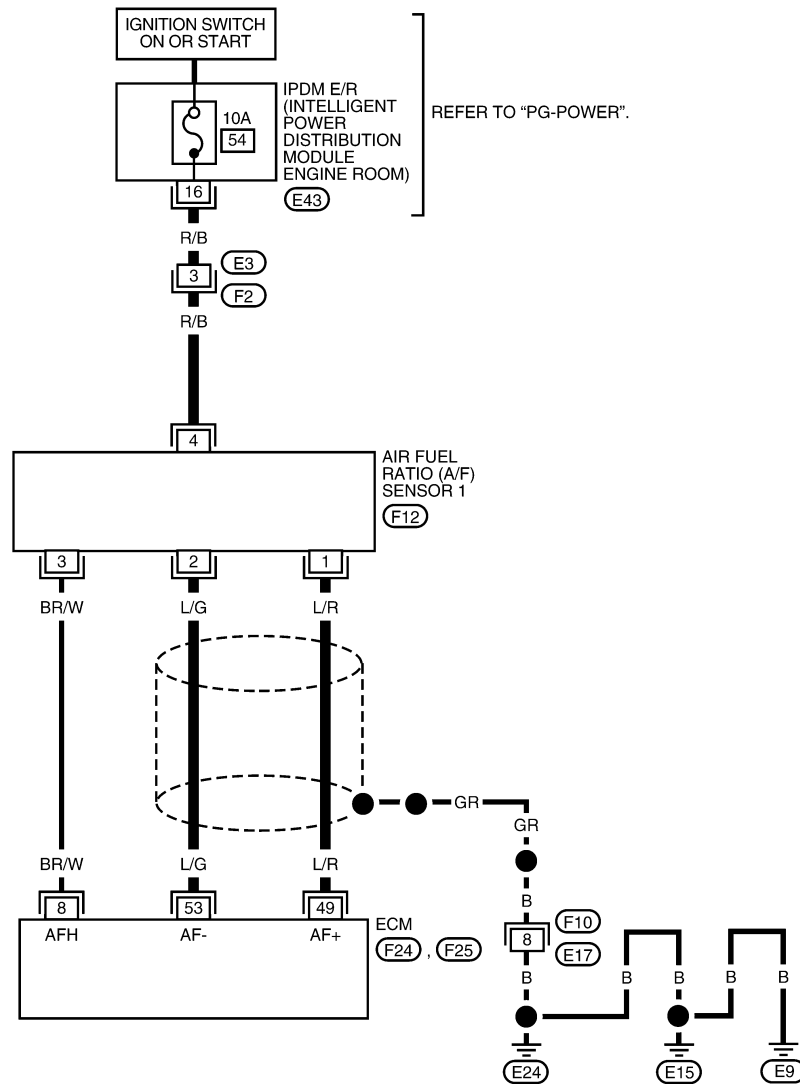
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006579888

Wiring Diagram

EC-A/F-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0146GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

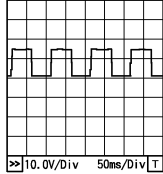
CAUTION:

DTC P0131 A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ 
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

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

Diagnosis Procedure

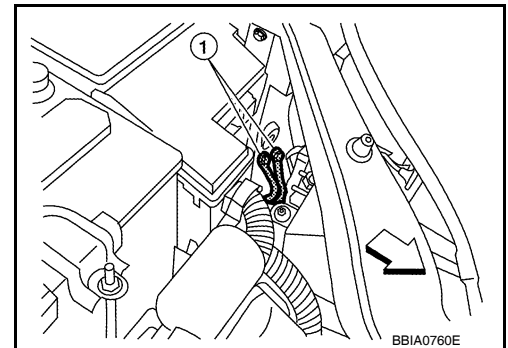
INFOID:000000006579889

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

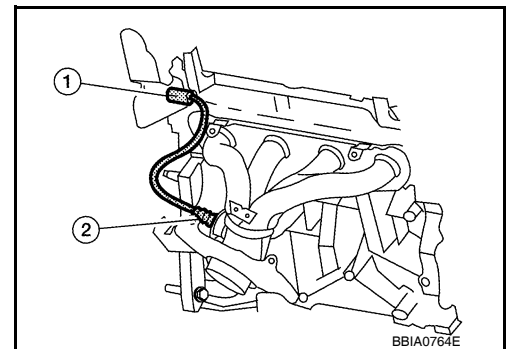
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



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

- Disconnect A/F sensor 1 harness connector (1).
- Turn ignition switch ON.



DTC P0131 A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

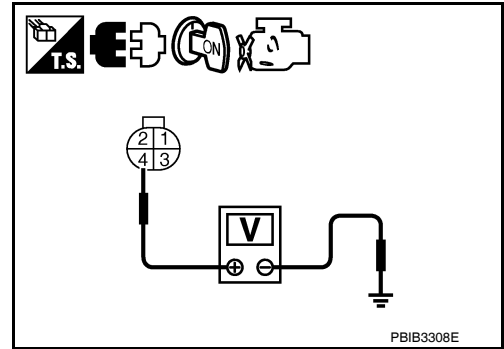
< SERVICE INFORMATION >

3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-153](#).

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

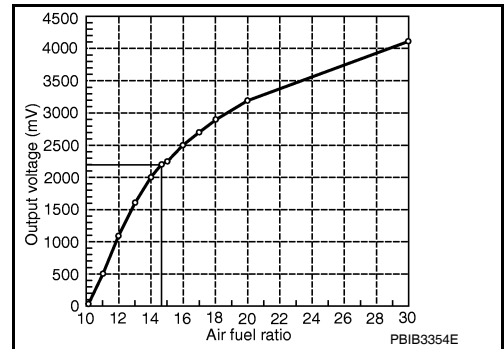
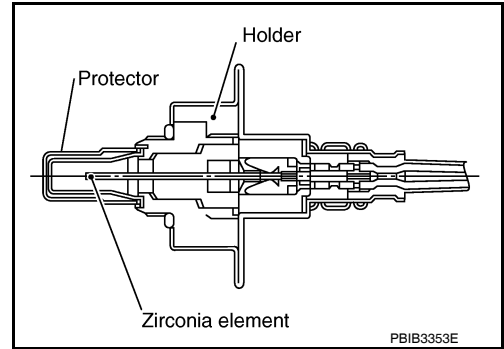
>> INSPECTION END

DTC P0132 A/F SENSOR 1

Component Description

INFOID:000000006579891

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 λ 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 about 800°C (1,472°F).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579892

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1)	<ul style="list-style-type: none"> Engine: After warming up Maintaining engine speed at 2,000 rpm 	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006579893

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately high.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0132 0132	Air fuel ratio (A/F) sensor 1 circuit high voltage	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 5 V.	<ul style="list-style-type: none"> Harness or connectors [Air fuel ratio (A/F) sensor circuit is open or shorted.] Air fuel ratio (A/F) sensor 1

DTC Confirmation Procedure

INFOID:000000006579894

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

WITH CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
- Check "A/F SEN1 (B1)" indication.
If the indication is constantly approx. 5 V, go to [EC-237. "Diagnosis Procedure"](#).

DTC P0132 A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

If the indication is not constantly approx. 5 V, go to next step.

4. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
5. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.
6. Maintain the following conditions for about 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
Shift lever	Suitable position

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 4, return to step 4.

7. Check 1st trip DTC.
8. If 1st trip DTC is displayed, go to [EC-237. "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "WITH CONSULT-III" above.

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DTC P0132 A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

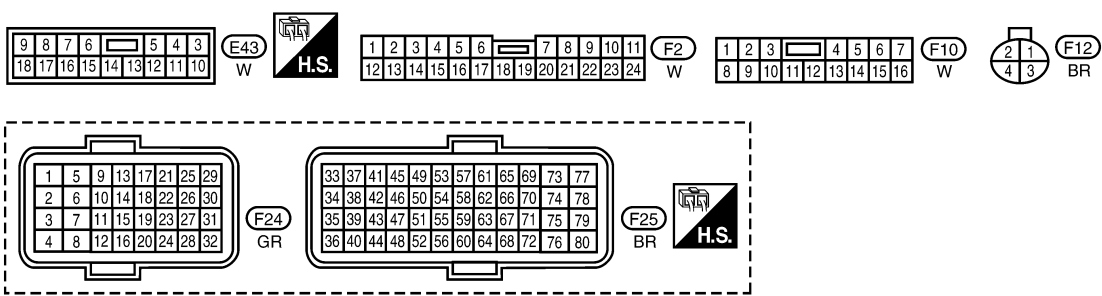
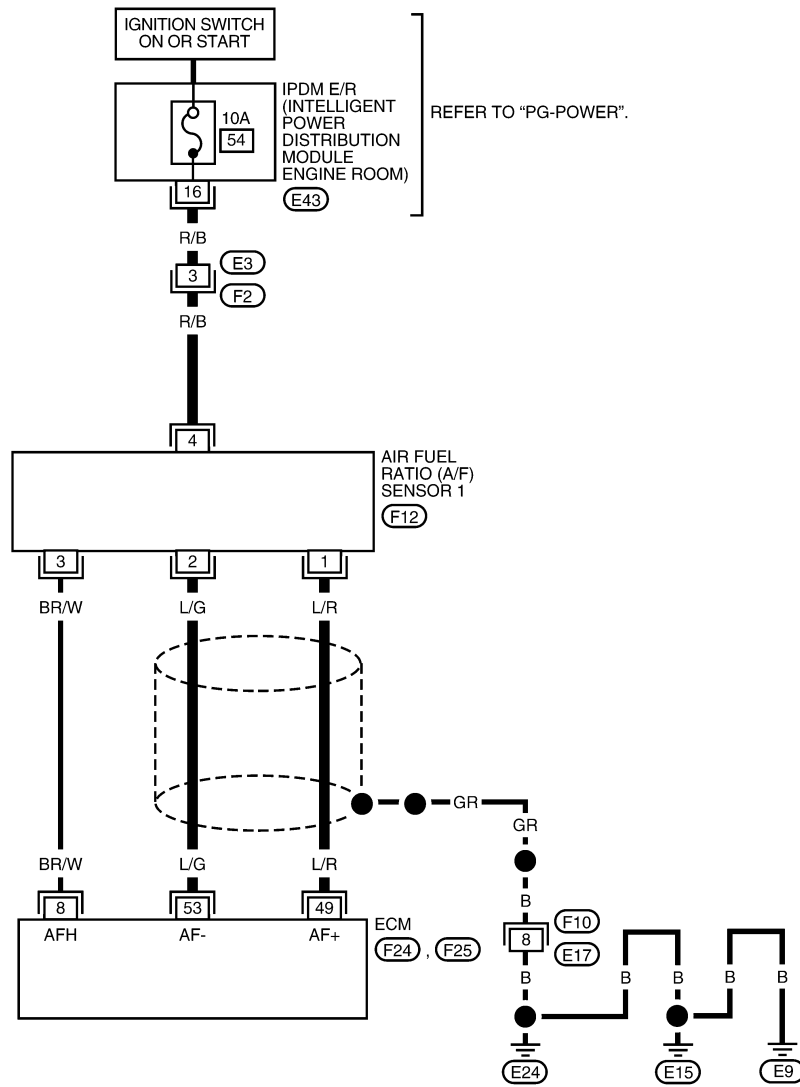
< SERVICE INFORMATION >

INFOID:000000006579895

Wiring Diagram

EC-A/F-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0146GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

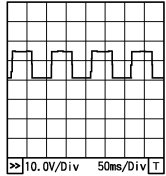
CAUTION:

DTC P0132 A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBI A8148J
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

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

Diagnosis Procedure

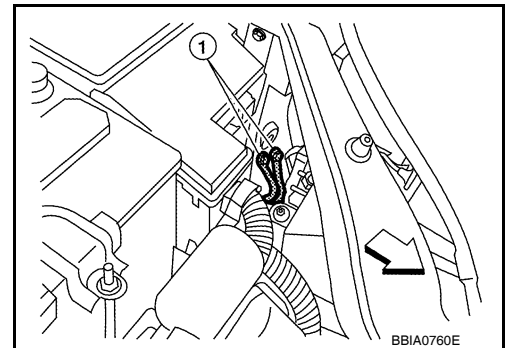
INFOID:000000006579896

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten three ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

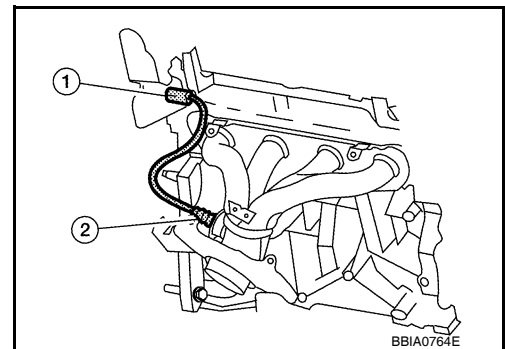
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



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

- Disconnect A/F sensor 1 harness connector (1).
- Turn ignition switch ON.



DTC P0132 A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

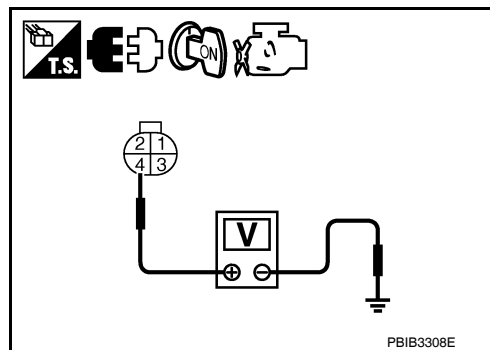
< SERVICE INFORMATION >

3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-153](#).

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

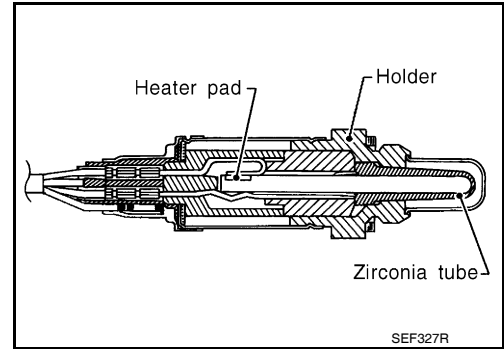
>> INSPECTION END

DTC P0137 HO2S2

Component Description

INFOID:000000006579905

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579906

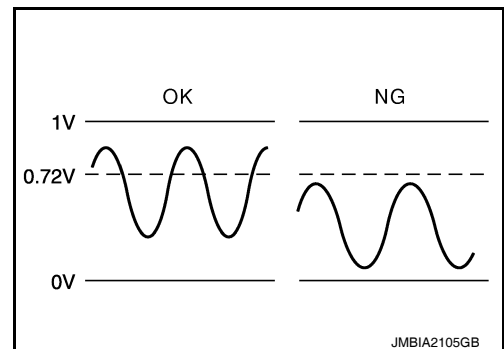
Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 (B1)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)		LEAN ↔ RICH

On Board Diagnosis Logic

INFOID:000000006579907

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 before 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 the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0137 0137	Heated oxygen sensor 2 circuit low voltage	The maximum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> • Harness or connectors (Heated oxygen sensor 2 circuit open or shorted.) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks

DTC Confirmation Procedure

INFOID:000000006579908

NOTE:

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

Ⓜ WITH CONSULT-III

TESTING CONDITION:

For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).

< SERVICE INFORMATION >

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1147" (for DTC P0137) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
9. Following the instruction of CONSULT-III.
NOTE:
It will take at most 10 minutes until "COMPLETED" is displayed.
10. Make sure that "OK" is displayed after touching "ON-BOARD DIAGNOSIS".
If "NG" is displayed, refer to [EC-242, "Diagnosis Procedure"](#).
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
 - b. Return to step 1.

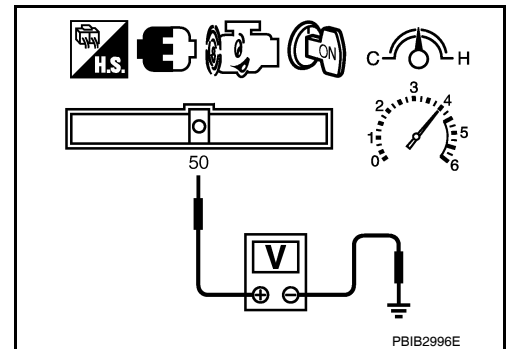
Overall Function Check

INFOID:000000006579909

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

 WITH GST

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 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.72 V at least once during this procedure.
If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be above 0.72 V at least once during this procedure.
8. If NG, go to [EC-242, "Diagnosis Procedure"](#).



DTC P0137 HO2S2

[MR20DE (FOR CALIFORNIA)]

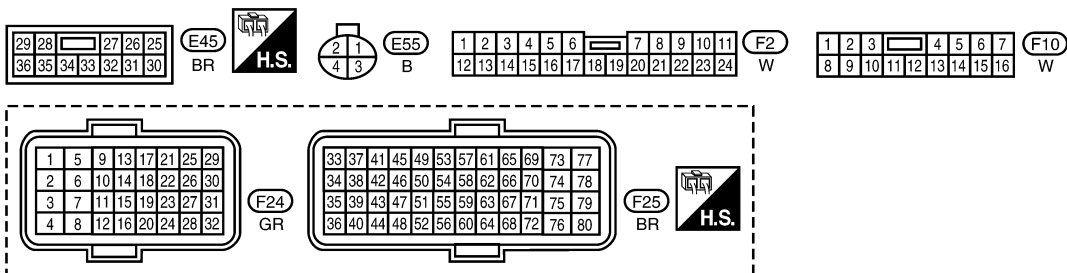
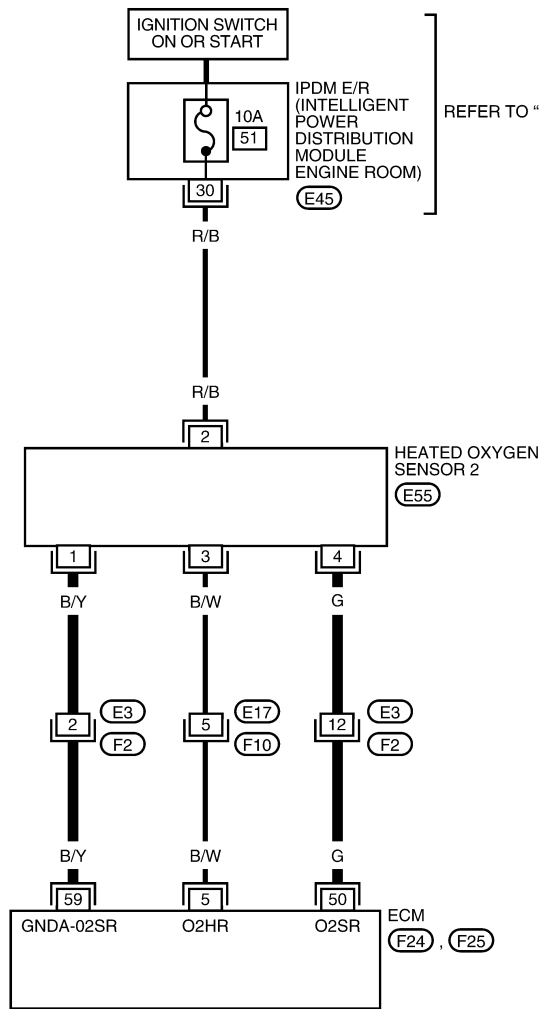
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006579910

EC-HO2S2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0278GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

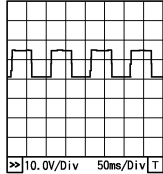
CAUTION:

DTC P0137 HO2S2

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
5	B/W	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★ 
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
50	G	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> Revvng engine from idle to 3,000 rpm quickly after the following conditions are met. <ul style="list-style-type: none"> - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
59	B/Y	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed 	Approximately 0 V

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

Diagnosis Procedure

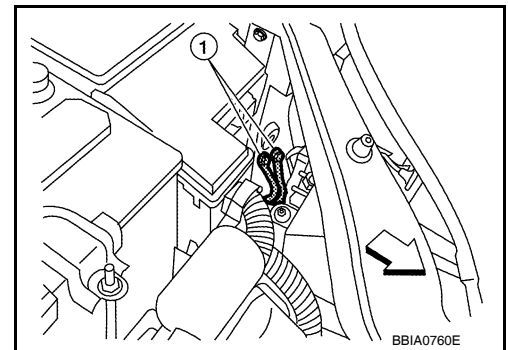
INFOID:000000006579911

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screw on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CLEAR THE SELF-LEARNING DATA

④ With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
- Clear the self-learning control coefficient by touching "CLEAR".
- Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 detected?

Is it difficult to start engine?

⊗ Without CONSULT-III

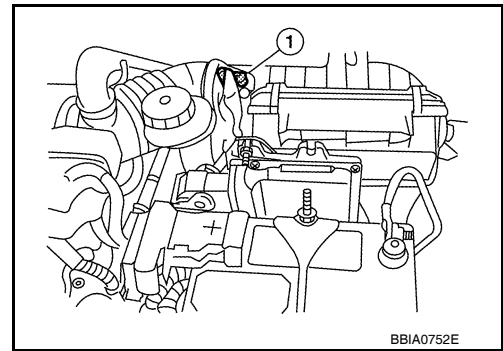
- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF.

DTC P0137 HO2S2

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-59. "Emission-related Diagnostic Information"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
**Is the 1st trip DTC P0171 detected?
Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171. Refer to [EC-272](#).
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector (2).
 - ⇐ : Vehicle front
 - Heated oxygen sensor 2 (1)
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 59 and HO2S2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

5. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and HO2S2 terminal 4. Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground. Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

>> Repair open circuit or short to ground or short between heated oxygen sensor 2 and ECM.

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< SERVICE INFORMATION >

7. CHECK HEATED OXYGEN SENSOR 2Refer to [EC-244, "Component Inspection"](#).OK or NG

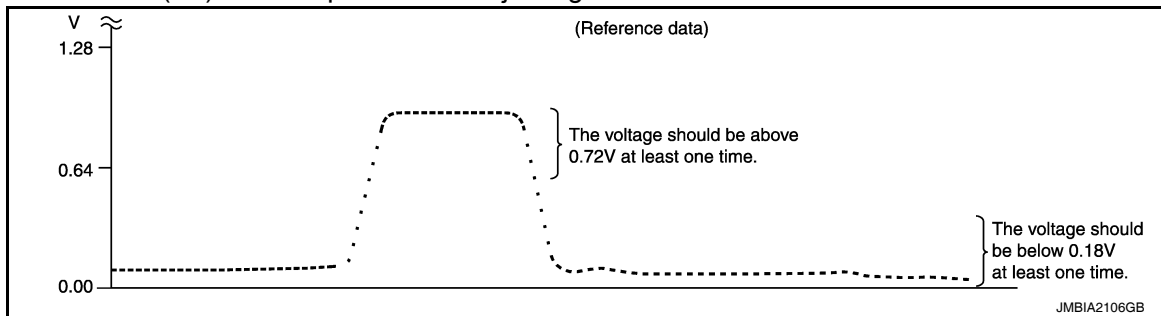
OK >> GO TO 6.

NG >> Replace heated oxygen sensor 2. Refer to [EX-5](#).**8. CHECK INTERMITTENT INCIDENT**Refer to [EC-153](#).>> **INSPECTION END****Component Inspection**

INFOID:000000006579912

HEATED OXYGEN SENSOR 2**Ⓜ WITH CONSULT-III**

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. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-III.
6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.72 V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

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

Ⓧ WITHOUT CONSULT-III

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. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.

DTC P0137 HO2S2

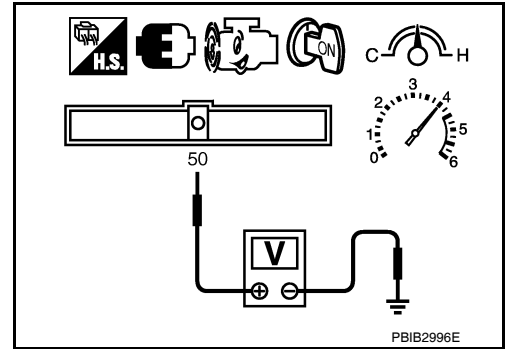
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
If the voltage can be confirmed at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2. Refer to [EX-5](#).

CAUTION:

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



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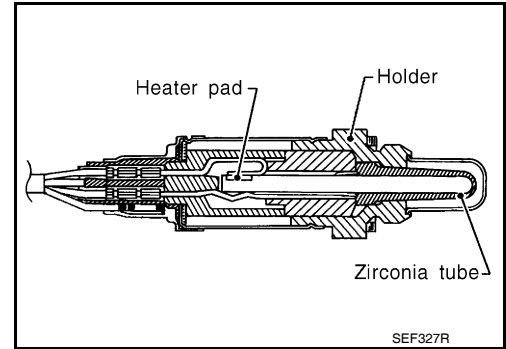
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DTC P0138 HO2S2

Component Description

INFOID:000000006579914

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579915

Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 (B1)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)		LEAN ↔ RICH

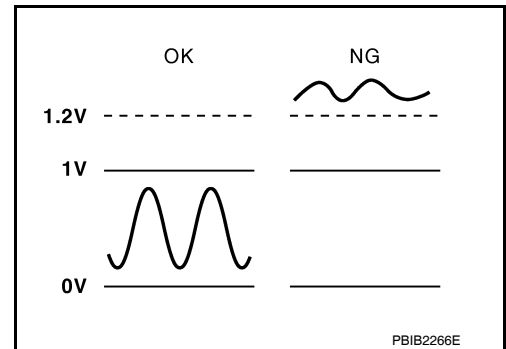
On Board Diagnosis Logic

INFOID:000000006579916

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 before the three way catalyst (manifold) causes the longer switching time.

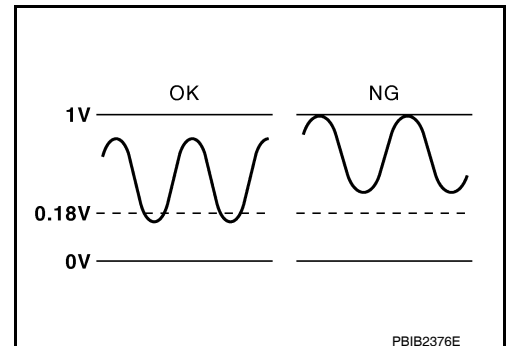
MALFUNCTION A

To judge the malfunctions of rear heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition 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 the various driving condition such as fuel-cut.



DTC P0138 HO2S2

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138 0138	Heated oxygen sensor 2 circuit high voltage	A) An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Heated oxygen sensor 2 circuit is open or shorted.) • Heated oxygen sensor 2
		B) The minimum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> • Harness or connectors (Heated oxygen sensor circuit is open or shorted.) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector

DTC Confirmation Procedure

INFOID:000000006579917

Perform PROCEDURE FOR MALFUNCTION A first.
If DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.

NOTE:

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

PROCEDURE FOR MALFUNCTION A

WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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 2 minutes.
6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-250. "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "With CONSULT-III" above.

PROCEDURE FOR MALFUNCTION B

WITH CONSULT-III

TESTING CONDITION:

For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III
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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1146" (for DTC P0138) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
9. Following the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

10. Make sure that "OK" is displayed after touching "ON-BOARD DIAGNOSIS".
 If "NG" is displayed, refer to [EC-250. "Diagnosis Procedure"](#).
 If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
 - b. Return to step 1.

Overall Function Check

PROCEDURE FOR MALFUNCTION B

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

 WITH GST

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 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)

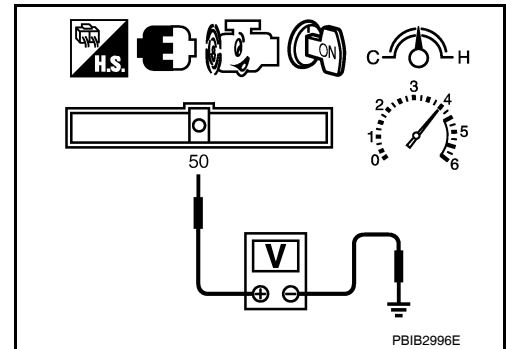
The voltage should be below 0.18 V at least once during this procedure.

If the voltage can be confirmed in step 6, step 7 is not necessary.

7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).

The voltage should be below 0.18 V at least once during this procedure.

8. If NG, go to [EC-250, "Diagnosis Procedure"](#).



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DTC P0138 HO2S2

[MR20DE (FOR CALIFORNIA)]

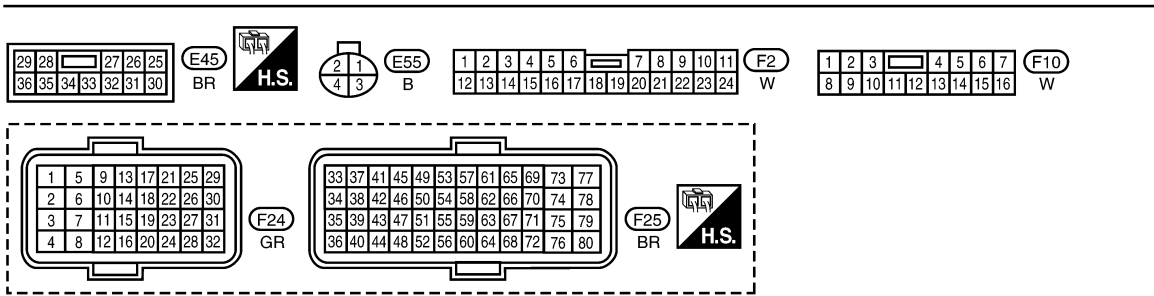
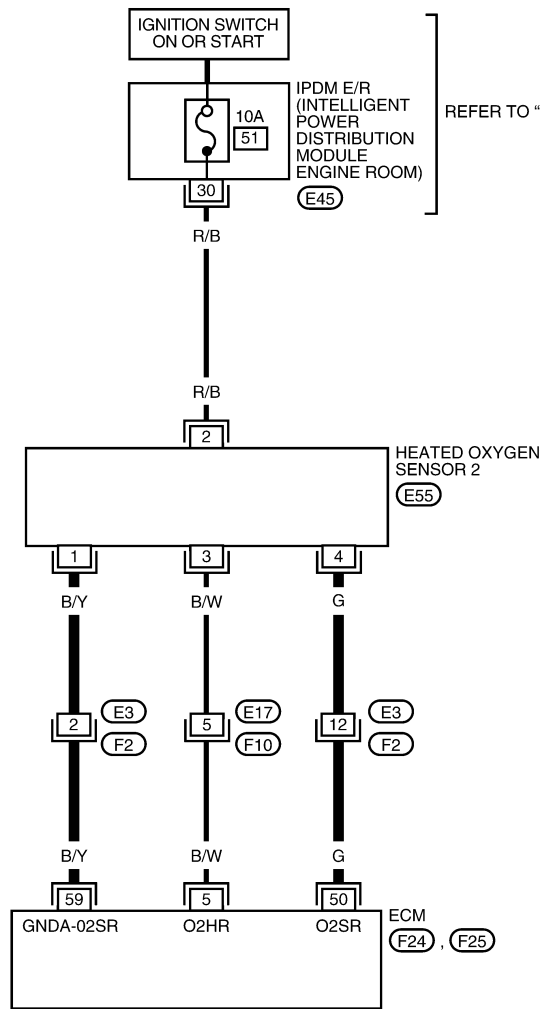
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006579919

EC-HO2S2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0278GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

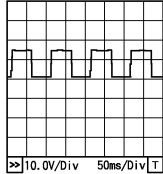
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DTC P0138 HO2S2

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
5	B/W	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★ 
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
50	G	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> Revvng engine from idle to 3,000 rpm quickly after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
59	B/Y	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed 	Approximately 0 V

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

Diagnosis Procedure

INFOID:000000006579920

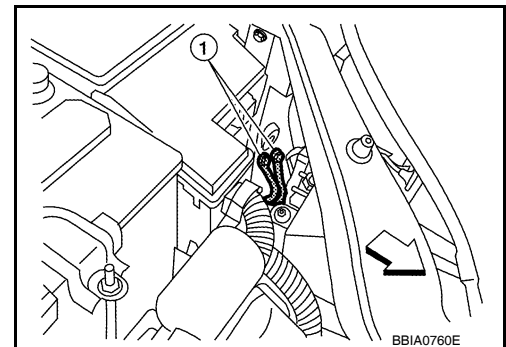
PROCEDURE FOR MALFUNCTION A

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten engine screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



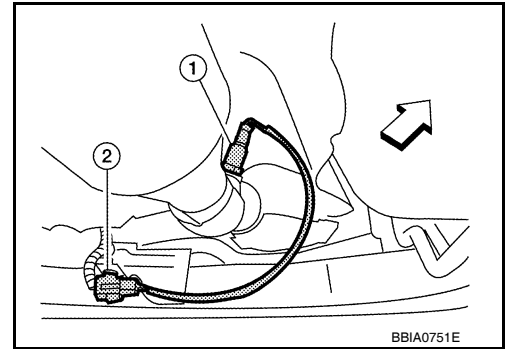
2. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

DTC P0138 HO2S2

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect heated oxygen sensor 2 harness connector (2).
 - ⇐ : Vehicle front
 - Heated oxygen sensor 2 (1)
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 59 and HO2S2 terminal 1. Refer to Wiring Diagram.



Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.

3.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

4.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and HO2S2 terminal 4. Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground. Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

6.CHECK HO2S2 CONNECTOR FOR WATER

Check connectors for water.

Water should not exist.

OK or NG

- OK >> GO TO 7.
- NG >> Repair or replace harness or connectors.

7.CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-253, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace heated oxygen sensor 2. Refer to [EX-5](#).

8.CHECK INTERMITTENT INCIDENT

< SERVICE INFORMATION >

Refer to [EC-153](#).>> **INSPECTION END**

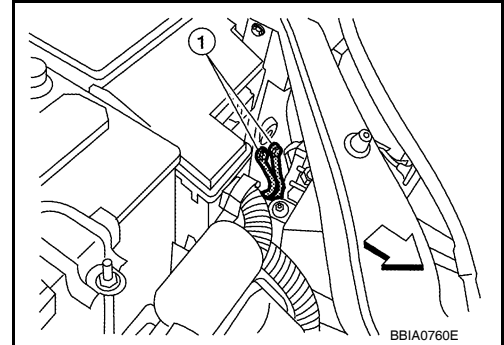
PROCEDURE FOR MALFUNCTION B

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten engine screws on the body.
Refer to [EC-158](#), "Ground Inspection".
- ⇐ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

**2. CLEAR THE SELF-LEARNING DATA****Ⓟ With CONSULT-III**

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected?**Is it difficult to start engine?****ⓧ Without CONSULT-III**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-59](#), "Emission-related Diagnostic Information".
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected?**Is it difficult to start engine?**Yes or No

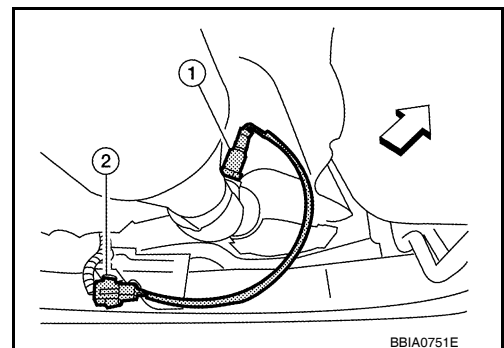
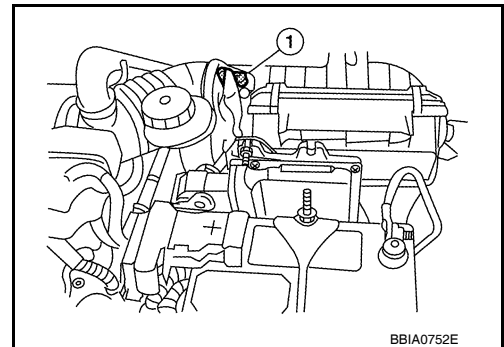
- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-278](#).
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector (2).
- ⇐ : Vehicle front
- Heated oxygen sensor 2 (1)
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 59 and HO2S2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

< SERVICE INFORMATION >

- OK >> GO TO 5.
 NG >> GO TO 4.

4.CHECK MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

5.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and HO2S2 terminal 4.
Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground.
Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 7.
 NG >> GO TO 6.

6.CHECK MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

7.CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-253, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
 NG >> Replace heated oxygen sensor 2. Refer to [EX-5](#).

8.CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006579921

HEATED OXYGEN SENSOR 2

 WITH CONSULT-III

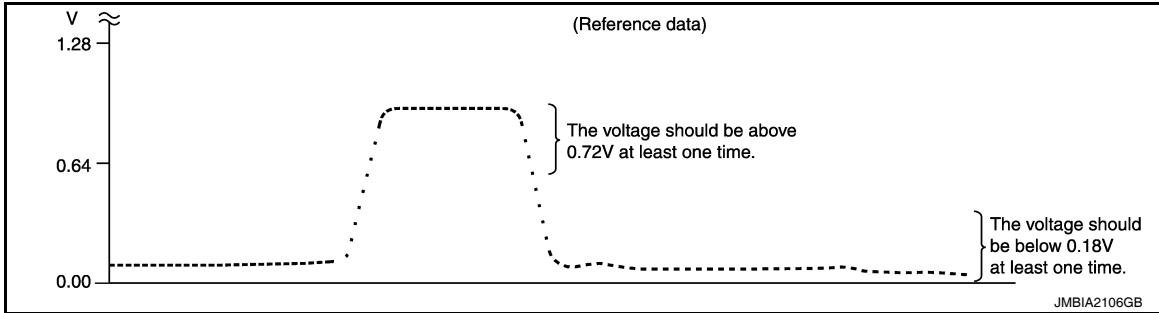
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-III.

DTC P0138 HO2S2

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.72 V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

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

⊗ WITHOUT CONSULT-III

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. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)

The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.

If the voltage can be confirmed at step 6, step 7 is not necessary.

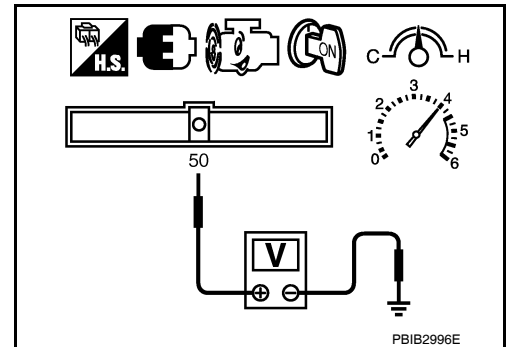
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).

The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.

8. If NG, replace heated oxygen sensor 2. Refer to [EX-5](#).

CAUTION:

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

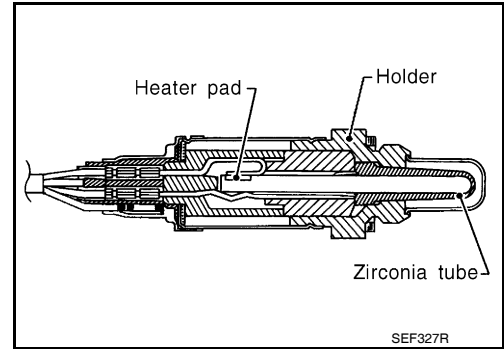


DTC P0139 HO2S2

Component Description

INFOID:000000006579923

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579924

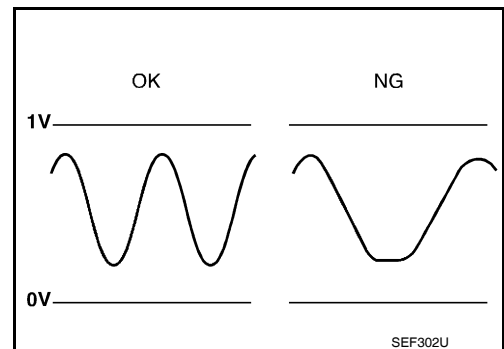
Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 (B1)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keep the engine speed between 3,500 rpm and 4,000 rpm for 1 minute and idle for 1 minute under no load 	0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)		LEAN ↔ RICH
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (delayed response) is complete.	CMPLT
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (slow response) is complete.	CMPLT

On Board Diagnosis Logic

INFOID:000000006579925

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.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139 0139	Heated oxygen sensor 2 (bank 1) circuit slow response	The switching time between rich and lean of a heated oxygen sensor 2 signal delays more than the specified time computed by ECM.	<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel system • EVAP system • Intake air system

DTC Confirmation Procedure

INFOID:000000006579926

1.INSPECTION START

Do you have CONSULT-III?

< SERVICE INFORMATION >

Do you have CONSULT-III?

- 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).

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

ⓅWith CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
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. Make sure that “COOLAN TEMP/S” indicates more than 70°C (158°F).
9. Drive the vehicle in a proper at 60 km/h (38MPH) and maintain the speed.

CAUTION:

Always drive vehicle at a safe speed.

10. Release the accelerator pedal fully at least 5 seconds.

CAUTION:

- **Enable 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)	CMPLT
HO2 S2 DIAG2 (B1)	

Is “CMPLT” displayed on CONSULT-III 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.
2. Select “HO2S2 (B1) P0139” in “DTC WORK SUPPORT” mode with CONSULT-III.
3. Start engine and follow the instruction of CONSULT-III display.

NOTE:

It will take at most 10 minutes until “COMPLETED” is displayed.

Is “COMPLETED” displayed on CONSULT-III 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.

< SERVICE INFORMATION >

>> GO TO 3.

6.PERFORM SELF-DIAGNOSIS **With CONSULT-III**

Perform ECM self-diagnosis.

Is DTC "P0139" detected?YES >> Proceed to [EC-260, "Diagnosis Procedure"](#).

NO >> INSPECTION END

7.PERFORM OVERALL FUNCTION CHECKPerform overall function check. Refer to [EC-257, "Overall Function Check"](#).**NOTE:**

Use overall 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 [EC-260, "Diagnosis Procedure"](#). **WITH CONSULT-III****TESTING CONDITION:****For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30 °C (32 to 86 °F).**

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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. Make sure 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 to 70°C (158°F).
7. Select "HO2S2 (B1) P0139" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
8. Following the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

9. Make sure that "OK" is displayed after touching "ON-BOARD DIAGNOSIS".
If "NG" is displayed, refer to [EC-260, "Diagnosis Procedure"](#).
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
 - b. Return to step 1.

Overall Function Check

INFOID:000000006579927

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

 **WITH GST**

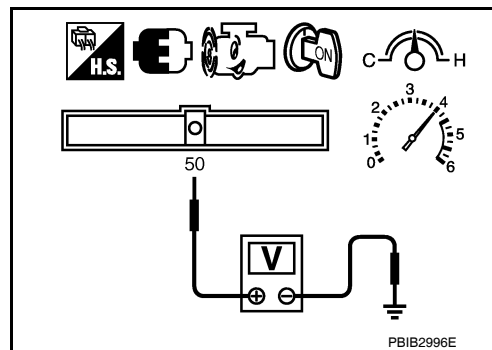
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.

DTC P0139 HO2S2

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
A change of voltage should be more than 0.8 V for 1 second during this procedure.
If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
A change of voltage should be more than 0.8 V for 1 second during this procedure.
8. If NG, go to [EC-260, "Diagnosis Procedure"](#).



DTC P0139 HO2S2

[MR20DE (FOR CALIFORNIA)]

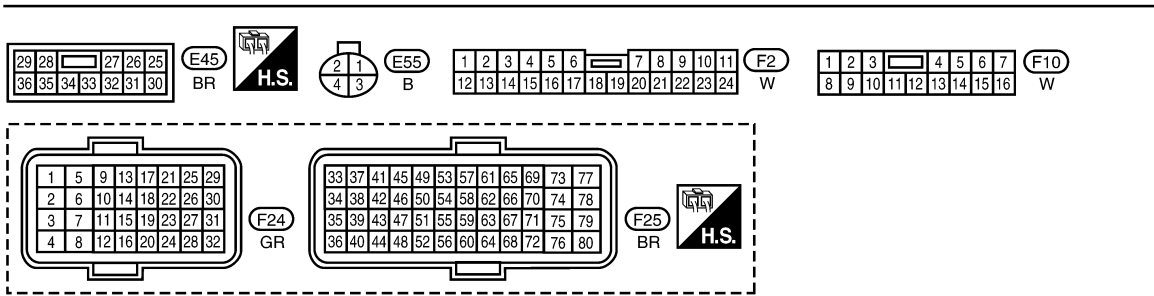
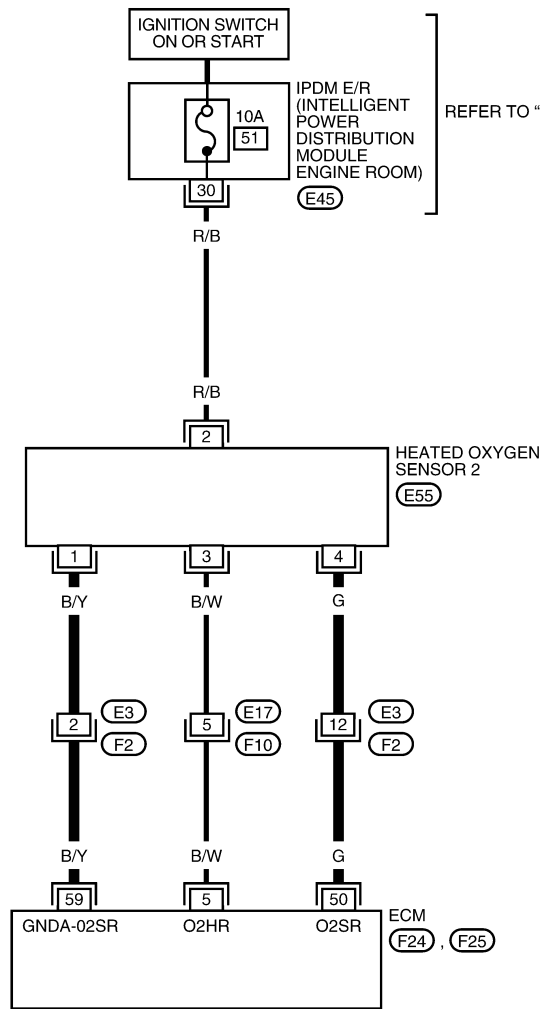
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006579928

EC-HO2S2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC

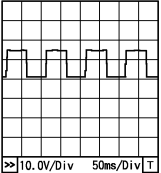


AABWA0278GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

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

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
5	B/W	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	Approximately 10 V★ 
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm 	BATTERY VOLTAGE (11 - 14 V)
50	G	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> Revvng engine from idle to 3,000 rpm quickly after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
59	B/Y	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed 	Approximately 0 V

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

Diagnosis Procedure

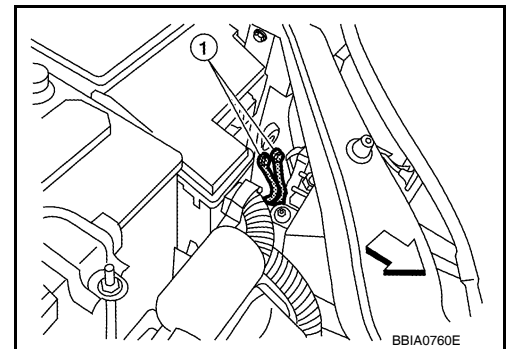
INFOID:000000006579929

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CLEAR THE SELF-LEARNING DATA

With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
- Clear the self-learning control coefficient by touching "CLEAR".
- Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 or P0172 detected?
Is it difficult to start engine?

Without CONSULT-III

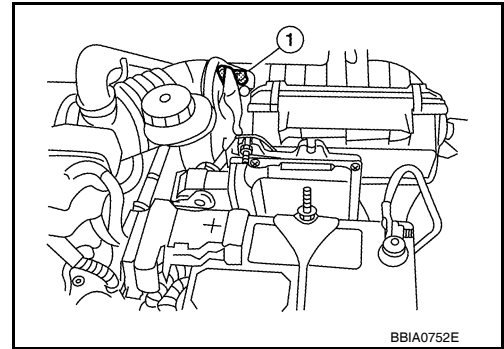
- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF.

DTC P0139 HO2S2

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-59. "Emission-related Diagnostic Information"](#).
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
**Is the 1st trip DTC P0171 or P0172 detected?
Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-272](#) or [EC-278](#).
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector (2).
 - ⇐: Vehicle front
 - Heated oxygen sensor 2 (1)
3. Disconnect ECM harness connector.
4. Check harness continuity between HO2S2 terminal 1 and ECM terminal 59. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

5. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S2 terminal 4 and ECM terminal 50. Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground. Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

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< SERVICE INFORMATION >

7. CHECK HEATED OXYGEN SENSOR 2Refer to [EC-262, "Component Inspection"](#).OK or NG

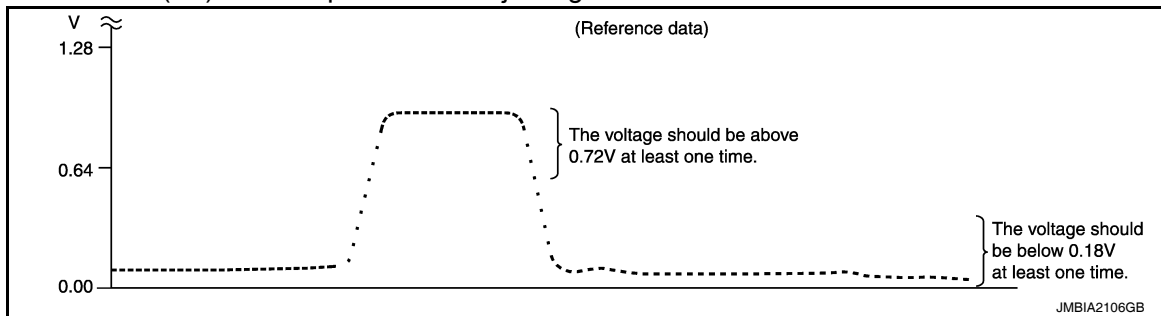
OK >> GO TO 8.

NG >> Replace heated oxygen sensor 2. Refer to [EX-5](#).**8. CHECK INTERMITTENT INCIDENT**Refer to [EC-153](#).>> **INSPECTION END****Component Inspection**

INFOID:000000006579930

HEATED OXYGEN SENSOR 2**Ⓜ WITH CONSULT-III**

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. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-III.
6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.72 V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

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

Ⓧ WITHOUT CONSULT-III

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. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.

DTC P0139 HO2S2

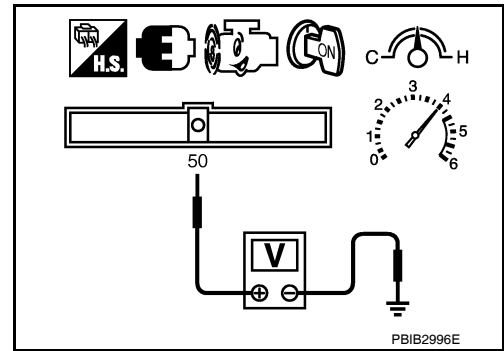
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
If the voltage can be confirmed at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2. Refer to [EX-5](#).

CAUTION:

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



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DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

Component Description

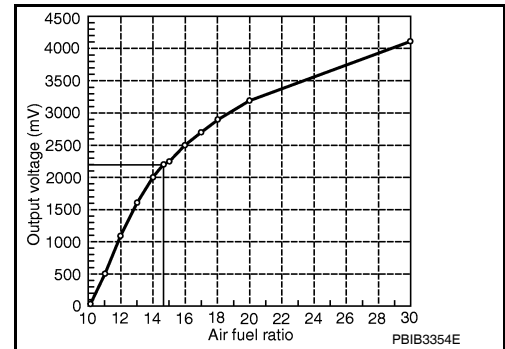
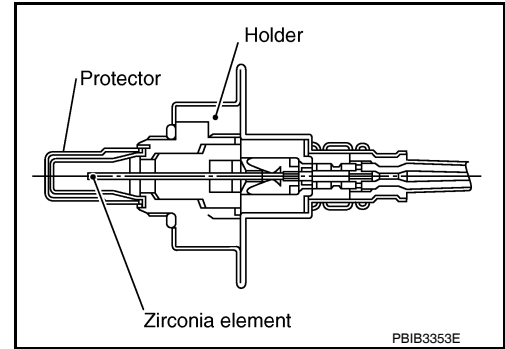
INFOID:000000006607805

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 λ 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 about 800°C (1,472°F).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006607806

Specification data are reference values.

Monitor item	Condition		Specification
A/F SEN1 (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
A/F SEN1 DIAG1 (B1)	DTC P015A and P015B self-diagnosis is incomplete.		INCMP
	DTC P015A and P015B self-diagnosis is complete.		CMPLT
A/F SEN1 DIAG2 (B1)	DTC P014C and P014D self-diagnosis is incomplete.		INCMP
	DTC P014C and P014D self-diagnosis is complete.		CMPLT
A/F SEN1 DIAG3 (B1)	The vehicle condition is not within the diagnosis range of DTC P014C, P014D, P015A or P015B.		ABSNT
	The vehicle condition is within the diagnosis range of DTC P014C, P014D, P015A or P015B.		PRSNB

On Board Diagnosis Logic

INFOID:000000006607807

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 (bank 1) circuit slow response	The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM.	<ul style="list-style-type: none"> • Harness or connectors (The A/F sensor 1 circuit is open or shorted.) • A/F sensor 1
P014D			
P015A	Air fuel ratio (A/F) sensor 1 (bank 1) circuit delayed response		
P015B			

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC Confirmation Procedure

INFOID:000000006607808

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 more than 11 V at idle.

Do you have CONSULT-III?

- YES >> GO TO 2.
NO >> GO TO 6.

2. PERFORM DTC CONFIRMATION PROCEDURE-1

Ⓜ With CONSULT-III

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 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. Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
8. Fully release accelerator pedal and then let engine idle for about 1 minute.
9. Check the items status of "DATA MONITOR" as follows.

NOTE:

If "PRCNT" changed to "ABSNP", refer to [EC-266, "Overall Function Check"](#).

Data monitor item	Status
A/F SEN1 DIAG3 (B1)	PRCNT

Is "PRCNT" displayed on CONSULT-III screen?

- YES >> GO TO 4.
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-2

Ⓜ With CONSULT-III

Perform DTC confirmation procedure-1 again.

Is "PRCNT" displayed on CONSULT-III screen?

- YES >> GO TO 4.
NO >> Refer to [EC-266, "Overall Function Check"](#).

4. PERFORM DTC CONFIRMATION PROCEDURE-2

1. Wait for about 20 seconds at idle.
2. Check the items status of "DATA MONITOR" as follows.

NOTE:

If "CMPLT" changed to "INCMPT", refer to [EC-266, "Overall Function Check"](#).

Data monitor item	Status
A/F SEN1 DIAG1 (B1)	CMPLT
A/F SEN1 DIAG2 (B1)	

Is "CMPLT" displayed on CONSULT-III screen?

- YES >> GO TO 5.
NO >> Refer to [EC-266, "Overall Function Check"](#).

5. PERFORM SELF-DIAGNOSIS

Ⓜ With CONSULT-III

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Check the "SELF-DIAG RESULT".

Is any DTC detected?

- YES >> Proceed to [EC-268, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

6. CHECK AIR-FUEL RATIO SELF-LEARNING VALUE

 **With GST**

1. 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 $\pm 15\%$?

- YES >> GO TO 8.
- NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Intake air leaks
- Exhaust gas leaks
- Incorrect fuel pressure
- Lack of fuel
- Fuel injector
- Incorrect PCV hose connection
- PCV valve
- Mass air flow sensor

>> Repair or replace malfunctioning part.

8. PERFORM DTC CONFIRMATION PROCEDURE

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 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 4,000 to 5,000 rpm and keep it for 10 seconds.
7. Fully release accelerator pedal and then let engine idle for about 1 minute.
8. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-268, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Overall Function Check

INFOID:000000006610567

PROCEDURE MALFUNCTION B

Use this procedure to check the overall function of the A/F sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

 **WITH GST**

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in the suitable gear position.
3. Set shift lever to D position (CVT) or 5th position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (31 MPH).

NOTE:

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 and 3 for five times.
5. Stop the vehicle and turn ignition switch OFF.
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 and 3 for five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no 1st trip DTC is displayed.

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

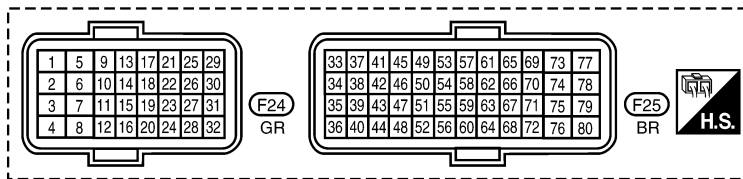
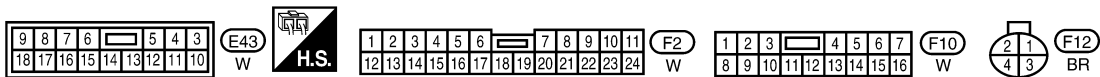
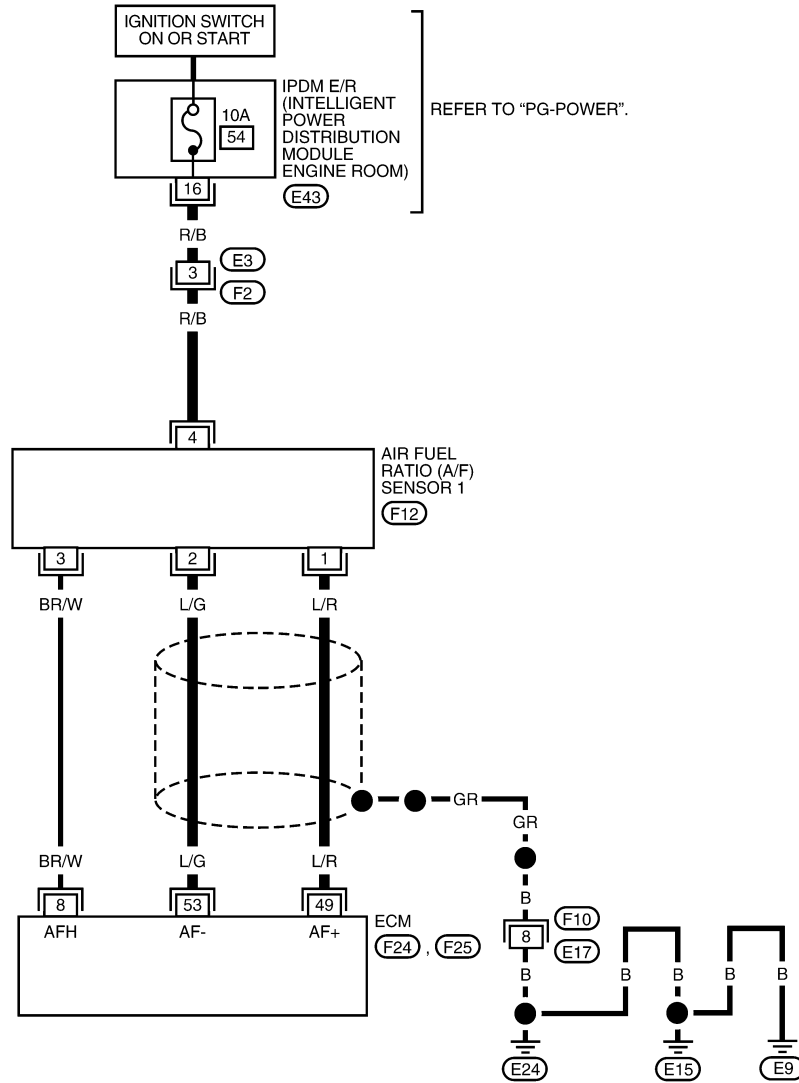
If 1st trip DTC is displayed, go to [EC-227. "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006579902

EC-A/F-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

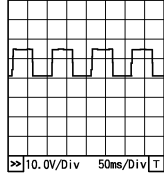
CAUTION:

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ 
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

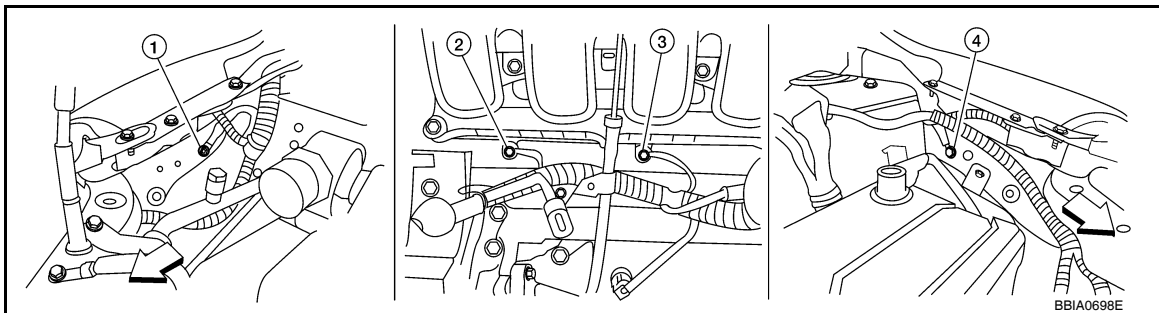
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006607810

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
- Loosen and retighten engine screw on the body.
Refer to [EC-158, "Ground Inspection"](#).



↶: Vehicle front

- Body ground E24
- Engine ground F9
- Engine ground F16
- Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1

Loosen and retighten the air fuel ratio (A/F) sensor 1. Refer to [EM-23, "Component"](#).

>> GO TO 3.

3. CHECK EXHAUST GAS LEAK

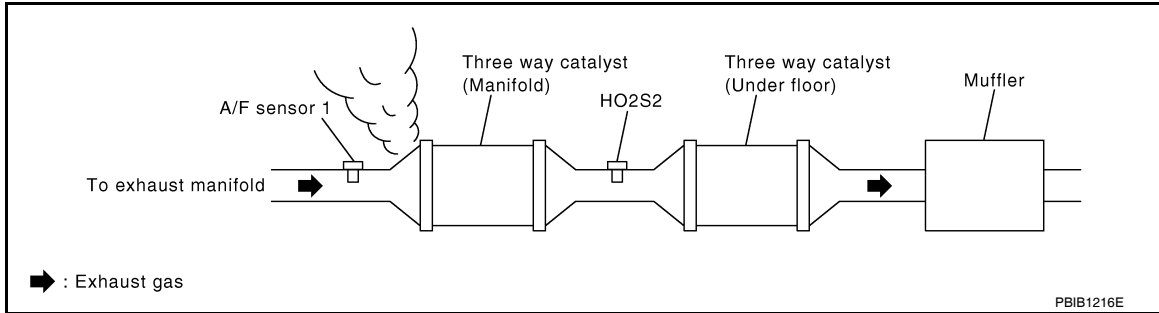
- Start engine and run it at idle.

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

- Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace. Refer to [EX-5](#).

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace. Refer to [EM-16](#).

5. CLEAR THE SELF-LEARNING DATA

With CONSULT-III

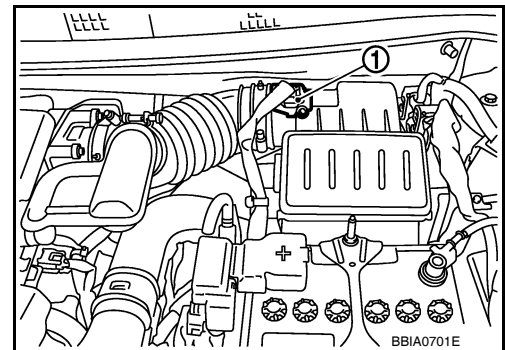
- Start engine and warm it up to normal operating temperature.
- Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
- Clear the self-learning control coefficient by touching "CLEAR" or "START".
- Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

Without CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF.
- Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
- Stop engine and reconnect mass air flow sensor harness connector.
- Make sure DTC P0102 is displayed.
- Erase the DTC memory. Refer to [EC-59. "Emission-related Diagnostic Information"](#).
- Make sure DTC P0000 is displayed.
- Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0172. Refer to [EC-272](#) or [EC-278](#).
- No >> GO TO 6.

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

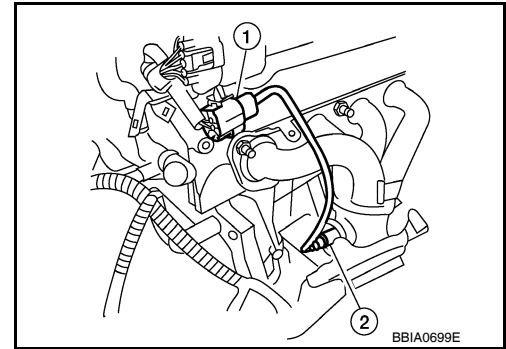
- Turn ignition switch OFF.

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Disconnect A/F sensor 1 harness connector (1).
 - Air fuel ratio (A/F) sensor (2)
3. Turn ignition switch ON.

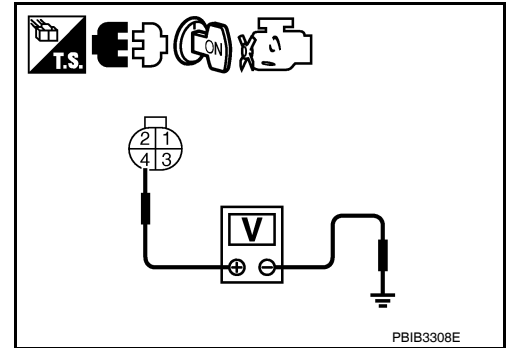


4. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.



7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E8, F8
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to [EC-173, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 13.

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

10. CHECK MASS AIR FLOW SENSOR

Refer to [EC-190. "Component Inspection"](#).

OK or NG

OK >> GO TO 11.

NG >> Replace mass air flow sensor. Refer to [EM-16](#).

11. CHECK PCV VALVE

Refer to [EC-53. "Component Inspection"](#).

OK or NG

OK >> GO TO 12.

NG >> Repair or replace PCV valve. Refer to [EM-33](#).

12. CHECK INTERMITTENT INCIDENT

Perform [EC-153. "Diagnosis Procedure"](#).

OK or NG

OK >> GO TO 13.

NG >> Repair or replace.

13. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23. "Component"](#).

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

A
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DTC P0171 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

On Board Diagnosis Logic

INFOID:000000006579932

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (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 lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Air fuel ratio (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
P0171 0171	Fuel injection system too lean	<ul style="list-style-type: none">Fuel injection system does not operate properly.The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)	<ul style="list-style-type: none">Intake air leaksAir fuel ratio (A/F) sensor 1Fuel injectorExhaust gas leaksIncorrect fuel pressureLack of fuelMass air flow sensorIncorrect PCV hose connection

DTC Confirmation Procedure

INFOID:000000006579933

NOTE:

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

④ WITH CONSULT-III

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 and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
4. Clear the self-learning control coefficient by touching "CLEAR".
5. Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction.
Perform the following procedure is advised.
 - a. 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.
 - b. If engine starts, go to [EC-275. "Diagnosis Procedure"](#).
If engine does not start, check exhaust and intake air leak visually.
6. Keep engine at idle for at least 5 minutes.
7. Check 1st trip DTC.
The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-275. "Diagnosis Procedure"](#).
NOTE:
If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.
 - a. Turn ignition switch OFF and wait at least 10 seconds.
 - b. Start engine.
 - c. Maintain the following conditions for at least 10 consecutive minutes.
Hold the accelerator pedal as steady as possible.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

VHCL SPEED SE	50 – 120 km/h (31 – 75 MPH)
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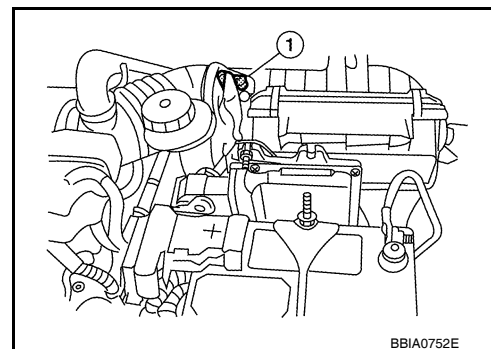
CAUTION:

Always drive vehicle at a safe speed.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-275, "Diagnosis Procedure"](#).

GS† 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. Disconnect mass air flow sensor (1) harness connector.
- 4. Restart engine and let idle for at least 5 seconds.
- 5. Stop engine and reconnect mass air flow sensor harness connector.
- 6. Select Service \$03 with GST. Make sure DTC P0102 is detected.
- 7. Select Service \$04 with GST and erase the DTC P0102.



- 8. Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction.
Perform the following procedure is advised.

- a. 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.

- b. If engine starts, go to [EC-275, "Diagnosis Procedure"](#).
If engine does not start, check exhaust and intake air leak visually.
- 9. Keep engine at idle for at least 5 minutes.

- 10. Check 1st trip DTC.

The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-275, "Diagnosis Procedure"](#).

NOTE:

If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

- a. Turn ignition switch OFF and wait at least 10 seconds.
- b. Start engine.
- c. 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)
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CAUTION:

Always drive vehicle at a safe speed.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-275, "Diagnosis Procedure"](#).

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

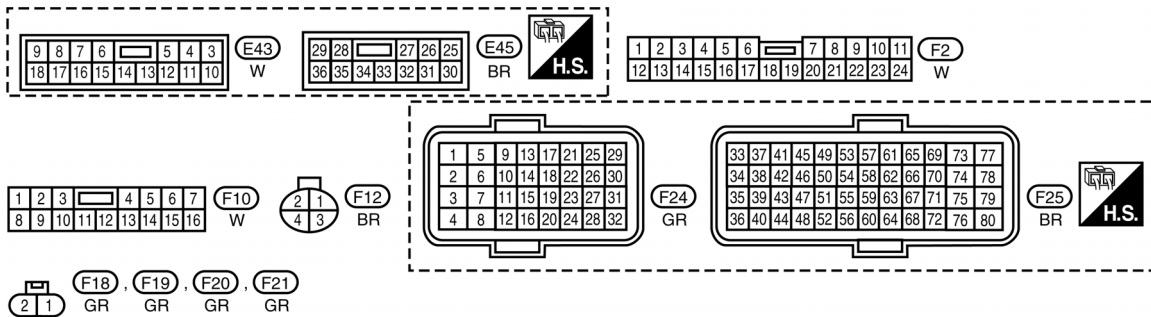
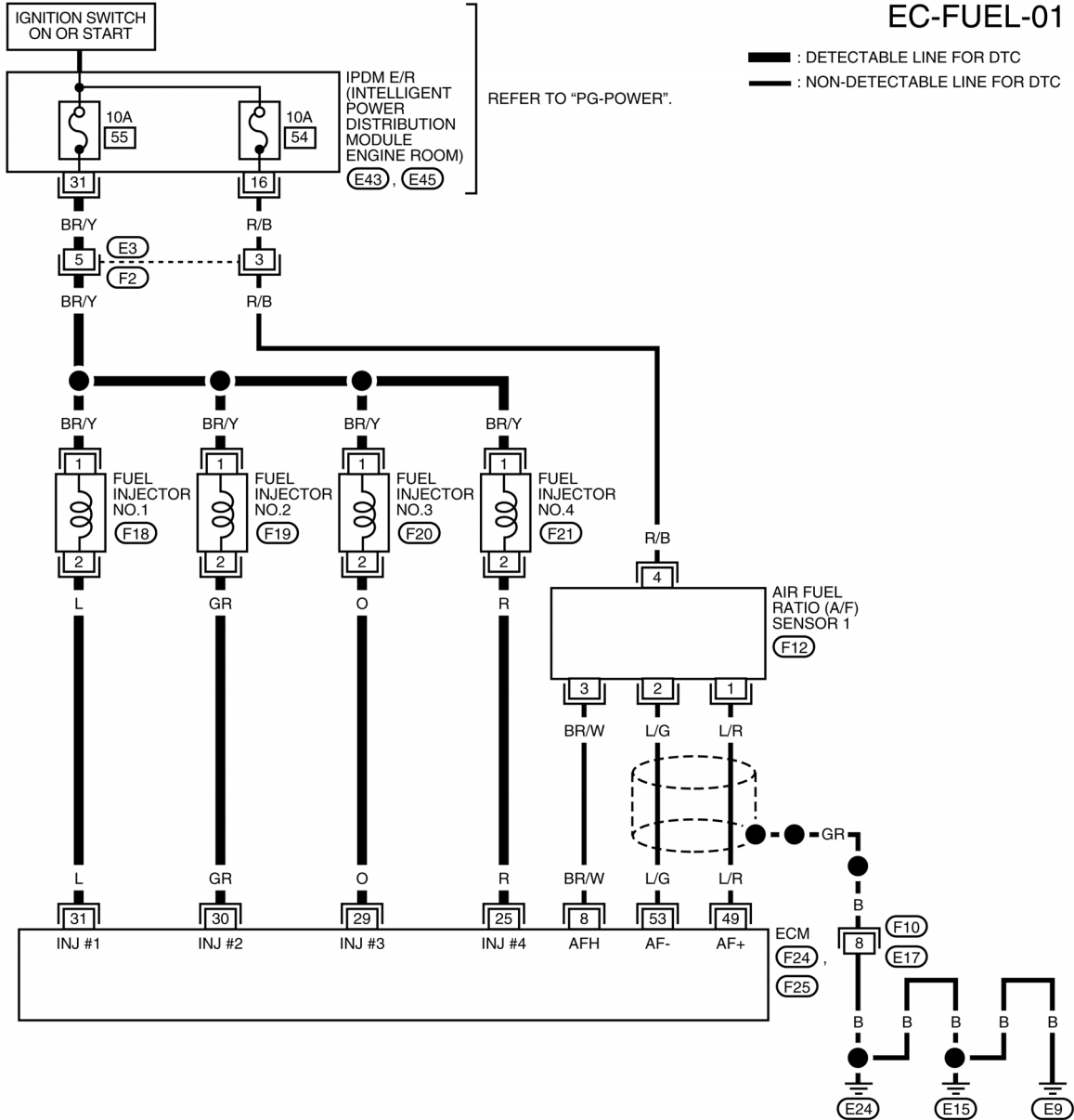
< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

INFOID:000000006579934

Wiring Diagram

EC-FUEL-01



ABBWA0147GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

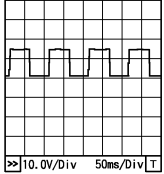
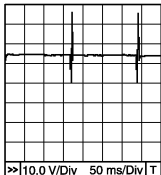
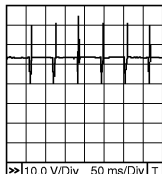
CAUTION:

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  <small>PBIA8148J</small>
25 29 30 31	R O GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIB0529E</small>
			[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIA4943J</small>
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

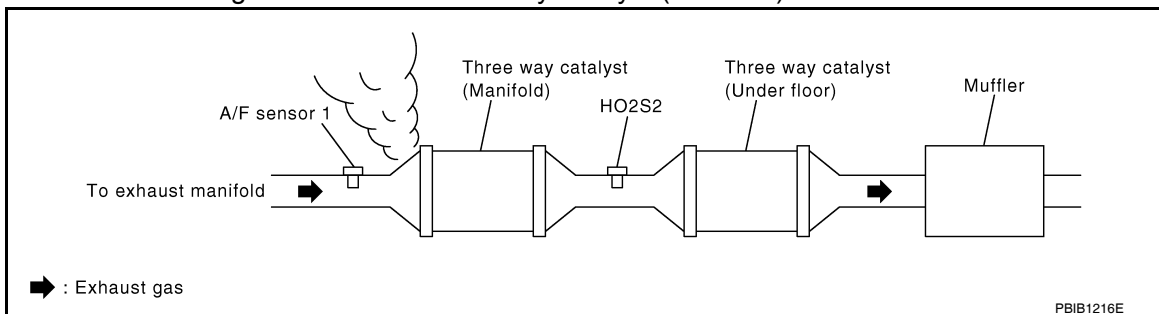
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006579935

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace. Refer to [EX-5](#).

2. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Listen for an intake air leak after the mass air flow sensor.
2. Check PCV hose connection.

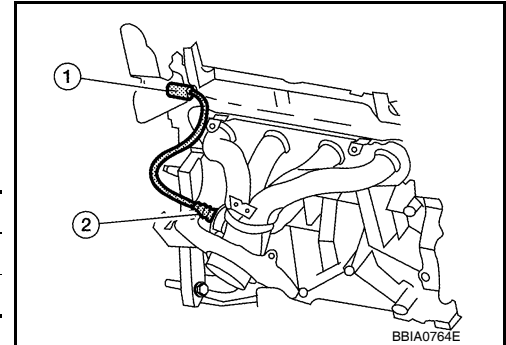
OK or NG

- OK >> GO TO 3.
NG >> Repair or replace. Refer to [EM-16](#).

3. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).
- Air fuel ratio (A/F) sensor 1 (2)
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53



Continuity should exist.

5. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground.
Refer to Wiring Diagram.

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-100, "Fuel Pressure Check"](#).
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-100, "Fuel Pressure Check"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-549](#).)
- Fuel pressure regulator (Refer to [EC-100, "Fuel Pressure Check"](#).)
- Fuel lines (Refer to [EM-36, "Component"](#).)
- Fuel filter for clogging

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III.

At idling : 1.0 - 4.0 g·m/sec

At 2,500 rpm : 2.0 - 10.0 g·m/sec

With GST

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check mass air flow sensor signal in Service \$01 with GST.

At idling : 1.0 - 4.0 g-m/sec

At 2,500 rpm : 2.0 - 10.0 g-m/sec

OK or NG

OK >> GO TO 7.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to [EC-185](#).

7. CHECK FUNCTION OF FUEL INJECTORS

With CONSULT-III

1. Let engine idle.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

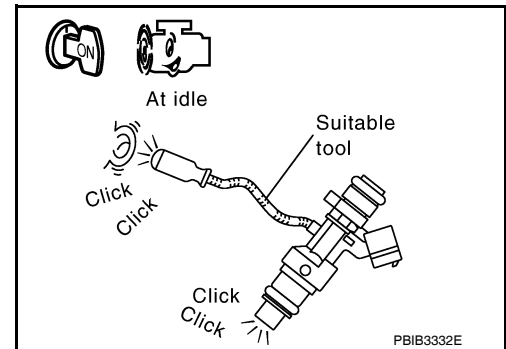
1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

OK or NG

OK >> GO TO 8.

NG >> Perform trouble diagnosis for [EC-544](#).



8. CHECK FUEL INJECTOR

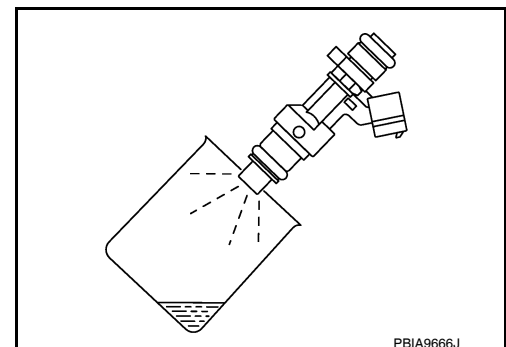
1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch OFF.
3. Reconnect all harness connectors disconnected.
4. Remove fuel tube assembly. Refer to [EM-36. "Component"](#). Keep fuel hose and all fuel injectors connected to fuel tube. The fuel injector harness connectors should remain connected.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each fuel injector.
7. Crank engine for about 3 seconds. Make sure that fuel sprays out from fuel injectors.

Fuel should be sprayed evenly for each fuel injector.

OK or NG

OK >> GO TO 9.

NG >> Replace fuel injectors from which fuel does not spray out. Always replace O-ring with new ones. Refer to [EM-36](#).



9. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

On Board Diagnosis Logic

INFOID:000000006579936

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (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 lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Air fuel ratio (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 0172	Fuel injection system too rich	<ul style="list-style-type: none">Fuel injection system does not operate properly.The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)	<ul style="list-style-type: none">Air fuel ratio (A/F) sensor 1Fuel injectorExhaust gas leaksIncorrect fuel pressureMass air flow sensor

DTC Confirmation Procedure

INFOID:000000006579937

NOTE:

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

④ WITH CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
- Clear the self-learning control coefficient by touching "CLEAR".
- Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction.
Perform the following procedure is advised.
 - 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.
 - If engine starts, go to [EC-281. "Diagnosis Procedure"](#).
If engine does not start, remove ignition plugs and check for fouling, etc.
- Keep engine at idle for at least 5 minutes.
- Check 1st trip DTC.
The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-281. "Diagnosis Procedure"](#).
NOTE:
If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.
 - Turn ignition switch OFF and wait at least 10 seconds.
 - Start engine.
 - 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)
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DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

CAUTION:

Always drive vehicle at a safe speed.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-281, "Diagnosis Procedure"](#).

Ⓢ 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. Disconnect mass air flow sensor (1) harness connector.
4. Restart engine and let idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select Service \$03 with GST. Make sure DTC P0102 is detected.
7. Select Service \$04 with GST and erase the DTC P0102.

8. Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction.

Perform the following procedure is advised.

- a. 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.

- b. If engine starts, go to [EC-281, "Diagnosis Procedure"](#).
If engine does not start, remove ignition plugs and check for fouling, etc.

9. Keep engine at idle for at least 5 minutes.

10. Check 1st trip DTC.

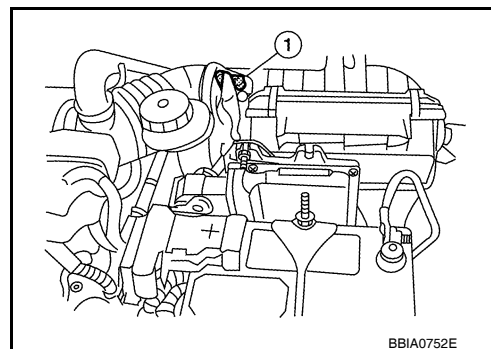
The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-281, "Diagnosis Procedure"](#).

NOTE:

If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

- a. Turn ignition switch OFF and wait at least 10 seconds.
- b. Start engine.
- c. 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.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-281, "Diagnosis Procedure"](#).

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

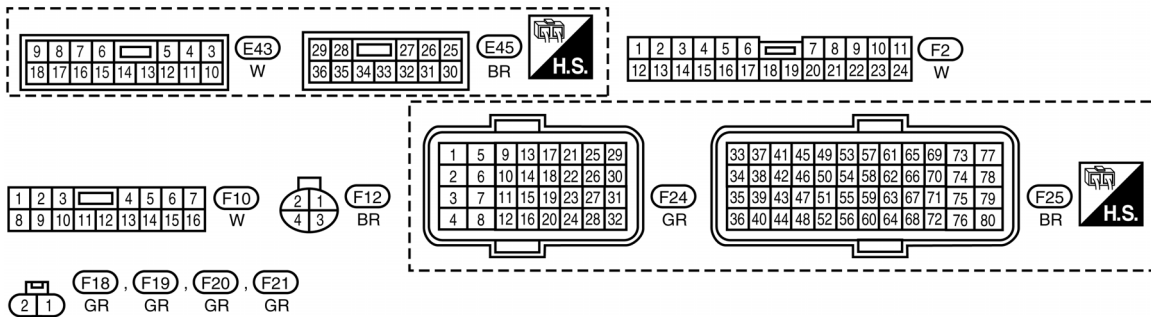
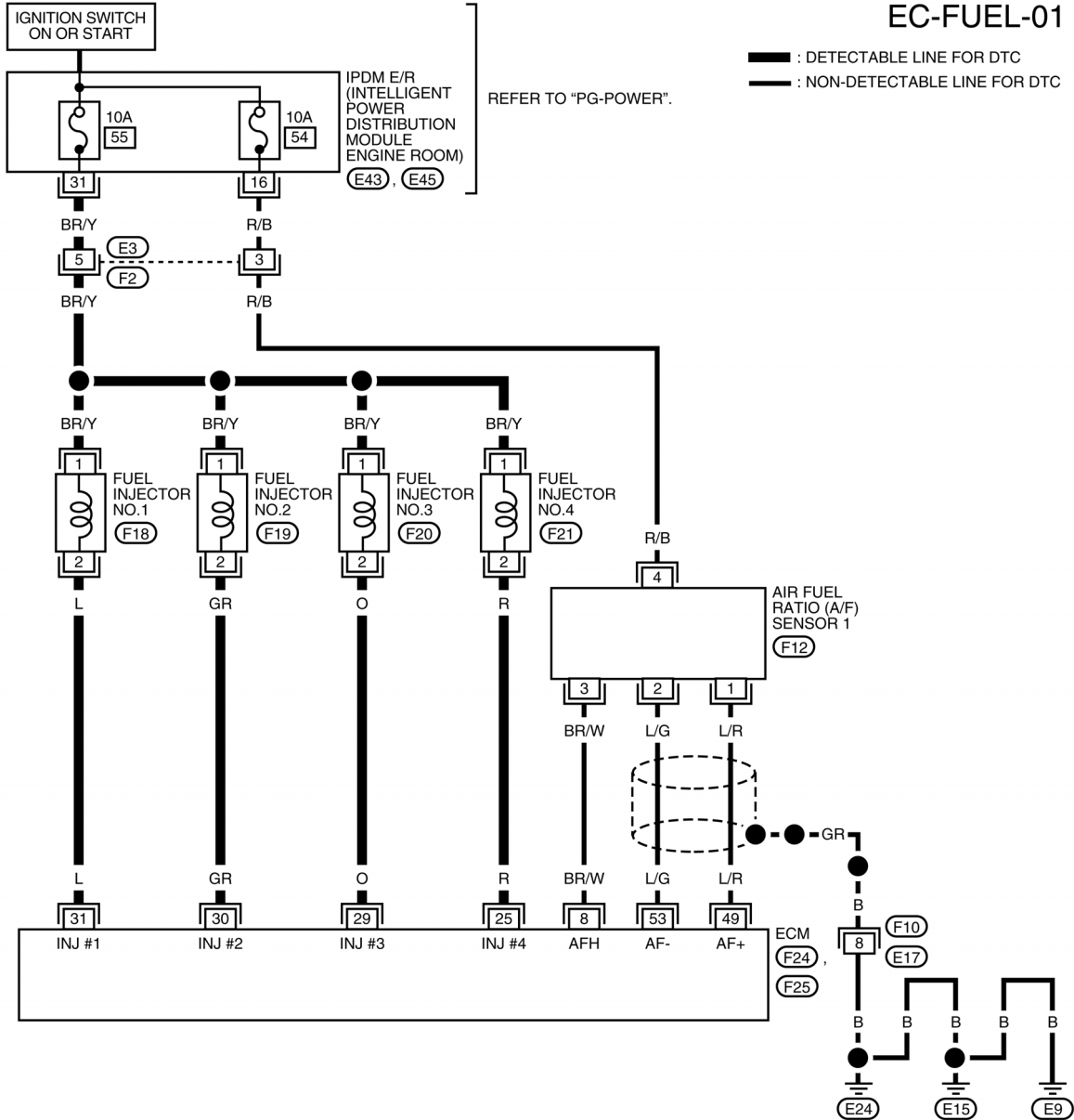
< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

INFOID:000000006579938

Wiring Diagram

EC-FUEL-01



ABBWA0147GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

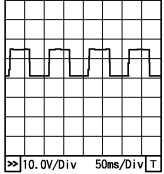
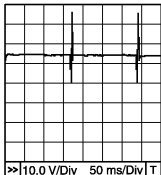
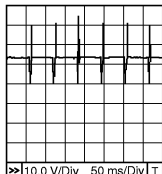
CAUTION:

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  <small>PBIA8148J</small>
25 29 30 31	R O GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIB0529E</small>
			[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIA4943J</small>
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

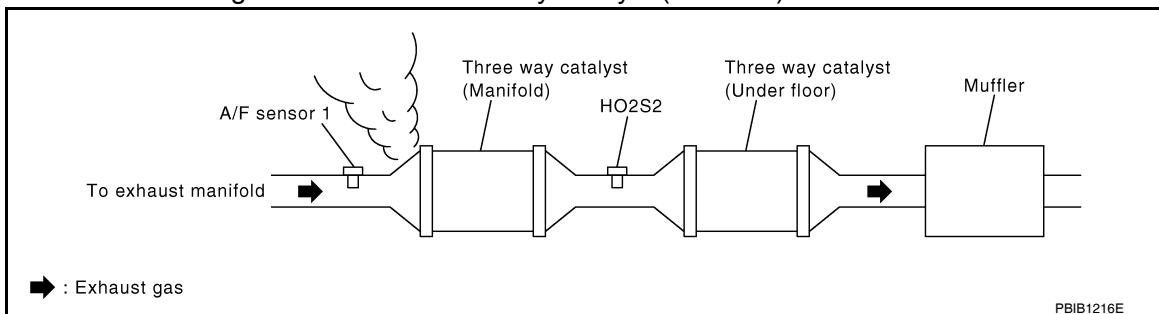
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006579939

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace. Refer to [EX-5](#).

2. CHECK FOR INTAKE AIR LEAK

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Listen for an intake air leak after the mass air flow sensor.

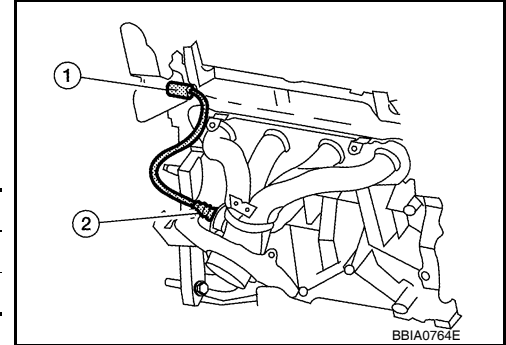
OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace. Refer to [EM-16](#).

3. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).
 - Air fuel ratio (A/F) sensor 1 (2)
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53



Continuity should exist.

5. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-100, "Fuel Pressure Check"](#).
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-100, "Fuel Pressure Check"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-549](#).)
- Fuel pressure regulator (Refer to [EC-100, "Fuel Pressure Check"](#).)

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III.

At idling : 1.0 - 4.0 g·m/sec

At 2,500 rpm : 2.0 - 10.0 g·m/sec

With GST

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check mass air flow sensor signal in Service \$01 with GST.

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

- At idling : 1.0 - 4.0 g·m/sec**
At 2,500 rpm : 2.0 - 10.0 g·m/sec

OK or NG

OK >> GO TO 7.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to [EC-185](#).

7. CHECK FUNCTION OF FUEL INJECTORS

With CONSULT-III

1. Let engine idle.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

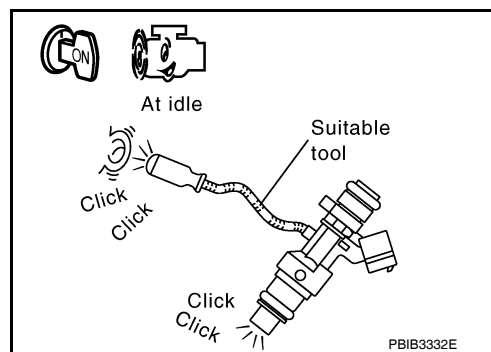
1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

OK or NG

OK >> GO TO 8.

NG >> Perform trouble diagnosis for [EC-544](#).



8. CHECK FUEL INJECTOR

1. Remove fuel injector assembly. Refer to [EM-36, "Component"](#).
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. Reconnect all harness connectors disconnected.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each fuel injectors.
6. Crank engine for about 3 seconds.
Make sure fuel does not drip from fuel injector.

OK or NG

OK (Does not drip.)>>GO TO 9.

NG (Drips.)>>Replace the fuel injectors from which fuel is dripping. Always replace O-ring with new one.
Refer to [EM-36](#).

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

DTC P0181 FTT SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

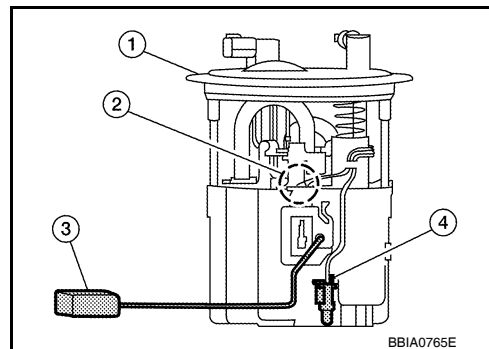
DTC P0181 FTT SENSOR

Component Description

INFOID:000000006579940

The fuel tank temperature sensor (4) 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.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)



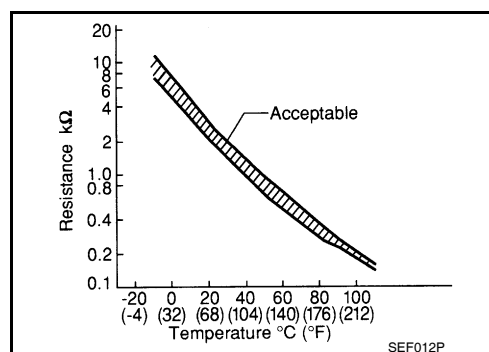
<Reference data>

Fluid temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference values and is measured between ECM terminal 43 (Fuel tank temperature sensor) and ground.

CAUTION:

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



On Board Diagnosis Logic

INFOID:000000006579941

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0181 0181	Fuel tank temperature sensor circuit range/performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	<ul style="list-style-type: none"> • Harness or connectors (Fuel tank temperature sensor circuit is open or shorted) • Fuel tank temperature sensor

DTC Confirmation Procedure

INFOID:000000006579942

NOTE:

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

WITH CONSULT-III

1. Turn ignition switch ON wait at least 10 seconds.
2. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-285. "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to following step.
3. Select "DATA MONITOR" mode with CONSULT-III.
4. Check "COOLAN TEMP/S" value.
If the "COOLAN TEMP/S" is less than 60°C (140°F), the result will be OK.
If the "COOLAN TEMP/S" is above 60°C (140°F), go to the following step.
5. Cool engine down until "COOLAN TEMP/S" signal is less than 60°C (140°F).
6. Wait at least 10 seconds.
7. Check 1st trip DTC.
8. If 1st trip DTC is detected, go to [EC-285. "Diagnosis Procedure"](#).

WITH GST

DTC P0181 FTT SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

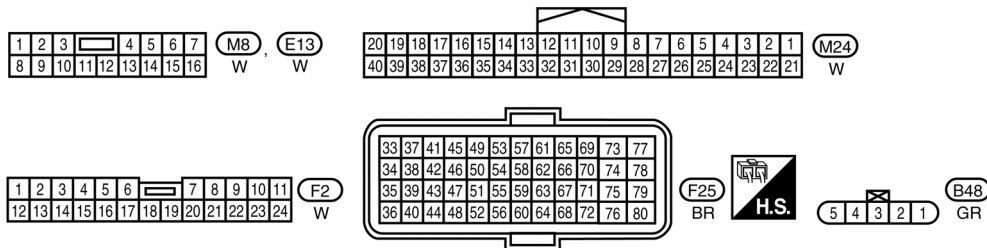
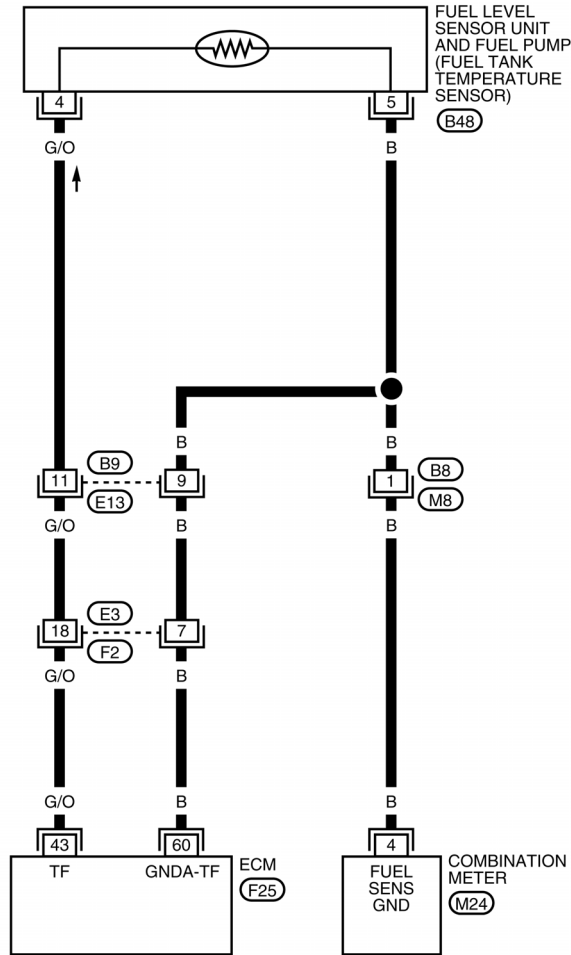
Follow the procedure "WITH CONSULT-III" above.

Wiring Diagram

INFOID:000000006579943

EC-FTTS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0148GB

Diagnosis Procedure

INFOID:000000006579944

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0181 FTT SENSOR

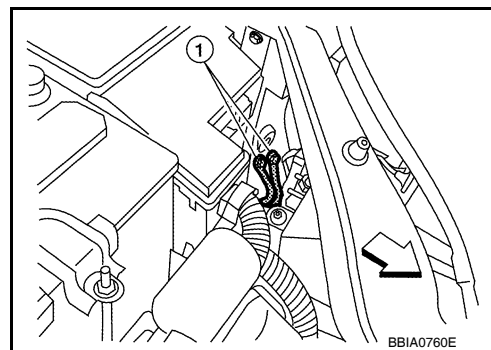
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

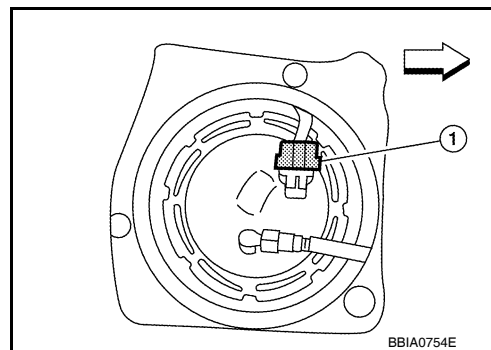
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
 - Disconnect "fuel level sensor unit and fuel pump" harness connector (1).
- ↔ : Vehicle front
- Turn ignition switch ON.

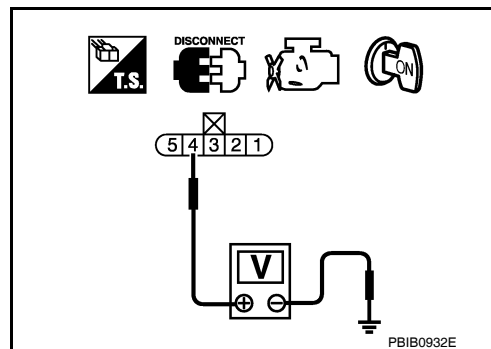


- Check voltage between "fuel level sensor unit and fuel pump" terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness connectors E3, F2
- Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

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

4. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect combination meter harness connector.
- Check harness continuity between "fuel level sensor unit and fuel pump" terminal 5 and combination meter terminal 4, ECM terminal 60. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

DTC P0181 FTT SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B8, M8
- Harness connectors B9, E13
- Harness connectors E3, F2
- Harness for open or short between “fuel level sensor unit and fuel pump” and combination meter.
- Harness for open or short between “fuel level sensor unit and fuel pump” and ECM.

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

6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, [EC-287. "Component Inspection"](#).

OK or NG

OK >> GO TO 7.

NG >> Replace “fuel level sensor unit and fuel pump”. Refer to [FL-6](#).

7. CHECK INTERMITTENT INCIDENT

Perform [EC-153](#).

>> **INSPECTION END**

Component Inspection

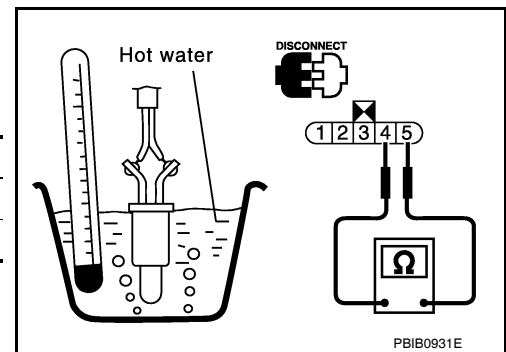
INFOID:000000006579945

FUEL TANK TEMPERATURE SENSOR

1. Check resistance between “fuel level sensor unit and fuel pump” terminal 4 and 5 by heating with hot water as shown in the figure.

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

2. If NG, replace “fuel level sensor unit and fuel pump”. Refer to [FL-6](#).



DTC P0182, P0183 FTT SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

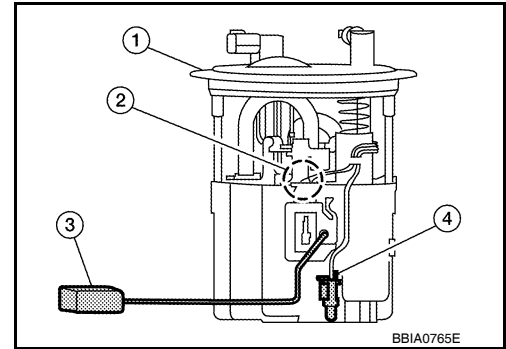
DTC P0182, P0183 FTT SENSOR

Component Description

INFOID:000000006579947

The fuel tank temperature sensor (4) 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.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)



BBI A0765E

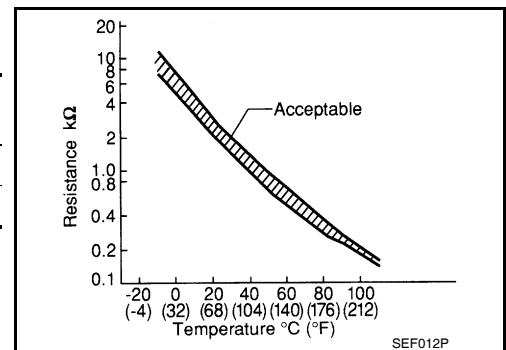
<Reference data>

Fluid temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference values and is measured between ECM terminal 43 (Fuel tank temperature sensor) and ground.

CAUTION:

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



SEF012P

On Board Diagnosis Logic

INFOID:000000006579948

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182 0182	Fuel tank temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Fuel tank temperature sensor circuit is open or shorted.) • Fuel tank temperature sensor
P0183 0183	Fuel tank temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006579949

NOTE:

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

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-289. "Diagnosis Procedure"](#).

DTC P0182, P0183 FTT SENSOR

< SERVICE INFORMATION >

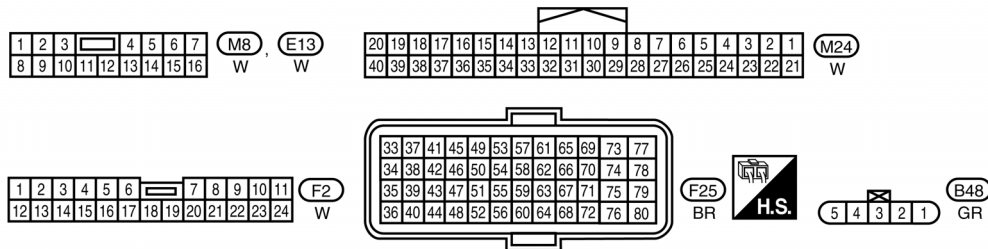
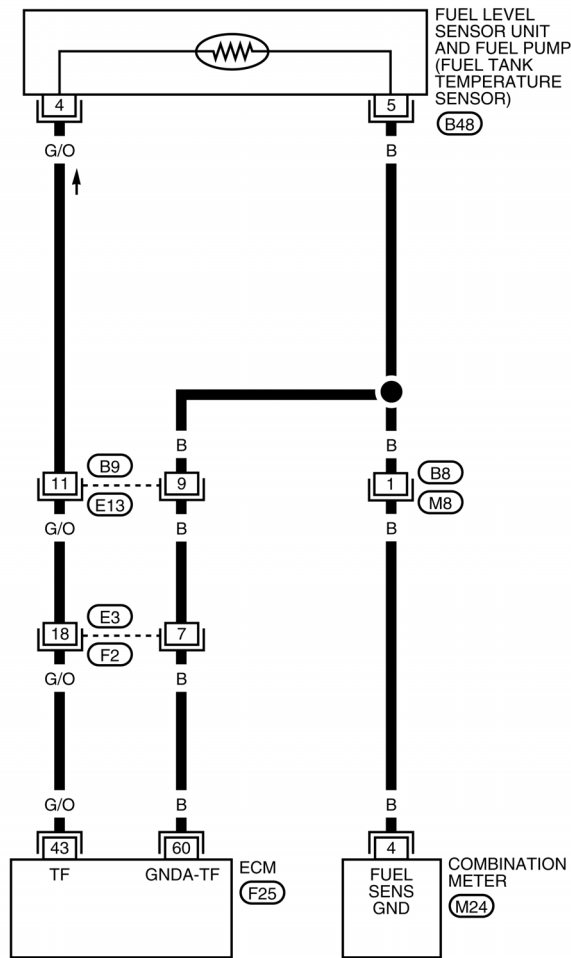
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006579950

EC-FTTS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Diagnosis Procedure

INFOID:000000006579951

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0182, P0183 FTT SENSOR

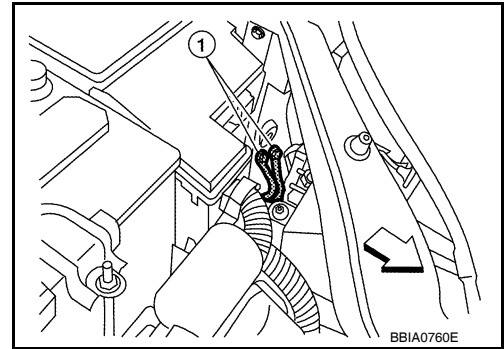
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screw on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

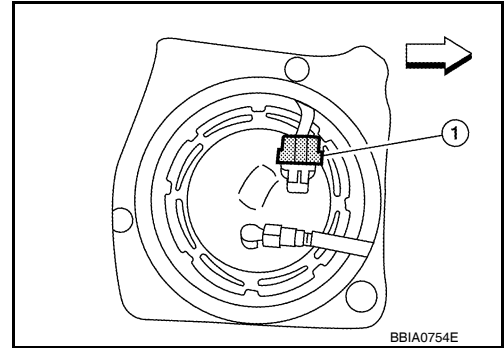
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- Disconnect "fuel level sensor unit and fuel pump" harness connector (1).
- ↔ : Vehicle front
- Turn ignition switch ON.

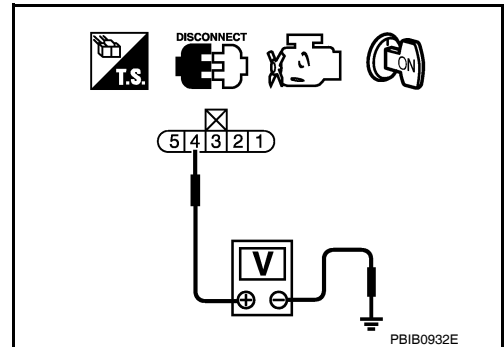


- Check voltage between "fuel level sensor unit and fuel pump" terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness connectors E3, F2
- Harness for open or short to ground or short between ECM and "fuel level sensor unit and fuel pump"

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

4. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect combination meter harness connector.
- Check harness continuity between "fuel level sensor unit and fuel pump" terminal 5 and combination meter terminal 4, ECM terminal 60. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

DTC P0182, P0183 FTT SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Check the following.

- Harness connectors B8, M8
- Harness connectors B9, E13
- Harness connectors E3, F2
- Harness for open or short between “fuel level sensor unit and fuel pump” and combination meter
- Harness for open or short between “fuel level sensor unit and fuel pump” and ECM

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

6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, [EC-291. "Component Inspection"](#).

OK or NG

OK >> GO TO 7.

NG >> Replace “fuel level sensor unit and fuel pump”. Refer to [FL-6](#).

7. CHECK INTERMITTENT INCIDENT

Perform [EC-153](#).

>> **INSPECTION END**

Component Inspection

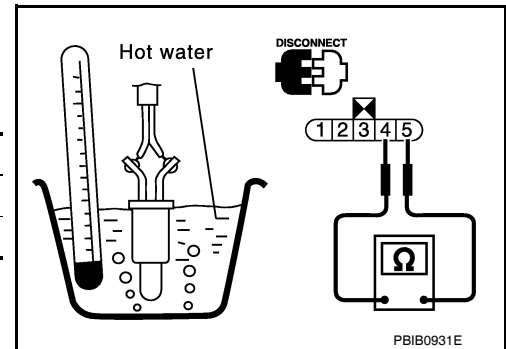
INFOID:000000006579952

FUEL TANK TEMPERATURE SENSOR

1. Check resistance between “fuel level sensor unit and fuel pump” terminal 4 and 5 by heating with hot water as shown in the figure.

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

2. If NG, replace “fuel level sensor unit and fuel pump”. Refer to [FL-6](#).



DTC P0196 EOT SENSOR

< SERVICE INFORMATION >

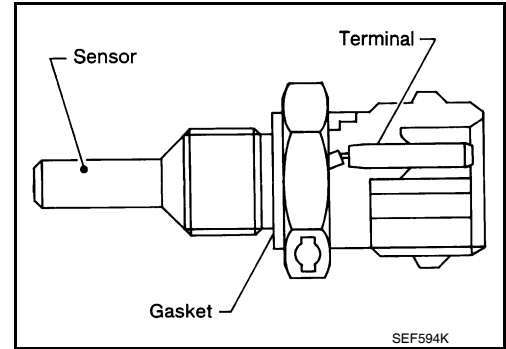
[MR20DE (FOR CALIFORNIA)]

DTC P0196 EOT SENSOR

Component Description

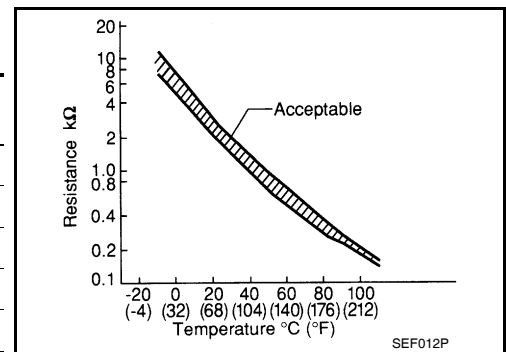
INFOID:000000006579954

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.



<Reference data>

Engine coolant temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
-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
150 (302)	0.3	0.050 - 0.065



*: This data is reference values and is measured between ECM terminal 27 (Engine oil temperature sensor) and ground.

CAUTION:

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

On Board Diagnosis Logic

INFOID:000000006579955

NOTE:

If DTC P0196 is displayed with P0197 or P0198, first perform the trouble diagnosis for DTC P0197 or P0198. Refer to [EC-295](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0196 0196	Engine oil temperature sensor range/performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Engine oil temperature sensor

DTC Confirmation Procedure

INFOID:000000006579956

NOTE:

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

TESTING CONDITION:

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

④ WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for 5 minutes and 10 seconds.
4. Check 1st trip DTC.

DTC P0196 EOT SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

If 1st trip DTC is detected, go to [EC-293, "Diagnosis Procedure"](#).

If 1st trip DTC is not detected, go to following steps.

5. Select "DATA MONITOR" mode with CONSULT-III.
6. Check that "COOLAN TEMP/S" indicates above 70°C (158°F).
If it is above 70°C (158°F), go to the following steps.
If it is below 70°C (158°F), warm engine up until "COOLAN TEMP/S" indicates more than 70°C (158°F). Then go to the following steps.
7. Turn ignition switch OFF and soak the vehicle at cool place.
8. Turn ignition switch ON.
NOTE:
Do not turn ignition switch OFF until step 12
9. Select "DATA MONITOR" mode with CONSULT-III.
10. 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, go to following steps.

If they are out of the specified range, soak the vehicle to met the above conditions. Then go to 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.

11. Start engine and let it idle for 5 minutes.
12. Check 1st trip DTC.
13. If 1st trip DTC is detected, go to [EC-293, "Diagnosis Procedure"](#).

Ⓔ WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

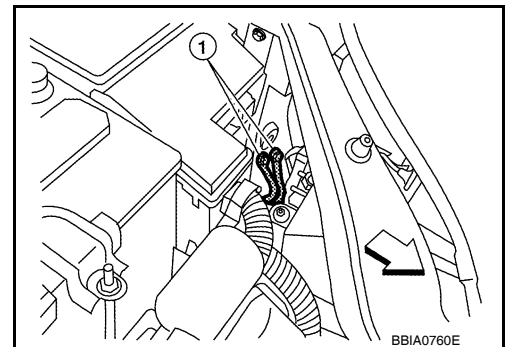
INFOID:000000006579957

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↶ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK ENGINE OIL TEMPERATURE SENSOR

Refer to [EC-294, "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace engine oil temperature sensor. Refer to [EM-80](#).

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

Refer to [EC-296, "Wiring Diagram"](#).

DTC P0196 EOT SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

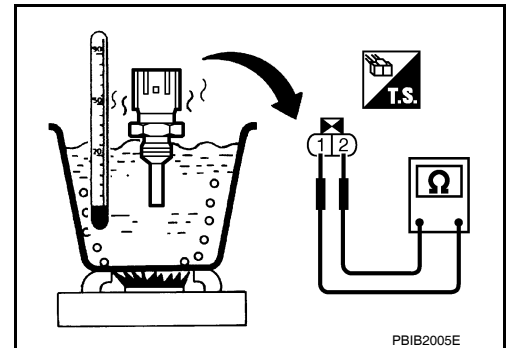
>> INSPECTION END

Component Inspection

INFOID:000000006579958

ENGINE OIL TEMPERATURE SENSOR

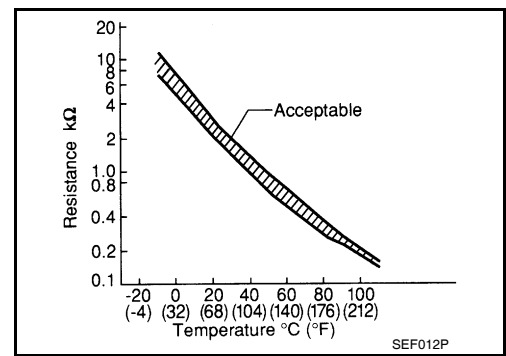
1. Check resistance between engine oil temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Engine coolant temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.37 - 2.63
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine oil temperature sensor. Refer to [EM-80](#).



DTC P0197, P0198 EOT SENSOR

< SERVICE INFORMATION >

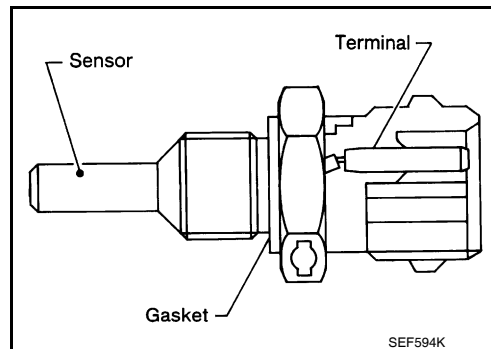
[MR20DE (FOR CALIFORNIA)]

DTC P0197, P0198 EOT SENSOR

Component Description

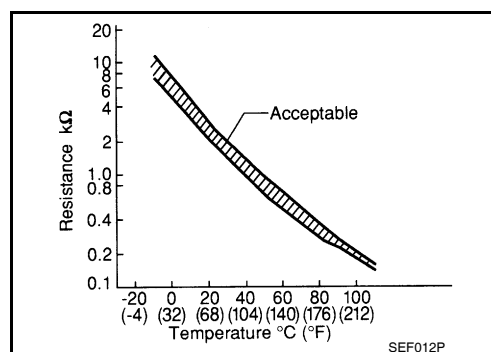
INFOID:000000006579960

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.



<Reference data>

Engine coolant temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
-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
150 (302)	0.3	0.050 - 0.065



*: This data is reference values and is measured between ECM terminal 27 (Engine oil temperature sensor) and ground.

CAUTION:

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

On Board Diagnosis Logic

INFOID:000000006579961

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0197 0197	Engine oil temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Engine oil temperature sensor circuit is open or shorted.) • Engine oil temperature sensor
P0198 0198	Engine oil temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006579962

NOTE:

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

1. Start engine and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-296, "Diagnosis Procedure"](#).

DTC P0197, P0198 EOT SENSOR

< SERVICE INFORMATION >

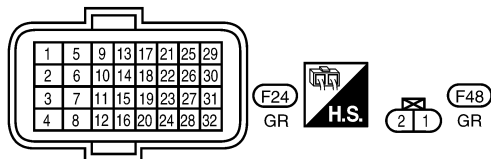
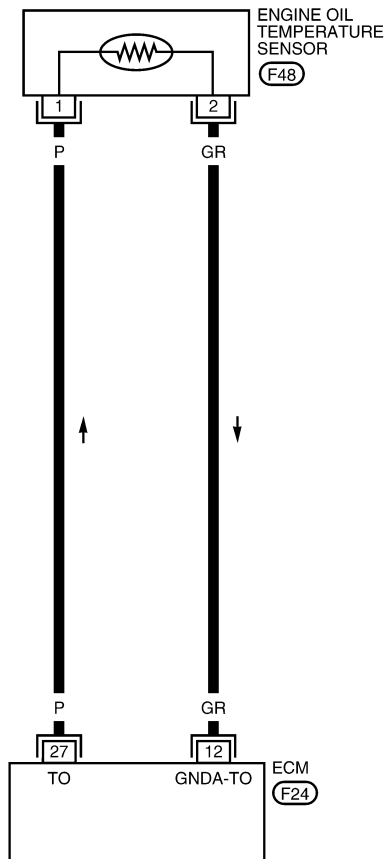
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006579963

EC-EOTS-01

— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC



AABWA0303GB

Diagnosis Procedure

INFOID:000000006579964

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0197, P0198 EOT SENSOR

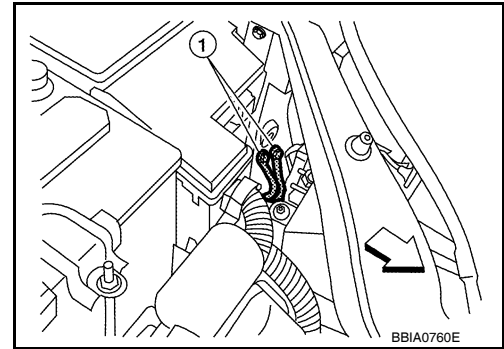
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ⇐ : Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.



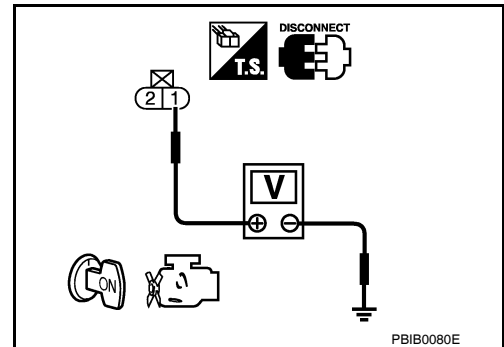
2. CHECK EOT SENSOR POWER SUPPLY CIRCUIT

- Disconnect engine oil temperature (EOT) sensor harness connector.
- Turn ignition switch ON.
- Check voltage between EOT sensor terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK EOT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check harness continuity between ECM terminal 12 and ECT sensor terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ENGINE OIL TEMPERATURE SENSOR

Refer to [EC-297, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace engine oil temperature sensor. Refer to [EM-80](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

ENGINE OIL TEMPERATURE SENSOR

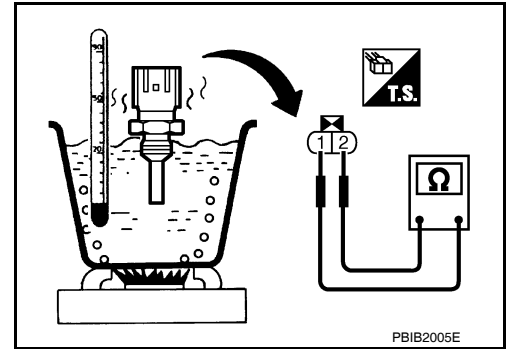
INFOID:000000006579965

DTC P0197, P0198 EOT SENSOR

[MR20DE (FOR CALIFORNIA)]

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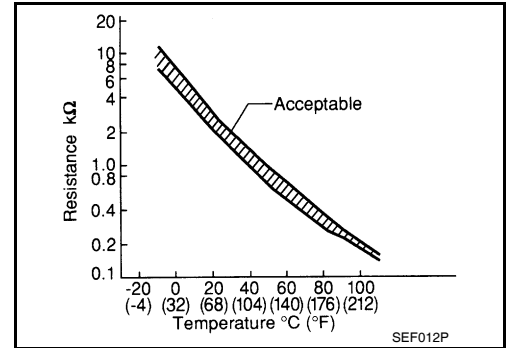
1. Check resistance between engine oil temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Engine coolant temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.37 - 2.63
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine oil temperature sensor. Refer to [EM-80](#).



DTC P0222, P0223 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

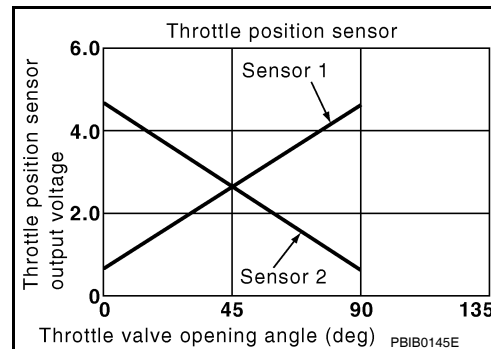
DTC P0222, P0223 TP SENSOR

Component Description

INFOID:000000006579967

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579968

Specification data are reference values.

Monitor item	Condition	Specification
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T)	Accelerator pedal: Fully released
	Accelerator pedal: Fully depressed	More than 0.36 V Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:000000006579969

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (TP sensor 1 circuit is open or shorted.) (APP sensor 2 circuit is shorted.) • Electric throttle control actuator (TP sensor 1) • Accelerator pedal position sensor (APP sensor 2)
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

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

Engine operation condition in fail-safe mode

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. So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006579970

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-301, "Diagnosis Procedure"](#).

DTC P0222, P0223 TP SENSOR

< SERVICE INFORMATION >

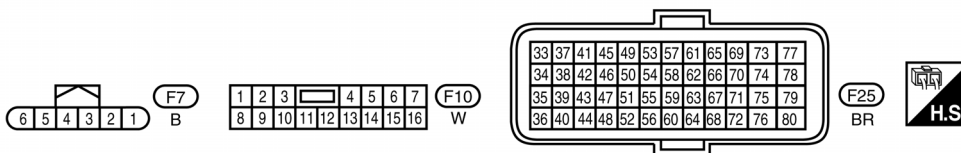
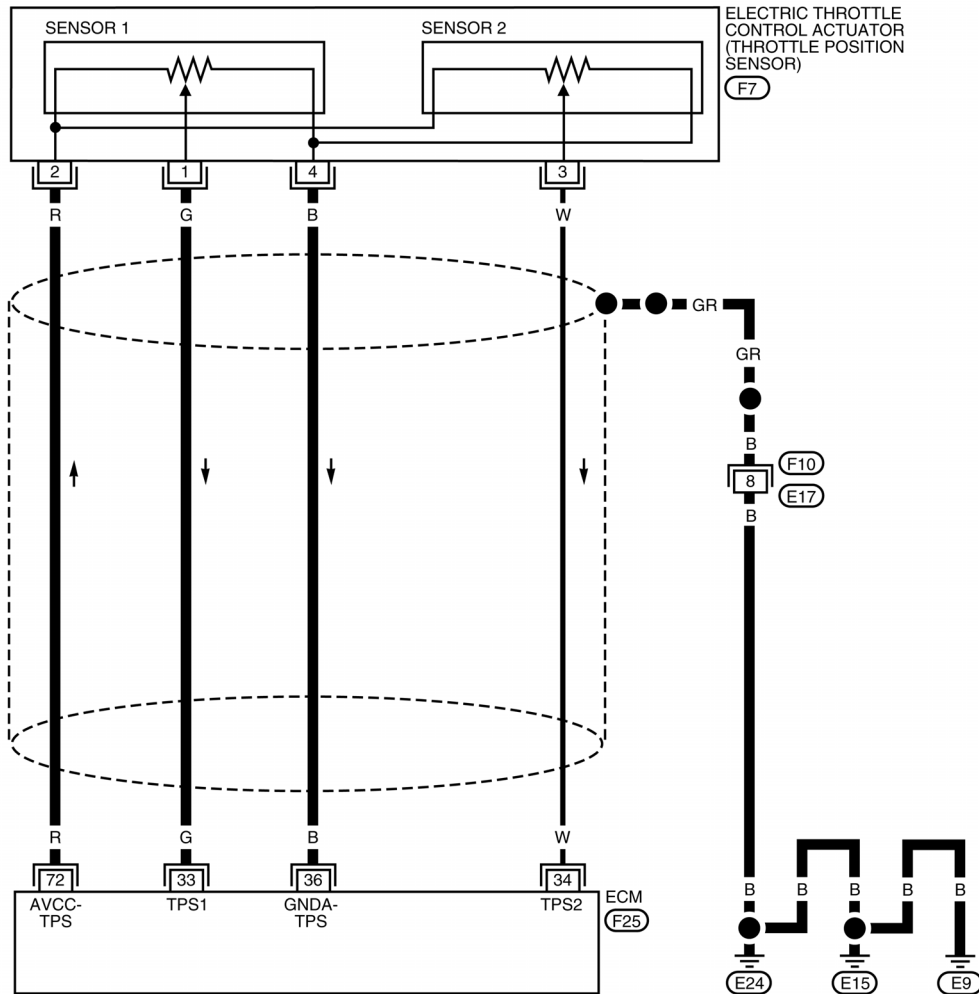
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006579971

EC-TPS1-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



ABBWA0149GB

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

CAUTION:

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

DTC P0222, P0223 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
33	G	Throttle position sensor 1	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34	W	Throttle position sensor 2	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
36	B	Sensor ground (Throttle position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
72	R	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

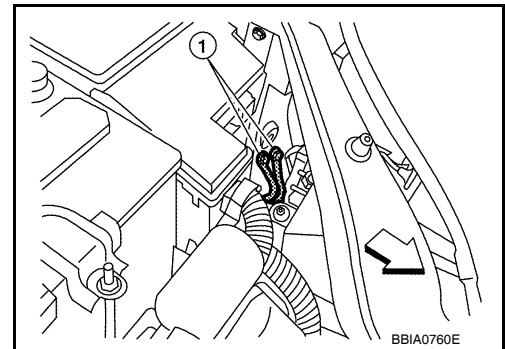
INFOID:000000006579972

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

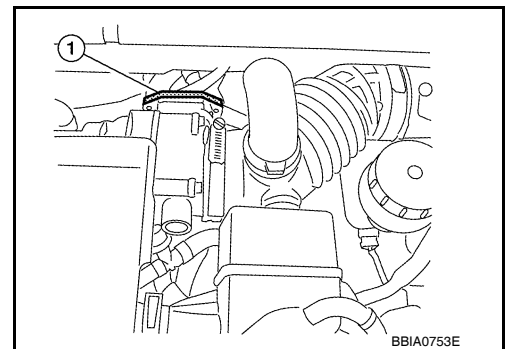
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-I

- Disconnect electric throttle control actuator (1) harness connector.
- Turn ignition switch ON.



DTC P0222, P0223 TP SENSOR

[MR20DE (FOR CALIFORNIA)]

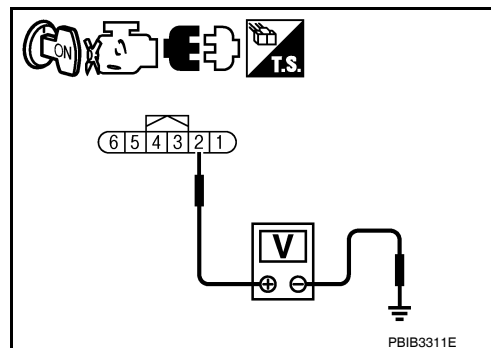
< SERVICE INFORMATION >

3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness connectors.



3. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 36 and electric throttle control actuator terminal 4. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 33 and electric throttle control actuator terminal 1. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-302, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18, "Component"](#).

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

Component Inspection

INFOID:000000006579973

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).
3. Turn ignition switch ON.

DTC P0222, P0223 TP SENSOR

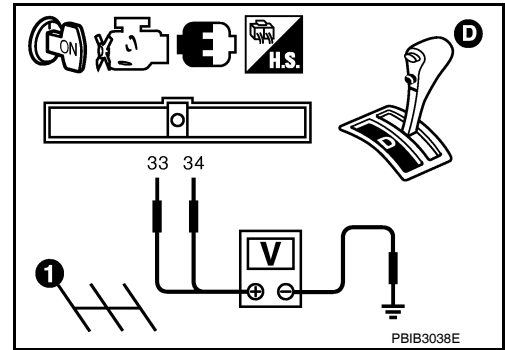
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Set shift lever to D position (CVT) or 1st position (M/T).
- Check voltage between ECM terminals 33 (TP sensor 1 signal), 34 (TP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
33 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
34 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V

- If NG, replace electric throttle control actuator and go to the next step. Refer to [EM-18. "Component"](#).



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DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

On Board Diagnosis Logic

INFOID:000000006579975

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
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 (POS) signal every 200 engine revolutions for a change.

When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.

If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.

When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.

If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
2. Two Trip Detection Logic (Exhaust quality deterioration)

For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.

A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300 0300	Multiple cylinder misfire detected	Multiple cylinder misfire.	<ul style="list-style-type: none"> Improper spark plug Insufficient compression Incorrect fuel pressure Fuel injector circuit is open or shorted Fuel injector Intake air leak The ignition signal circuit is open or shorted Lack of fuel Drive plate or flywheel Air fuel ratio (A/F) sensor 1 Incorrect PCV hose connection
P0301 0301	No. 1 cylinder misfire detected	No. 1 cylinder misfires.	
P0302 0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	
P0303 0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	
P0304 0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	

DTC Confirmation Procedure

INFOID:000000006579976

CAUTION:

Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving.

NOTE:

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

WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Restart engine and let it idle for about 15 minutes.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-305. "Diagnosis Procedure"](#).

NOTE:

If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

- a. Turn ignition switch OFF and wait at least 10 seconds.
- b. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to table below.

Hold the accelerator pedal as steady as possible.

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following condition should be satisfied at the same time:

Engine speed	Engine speed in the freeze frame data \pm 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data \pm 10 km/h (6 MPH)
Basic fuel schedule	Basic fuel schedule in the freeze frame data \times (1 \pm 0.1)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F)
	When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F)

The time to driving varies according to the engine speed in the freeze frame data. Refer to the following table.

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

WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

INFOID:000000006579977

1. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

OK or NG

- OK >> GO TO 3.
NG >> Repair or replace.

3. PERFORM POWER BALANCE TEST

With CONSULT-III

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

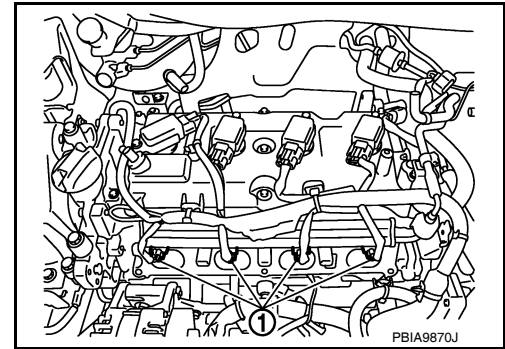
Without CONSULT-III

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

When disconnecting each fuel injector (1) harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



Yes or No

Yes >> GO TO 4.

No >> GO TO 9.

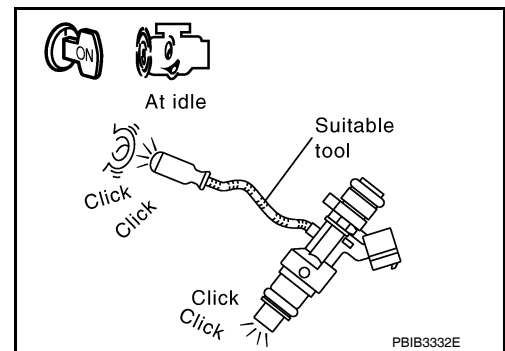
4. CHECK FUEL INJECTOR

Does each fuel injector make an operating sound at idle?

Yes or No

Yes >> GO TO 5.

No >> Check fuel injector(s) and circuit(s). Refer to [EC-544](#).



5. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

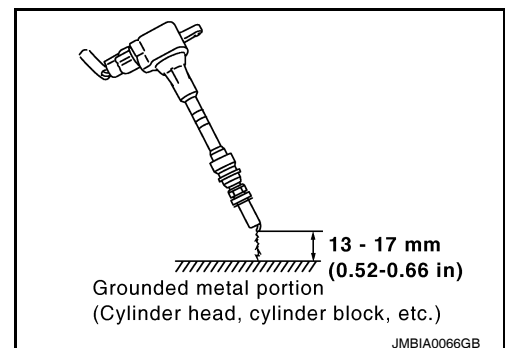
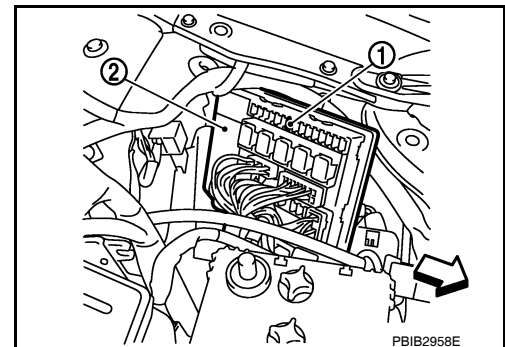
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Remove fuel pump fuse (1) in IPDM E/R (2) to release fuel pressure.

NOTE:

Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.

- ⇐ : Vehicle front
3. Start engine.
 4. After engine stalls, crank it two or three 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 about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

- Do not approach to the spark plug and the ignition coil within 50 cm. 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.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 6.

6. 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 about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

OK or NG

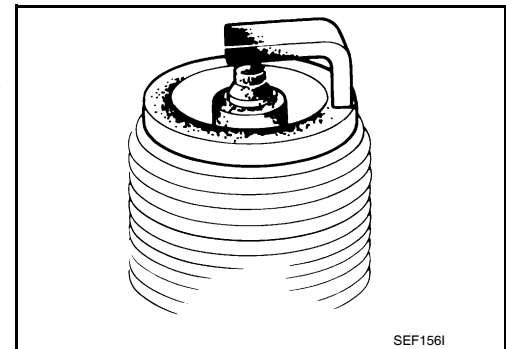
- OK >> GO TO 7.
- NG >> Check ignition coil, power transistor and their circuits. Refer to [EC-554](#).

7. CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

OK or NG

- OK >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-33, "Removal and Installation"](#).
- NG >> 1. Repair or clean spark plug. Refer to [EM-33, "Removal and Installation"](#).
2. GO TO 8.



8. CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about three seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-33, "Removal and Installation"](#).

9. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-65, "On-Vehicle Service"](#).

OK or NG

- OK >> GO TO 10.
- NG >> 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-100, "Fuel Pressure Check"](#).
3. Install fuel pressure gauge and check fuel pressure. Refer to [EC-100, "Fuel Pressure Check"](#).

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

OK or NG

- OK >> GO TO 12.
- NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-549.](#))
- Fuel pressure regulator (Refer to [EC-100, "Fuel Pressure Check".](#))
- Fuel lines (Refer to [FL-5, "Checking Fuel Line".](#))
- Fuel filter for clogging

>> Repair or replace.

12. CHECK IGNITION TIMING

Check the following items. Refer to [EC-92, "Basic Inspection".](#)

Items	Specifications
Target idle speed	CVT: 675 ± 50 rpm (in P or N position)
	M/T: 700 ± 50 rpm (in Neutral position)
Ignition timing	CVT: 6 ± 5° BTDC (in Neutral position)
	M/T: 6 ± 5° BTDC (in Neutral position)

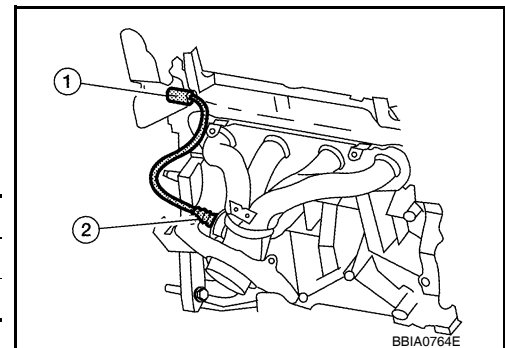
OK or NG

- OK >> GO TO 13.
- NG >> Follow the [EC-92, "Basic Inspection".](#)

13. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).
 - Air fuel ratio (A/F) sensor 1 (2)
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53



Continuity should exist.

5. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground.
Refer to Wiring Diagram.

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

- OK >> GO TO 14.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to [EC-173, "Component Inspection".](#)

OK or NG

- OK >> GO TO 16.

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

NG >> GO TO 15.

15. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23, "Component"](#).

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

16. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check mass air flow sensor signal in "DATA MONITOR" mode with CONSULT-III.

At idling : 1.0 - 4.0 g·m/sec

At 2,500 rpm : 2.0 - 10.0 g·m/sec

With GST

1. Start engine and warm it up to normal operating temperature.
2. Check mass air flow sensor signal in Service \$01 with GST.

At idling : 1.0 - 4.0 g·m/sec

At 2,500 rpm : 2.0 - 10.0 g·m/sec

OK or NG

OK >> GO TO 17.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to [EC-185](#).

17. CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in [EC-110, "Symptom Matrix Chart"](#).

OK or NG

OK >> GO TO 18.

NG >> Repair or replace.

18. 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 [EC-59, "Emission-related Diagnostic Information"](#).

>> GO TO 19.

19. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

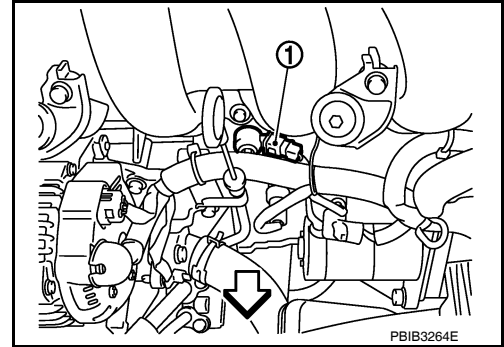
DTC P0327, P0328 KS

Component Description

INFOID:000000006579978

The knock sensor (1) 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.

- ↵: Vehicle front



On Board Diagnosis Logic

INFOID:000000006579979

The MIL will not light up for these self-diagnoses.

DTC No.	Trouble Diagnosis Name	DTC Detected Condition	Possible Cause
P0327 0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Knock sensor circuit is open or shorted.) • Knock sensor
P0328 0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006579980

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

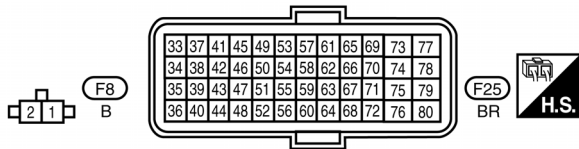
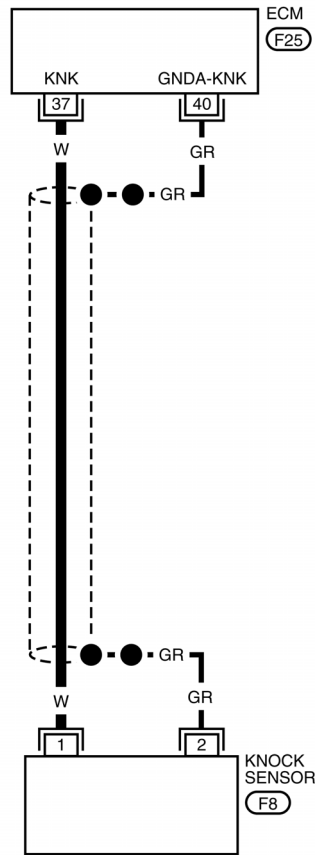
1. Start engine and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-312. "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006579981

EC-KS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0150GB

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

CAUTION:

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

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TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
37	W	Knock sensor	[Engine is running] • Idle speed	Approximately 2.5 V
40	GR	Sensor ground (Knock sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006579982

1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 37 and ground. Refer to Wiring Diagram.

NOTE:

It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Resistance: Approximately 532 - 588 kΩ [at 20°C (68°F)]

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

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 2.

2. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-II

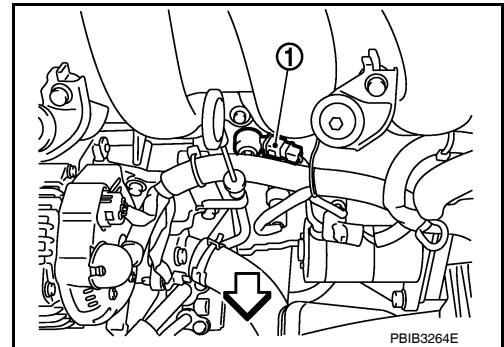
1. Disconnect knock sensor (1) harness connector.
- ⇐: Vehicle front
2. Check harness continuity between ECM terminal 37 and knock sensor terminal 1. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK KNOCK SENSOR

Refer to [EC-313, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace knock sensor. Refer to [EM-80, "Component"](#).

4. CHECK GROUND CONNECTIONS

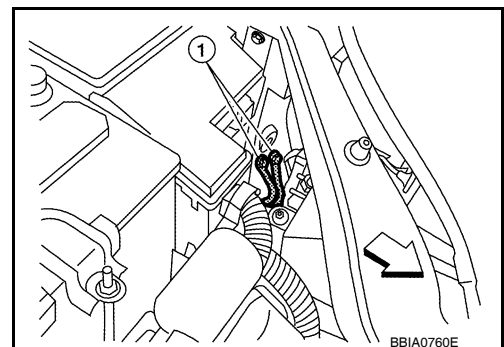
Loosen and retighten ground screws on the body.

Refer to [EC-158, "Ground Inspection"](#).

- ⇐: Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace ground connections.



5.CHECK KNOCK SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT

1. Reconnect knock sensor harness connector.
2. Check harness continuity between ECM terminal 40 and knock sensor terminal 2.
Refer to Wiring Diagram.

Continuity should exist

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

OK or NG

OK >> GO TO 6.

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

6.CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006579983

KNOCK SENSOR

1. Check resistance between knock sensor terminal 1 and ground.

NOTE:

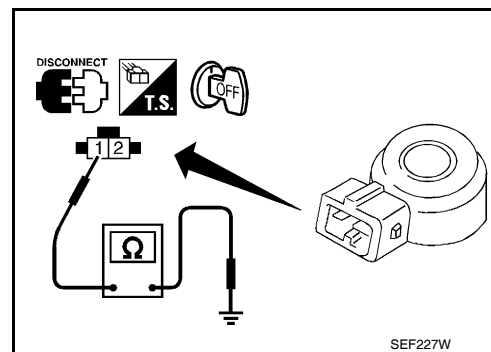
It is necessary to use an ohmmeter which can measure more than 10 M Ω .

Resistance: Approximately 532 - 588 k Ω [at 20°C (68°F)]

CAUTION:

Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

2. If NG, replace knock sensor. Refer to [EM-80, "Component"](#).



DTC P0335 CKP SENSOR (POS)

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

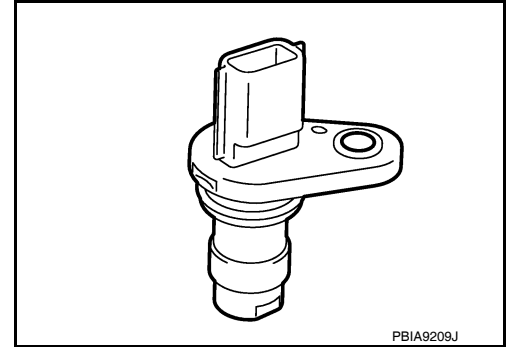
DTC P0335 CKP SENSOR (POS)

Component Description

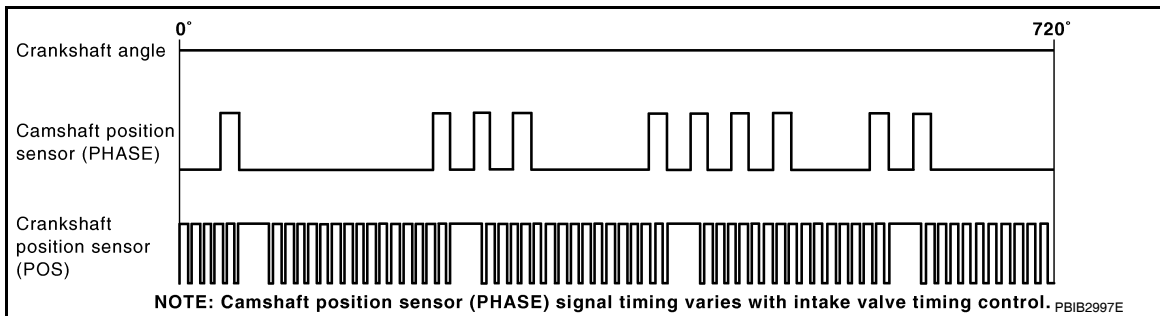
INFOID:000000006579985

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. 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.



PBIA9209J



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579986

Specification data are reference values.

Monitor item	Condition	Specification
ENG SPEED	<ul style="list-style-type: none"> Run engine and compare CONSULT-III value with the tachometer indication. 	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

INFOID:000000006579987

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor (POS) circuit	<ul style="list-style-type: none"> The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. The crankshaft position sensor (POS) signal is not in the normal pattern during engine running. 	<ul style="list-style-type: none"> Harness or connectors [Crankshaft position sensor (POS) circuit is open or shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is sorted.) (Tumble control valve position sensor circuit is shorted.) Crankshaft position sensor (POS) Accelerator pedal position sensor Refrigerant pressure sensor EVAP control system pressure sensor Tumble control valve position sensor Signal plate

DTC Confirmation Procedure

INFOID:000000006579988

NOTE:

DTC P0335 CKP SENSOR (POS)

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

1. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-317, "Diagnosis Procedure"](#).

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DTC P0335 CKP SENSOR (POS)

< SERVICE INFORMATION >

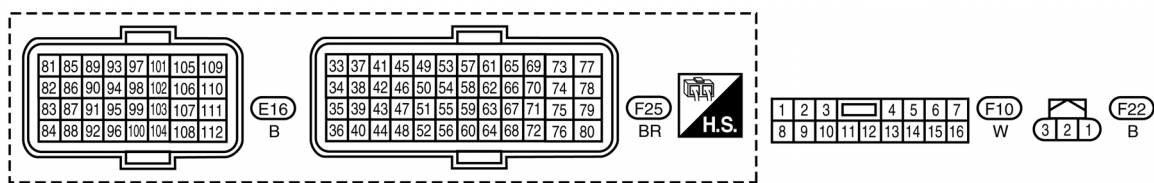
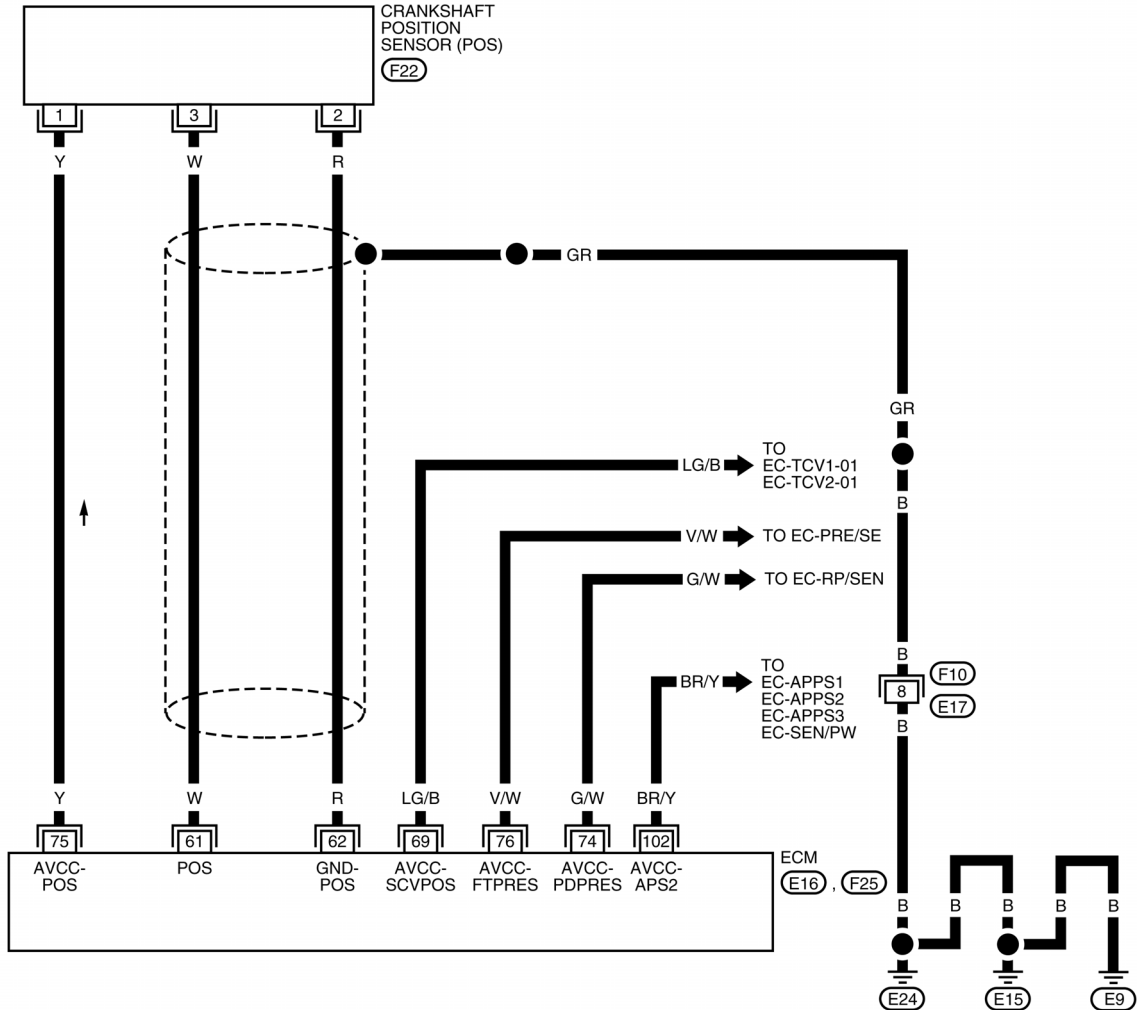
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006579989

EC-POS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0151GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

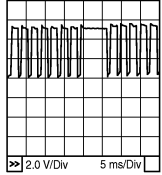
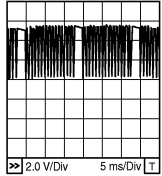
CAUTION:

DTC P0335 CKP SENSOR (POS)

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
61	W	Crankshaft position sensor (POS)	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	Approximately 4.0 V★ 
			[Engine is running] • Engine speed: 2,000 rpm	Approximately 4.0 V★ 
62	R	Sensor ground [Crankshaft position sensor (POS)]	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
69	LG/B	Sensor power supply (Tumble control valve position sensor)	[Ignition switch: ON]	Approximately 5 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V

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

Diagnosis Procedure

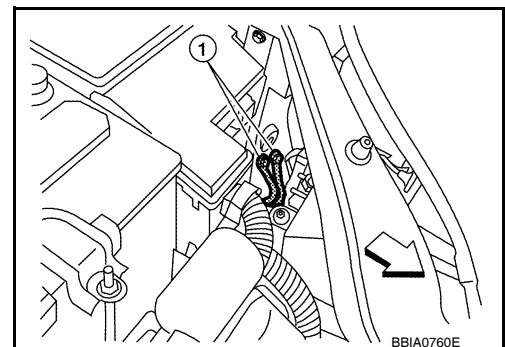
INFOID:000000006579990

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↖ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



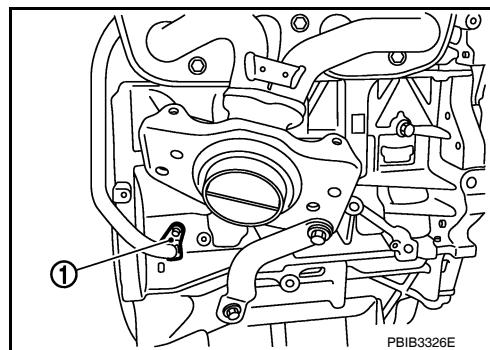
2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

DTC P0335 CKP SENSOR (POS)

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect crankshaft position (CKP) sensor (POS) (1) harness connector.
2. Turn ignition switch ON.

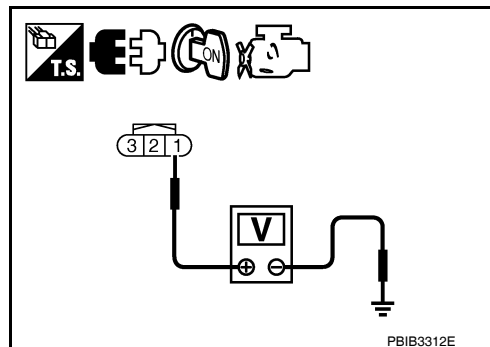


3. Check voltage between CKP sensor (POS) terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 10.
NG >> GO TO 3.



3. CHECK CKP SENSOR (POS) POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between CKP sensor (POS) terminal 1 and ECM terminal 75. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit.

4. CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
69	Tumble control valve position sensor terminal 1	EC-480, "Wiring Diagram"
74	Refrigerant pressure sensor terminal 3	EC-564, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-316, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-374, "Wiring Diagram"
102	APP sensor terminal 5	EC-507, "Wiring Diagram"

OK or NG

- OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK TUMBLE CONTROL VALVE POSITION SENSOR

Refer to [EC-481, "Diagnosis Procedure"](#).

OK or NG

- OK >> GO TO 6.
NG >> Replace intake manifold adapter. Refer to [EM-18, "Component"](#).

6. CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28, "How to Perform Trouble Diagnosis for Quick and Accurate Repair"](#).

DTC P0335 CKP SENSOR (POS)

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 7.

NG >> Replace refrigerant pressure sensor. Refer to [MTC-92, "Removal and Installation for Refrigerant Pressure Sensor"](#).

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-378, "Component Inspection"](#).

OK or NG

OK >> GO TO 8.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

8. CHECK APP SENSOR

Refer to [EC-510, "Component Inspection"](#).

OK or NG

OK >> GO TO 14.

NG >> GO TO 9.

9. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> **INSPECTION END**

10. CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between CKP sensor (POS) terminal 2 and ECM terminal 62. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 11.

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

11. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between CKP sensor (POS) terminal 3 and ECM terminal 61. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 12.

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

12. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-320, "Component Inspection"](#).

OK or NG

OK >> GO TO 13.

NG >> Replace crankshaft position sensor (POS). Refer to [EM-80, "Component"](#).

13. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 14.

NG >> Replace the signal plate. Refer to [EM-80, "Component"](#).

DTC P0335 CKP SENSOR (POS)

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

14. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

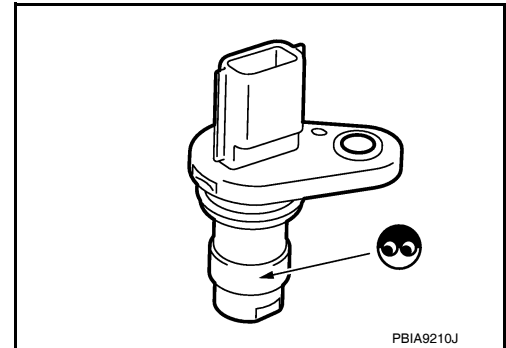
>> **INSPECTION END**

Component Inspection

INFOID:000000006579991

CRANKSHAFT POSITION SENSOR (POS)

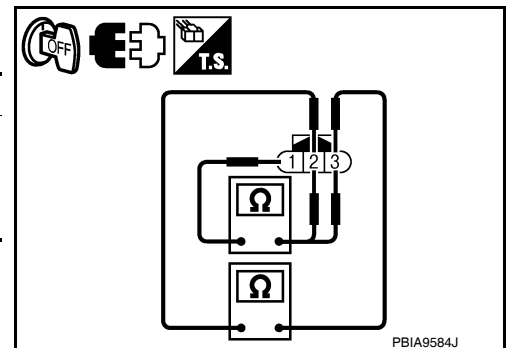
1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	

6. If NG, replace crankshaft position sensor (POS). Refer to [EM-80](#). "Component".



DTC P0340 CMP SENSOR (PHASE)

< SERVICE INFORMATION >

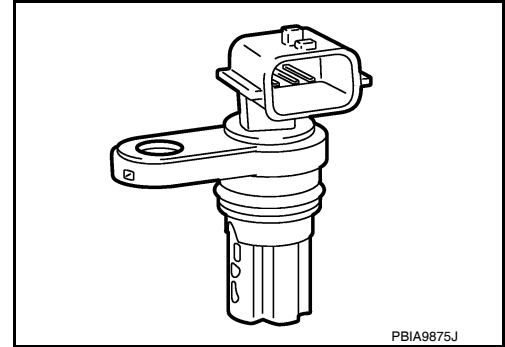
[MR20DE (FOR CALIFORNIA)]

DTC P0340 CMP SENSOR (PHASE)

Component Description

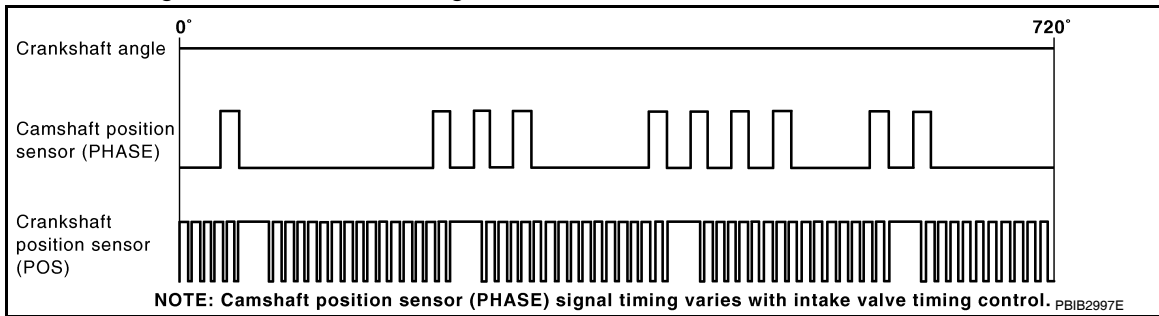
INFOID:000000006579993

The camshaft position sensor (PHASE) senses the protrusion of camshaft (INT) 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.



PBIA9875J

ECM receives the signals as shown in the figure.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006579994

Specification data are reference values.

Monitor item	Condition	Specification
ENG SPEED	• Run engine and compare CONSULT-III value with the tachometer indication.	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

INFOID:000000006579995

NOTE:

If DTC P0340 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-422](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor (PHASE) circuit	<ul style="list-style-type: none"> The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. The cylinder No. signal is not set to ECM during engine running. The cylinder No. signal is not in the normal pattern during engine running. 	<ul style="list-style-type: none"> Harness or connectors [Camshaft position sensor (PHASE) circuit is open or shorted.] Camshaft position sensor (PHASE) Camshaft (INT) Starter motor (Refer to SC-11.) Starting system circuit (Refer to SC-11.) Dead (Weak) battery

DTC Confirmation Procedure

INFOID:000000006579996

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

1. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.

DTC P0340 CMP SENSOR (PHASE)

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

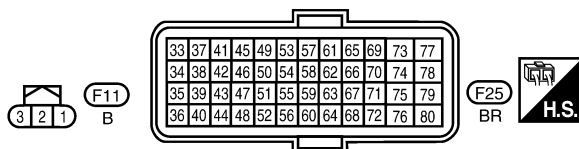
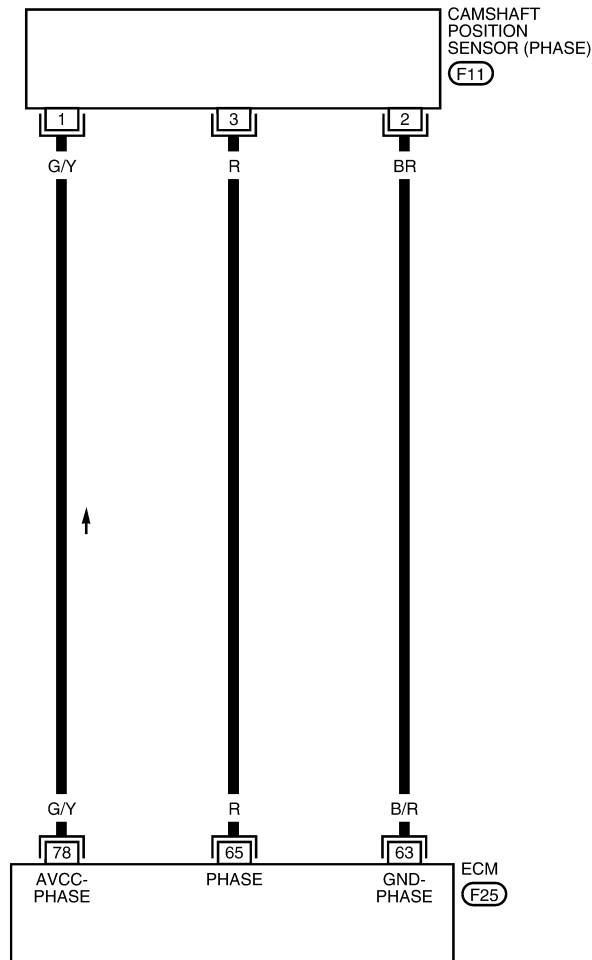
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-323, "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to next step.
4. Maintain engine speed at more than 800 rpm for at least 5 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-323, "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006579997

EC-PHASE-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



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DTC P0340 CMP SENSOR (PHASE)

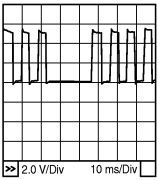
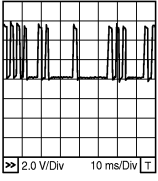
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-III.

CAUTION:

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
63	B/R	Sensor ground [Camshaft position sensor (PHASE)]	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
65	R	Camshaft position sensor (PHASE)	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	1.0 - 2.0 V★ 
			[Engine is running] • Engine speed: 2,000 rpm.	1.0 - 2.0 V★ 
78	G/Y	Sensor power supply [Camshaft position sensor (PHASE)]	[Ignition switch: ON]	Approximately 5 V

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

Diagnosis Procedure

INFOID:000000006579998

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

Yes or No

Yes >> GO TO 2.

No >> Check starting system. (Refer to [SC-11.](#))

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0340 CMP SENSOR (PHASE)

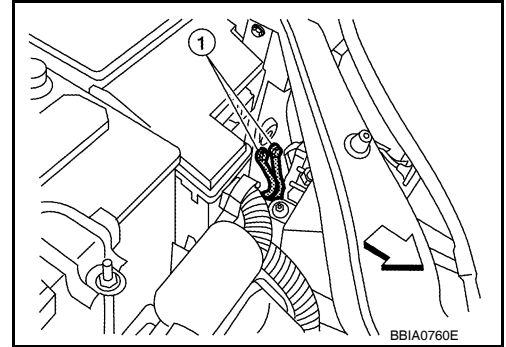
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

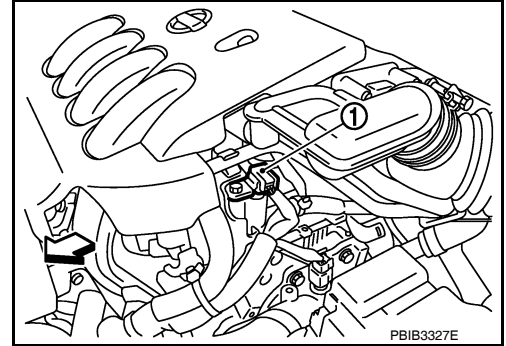
OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace ground connections.



3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

- Disconnect camshaft position (CMP) sensor (PHASE) (1) harness connector.
- ↔ : Vehicle front
- Turn ignition switch ON.

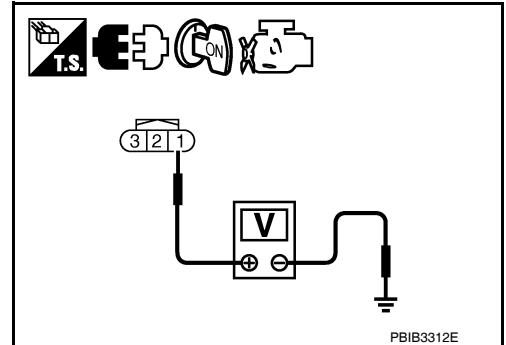


- Check voltage between CMP sensor (PHASE) terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check harness continuity between CMP sensor (PHASE) terminal 2 and ECM terminal 63.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- Check harness continuity between CMP sensor (PHASE) terminal 3 and ECM terminal 65.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 6.

DTC P0340 CMP SENSOR (PHASE)

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

6. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-325, "Component Inspection"](#).

OK or NG

OK >> GO TO 7.

NG >> Replace camshaft position sensor (PHASE). Refer to [EM-50](#).

7. CHECK CAMSHAFT (INTAKE)

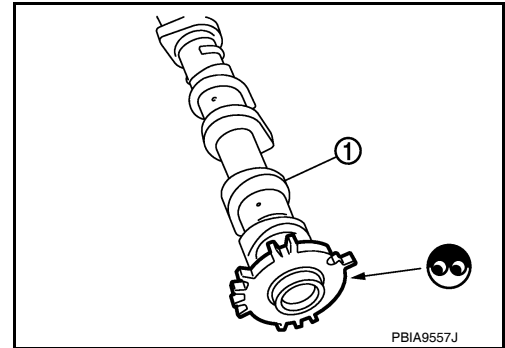
Check the following.

- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 8.

NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to [EM-50](#).



8. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

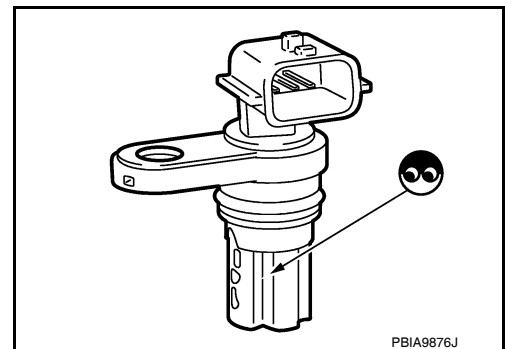
>> **INSPECTION END**

Component Inspection

INFOID:000000006579999

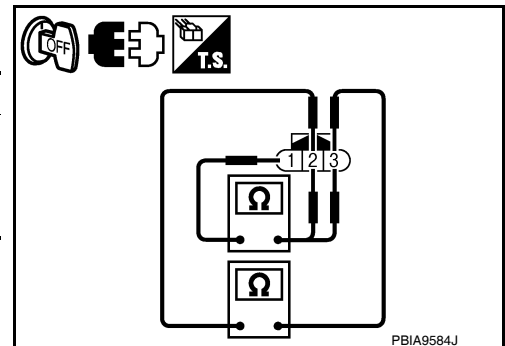
CAMSHAFT POSITION SENSOR (PHASE)

1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor (PHASE) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	



6. If NG, replace camshaft position sensor (PHASE). Refer to [EM-50, "Component"](#).

DTC P0420 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0420 THREE WAY CATALYST FUNCTION

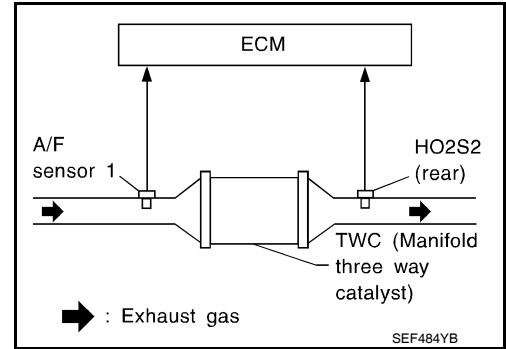
On Board Diagnosis Logic

INFOID:000000006580001

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 air fuel ratio (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 0420	Catalyst system efficiency below threshold	<ul style="list-style-type: none"> • Three way catalyst (manifold) does not operate properly. • Three way catalyst (manifold) does not have enough oxygen storage capacity. 	<ul style="list-style-type: none"> • Three way catalyst (manifold) • Exhaust tube • Intake air leaks • Fuel injector • Fuel injector leaks • Spark plug • Improper ignition timing

DTC Confirmation Procedure

INFOID:000000006580002

NOTE:

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

WITH CONSULT-III

TESTING CONDITION:

Do not hold engine speed for more than the specified minutes below.

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.
9. Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
If "INCMP" of "CATALYST" changed to "CMPLT", go to step 12.
10. Wait 5 seconds at idle.
11. Rev engine up to 2,000 to 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to "CMPLT" (It will take approximately 5 minutes).
If not "CMPLT", stop engine and cool it down to less than 70°C (158°F) and then retest from step 1.
12. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
13. Confirm that 1st trip DTC is not detected.
If 1st trip DTC is detected, go to [EC-327, "Diagnosis Procedure"](#).

DTC P0420 THREE WAY CATALYST FUNCTION

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

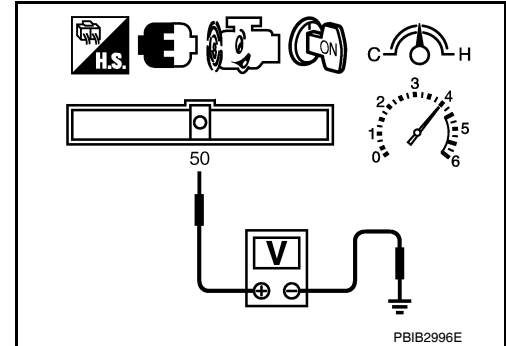
INFOID:000000006580003

Overall Function Check

Use this procedure to check the overall function of the three way catalyst (manifold). During this check, a 1st trip DTC might not be confirmed.

WITH GST

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. Open engine hood.
6. Set voltmeter probe between ECM terminals 50 HO2S2 signal and ground.
7. Keep engine speed at 2,500 rpm constant under no load.
8. Make sure that the voltage does not vary for more than 5 seconds.
If the voltage fluctuation cycle takes less than 5 seconds, go to [EC-327, "Diagnosis Procedure"](#).
 - 1 cycle: 0.6 - 1.0 → 0 - 0.3 → 0.6 - 1.0



Diagnosis Procedure

INFOID:000000006580004

1. CHECK EXHAUST SYSTEM

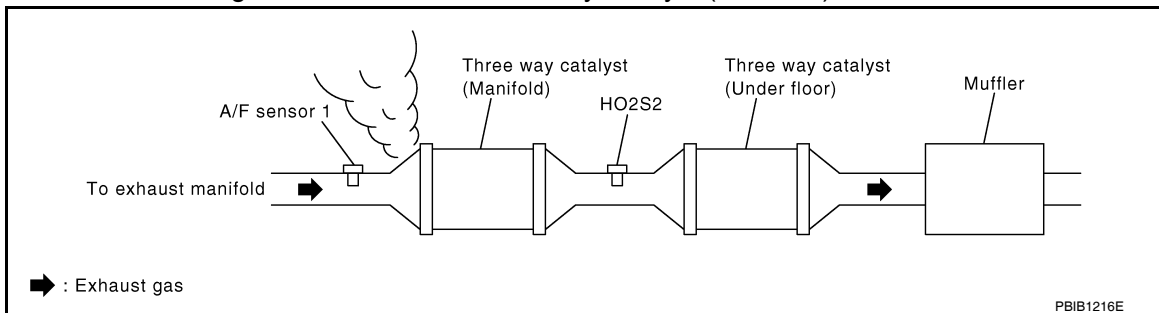
Visually check exhaust tubes and muffler for dent.

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace.

2. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (manifold).



OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace.

3. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace.

4. CHECK IGNITION TIMING

Check the following items. Refer to [EC-92, "Basic Inspection"](#).

DTC P0420 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Items	Specifications
Target idle speed	CVT: 675 ± 50 rpm (in P or N position)
	M/T: 700 ± 50 rpm (in Neutral position)
Ignition timing	CVT: 6 ± 5° BTDC (in P or N position)
	M/T: 6 ± 5° BTDC (in Neutral position)

OK or NG

OK >> GO TO 5.

NG >> Follow the [EC-92. "Basic Inspection"](#).

5. CHECK FUEL INJECTORS

1. Stop engine and turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Turn ignition switch ON.
4. Check voltage between ECM terminals 25, 29, 30, 31 and ground with CONSULT-III or tester. Refer to Wiring Diagram for fuel injectors, [EC-545. "Wiring Diagram"](#).

Voltage: Battery voltage

OK or NG

OK >> GO TO 6.

NG >> Perform [EC-546. "Diagnosis Procedure"](#).

6. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

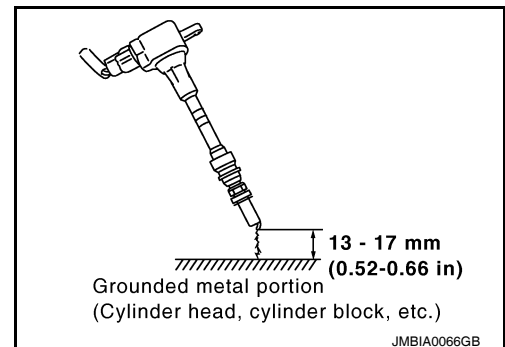
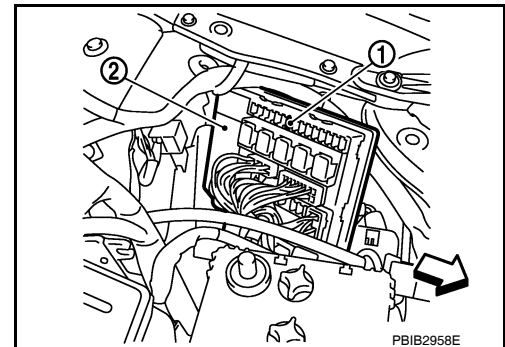
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Remove fuel pump fuse (1) in IPDM E/R (2) to release fuel pressure.

NOTE:

Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.

- ⇐ : Vehicle front
3. Start engine.
 4. After engine stalls, crank it two or three 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 about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm. 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:

DTC P0420 THREE WAY CATALYST FUNCTION

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

OK or NG

- OK >> GO TO 10.
- NG >> 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 about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

OK or NG

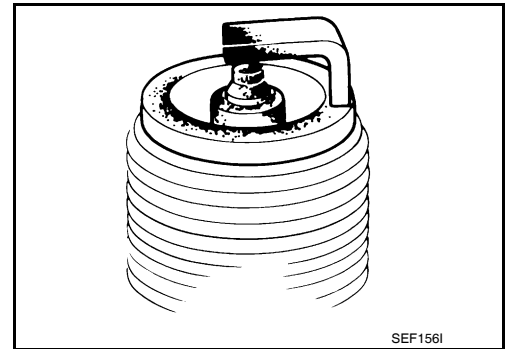
- OK >> GO TO 8.
- NG >> Check ignition coil, power transistor and their circuits. Refer to [EC-554](#).

8.CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

OK or NG

- OK >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-33](#).
- NG >> 1. Repair or clean spark plug. Refer to [EM-33](#).
2. GO TO 9.



9.CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-33](#).

10.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Remove fuel injector assembly.
Refer to [EM-36](#).
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.
5. Turn ignition switch ON.
Make sure fuel does not drip from fuel injector.

OK or NG

- OK (Does not drip.)>>GO TO 11.
- NG (Drips.)>>Replace the fuel injector(s) from which fuel is dripping. Refer to [EM-36](#).

11.CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

Trouble is fixed.>>**INSPECTION END**

DTC P0420 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Trouble is not fixed.>>Replace three way catalyst (manifold). Refer to [EM-23](#).

DTC P0441 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

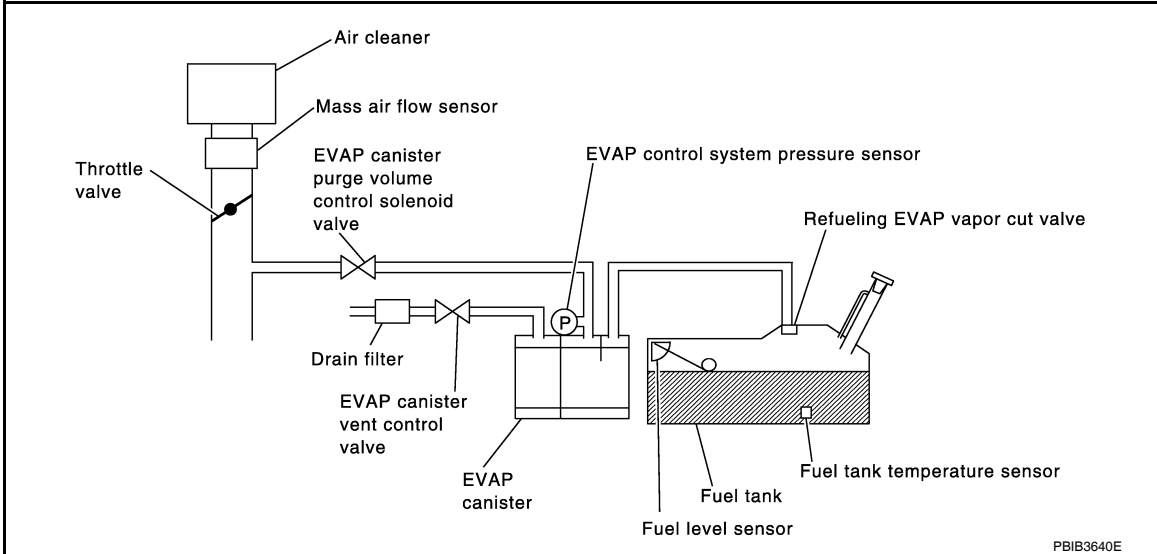
DTC P0441 EVAP CONTROL SYSTEM

System Description

INFOID:000000006580005

NOTE:

If DTC P0441 is displayed with other DTC such as P2122, P2123 P2127, P2128, 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.

On Board Diagnosis Logic

INFOID:000000006580006

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 0441	EVAP control system incorrect purge flow	<ul style="list-style-type: none"> EVAP control system does not operate properly. EVAP control system has a leak between intake manifold and EVAP control system pressure sensor. 	<ul style="list-style-type: none"> EVAP canister purge volume control solenoid valve stuck closed EVAP control system pressure sensor and the circuit Loose, disconnected or improper connection of rubber tube Blocked rubber tube Cracked EVAP canister EVAP canister purge volume control solenoid valve circuit Accelerator pedal position sensor Blocked purge port EVAP canister vent control valve Drain filter

DTC Confirmation Procedure

INFOID:000000006580007

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-III

DTC P0441 EVAP CONTROL SYSTEM

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 70 seconds.
4. Select "PURG FLOW P0441" of "EVAPORATIVE SYSTEM" in "DTC CONFIRMATION" mode with CONSULT-III.
5. Touch "START".
If "COMPLETED" is displayed, go to step 7.
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-III screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

Shift lever	Suitable position
VHCL SPEED SE	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,800 rpm
B/FUEL SCHDL	1.0 - 10.0 msec
COOLAN TEMP/S	More than 0°C (32 °F)

If TESTING is not changed for a long time, retry from step 2.

7. Make sure that "OK" is displayed after touching "ON-BOARD DIAGNOSIS". If "NG" is displayed, refer to [EC-332, "Diagnosis Procedure"](#).

Overall Function Check

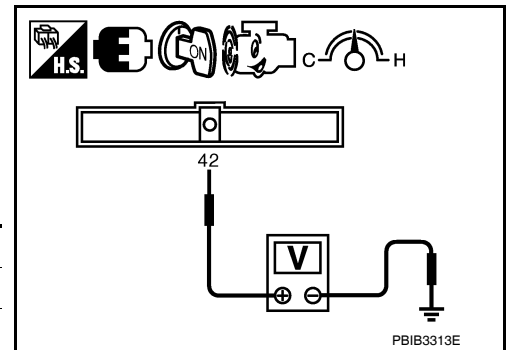
INFOID:000000006580008

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Lift up drive wheels.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.
5. Set voltmeter probes to ECM terminals 42 (EVAP control system pressure sensor signal) and ground.
6. Check EVAP control system pressure sensor value at idle speed and note it.
7. Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Shift lever	Any position other than P, N or R



8. 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.
9. If NG, go to [EC-332, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580009

1. CHECK EVAP CANISTER

1. Turn ignition switch OFF.
2. Check EVAP canister for cracks.

OK or NG

OK (With CONSULT-III)>>GO TO 2.

OK (Without CONSULT-III)>>GO TO 3.

NG >> Replace EVAP canister. Refer to [FL-14, "Removal and Installation"](#).

2. CHECK PURGE FLOW

DTC P0441 EVAP CONTROL SYSTEM

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

④ With CONSULT-III

1. 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-43, "Description"](#).
2. Start engine and let it idle.
3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
4. Rev engine up to 2,000 rpm.
5. Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

PURG VOL CONT/V	VACUUM
100%	Should exist.
0%	Should not exist.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 4.

3. CHECK PURGE FLOW

⊗ Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
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-43, "Description"](#).
4. Start engine and let it idle.
Do not depress accelerator pedal even slightly.
5. Check vacuum gauge indication before 60 seconds passed after starting engine.

Vacuum should not exist.

6. Revving engine up to 2,000 rpm after 100 seconds passed after starting engine.

Vacuum should exist.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 4.

4. CHECK EVAP PURGE LINE

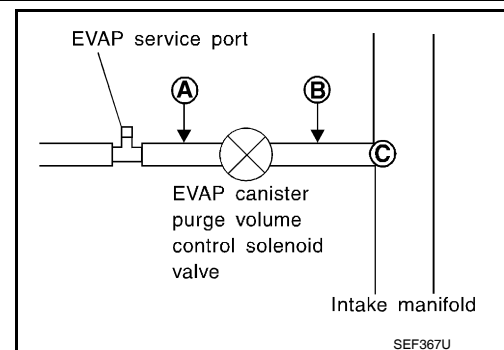
1. Turn ignition switch OFF.
2. Check EVAP purge line for improper connection or disconnection.
Refer to [EC-43, "Description"](#).

OK or NG

- OK >> GO TO 5.
NG >> Repair it.

5. CHECK EVAP PURGE HOSE AND PURGE PORT

1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.
2. Blow air into each hose and EVAP purge port **C**.



DTC P0441 EVAP CONTROL SYSTEM

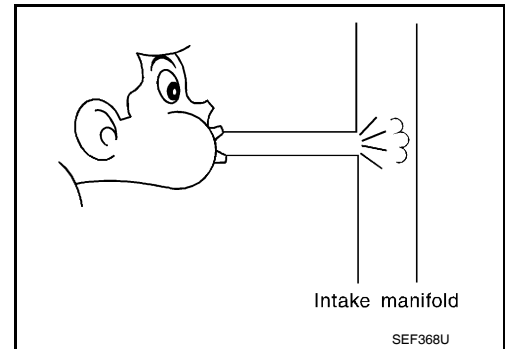
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Check that air flows freely.

OK or NG

- OK (With CONSULT-III)>>GO TO 6.
- OK (Without CONSULT-III)>>GO TO 7.
- NG >> Repair or clean hoses and/or purge port.



6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-356, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18, "Component"](#).

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to [EC-372](#) for DTC P0452 and [EC-379](#) for DTC P0453.

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

10. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 11.
- NG >> Clean the rubber tube using an air blower.

11. CHECK DRAIN FILTER

Refer to [EC-335, "Component Inspection"](#).

OK or NG

- OK >> GO TO 12.
- NG >> Replace drain filter. Refer to [FL-14, "Removal and Installation"](#).

12. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-361, "Component Inspection"](#).

DTC P0441 EVAP CONTROL SYSTEM

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 13.

NG >> Replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).

13. CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-43, "Description"](#).

OK or NG

OK >> GO TO 14.

NG >> Replace it.

14. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 15.

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

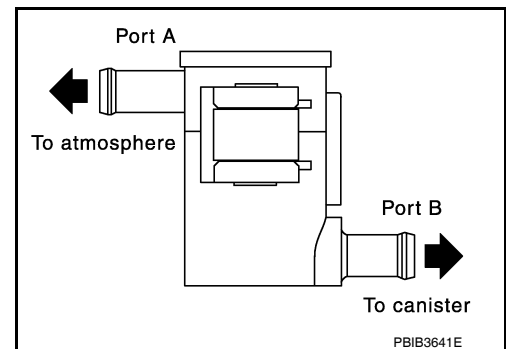
>> **INSPECTION END**

Component Inspection

INFOID:000000006580010

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to [FL-14, "Removal and Installation"](#).



DTC P0442 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

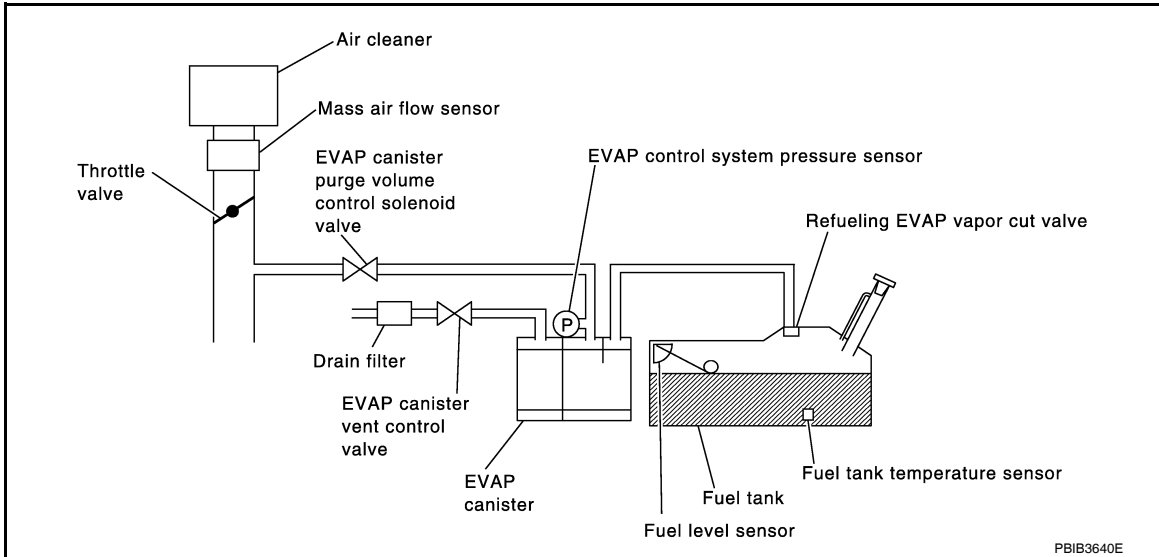
[MR20DE (FOR CALIFORNIA)]

DTC P0442 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

INFOID:000000006580011

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum. If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following Vacuum test conditions. The EVAP canister vent control valve is closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve will then be opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0442 0442	EVAP control system small leak detected (negative pressure)	EVAP control system has a leak, EVAP control system does not operate properly.	<ul style="list-style-type: none"> • Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap. • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged • Drain filter • EVAP canister is saturated with water • EVAP control system pressure sensor • Fuel level sensor and the circuit • Refueling EVAP vapor cut valve • ORVR system leaks

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC P0442 EVAP CONTROL SYSTEM

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

DTC Confirmation Procedure

INFOID:000000006580012

NOTE:

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

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" 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 0 to 10°C (32 to 140°F).
- Open engine hood before conducting following procedure.

CONSULT-III WITH CONSULT-III

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
4. Check the following conditions are met.
COOLAN TEMP/S: 0 - 100°C (32 - 212°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
5. Select "EVP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.
NOTE:
If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-92. "Basic Inspection"](#).
6. Make sure that "OK" is displayed.
If "NG" is displayed, refer to [EC-337. "Diagnosis Procedure"](#).

GST WITH GST

NOTE:

Be sure to read the explanation of Driving Pattern on [EC-59. "Emission-related Diagnostic Information"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to Driving Pattern, [EC-59. "Emission-related Diagnostic Information"](#)
3. Stop vehicle.
4. Turn ignition switch OFF and wait at least 10 seconds and then turn ignition switch ON.
5. Select Service \$07 with GST.
 - If P0442 is displayed on the screen, go to [EC-337. "Diagnosis Procedure"](#).
 - If P0441 is displayed on the screen, go to [EC-332. "Diagnosis Procedure"](#) for DTC P0441.

Diagnosis Procedure

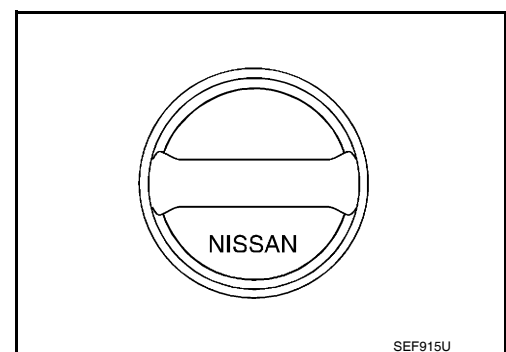
INFOID:000000006580013

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
- NG >> Replace with genuine NISSAN fuel filler cap.



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.
- NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.

DTC P0442 EVAP CONTROL SYSTEM

[MR20DE (FOR CALIFORNIA)]

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2. Retighten until reteaching sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-45. "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace fuel filler cap with a genuine one.

5. INSTALL THE PRESSURE PUMP

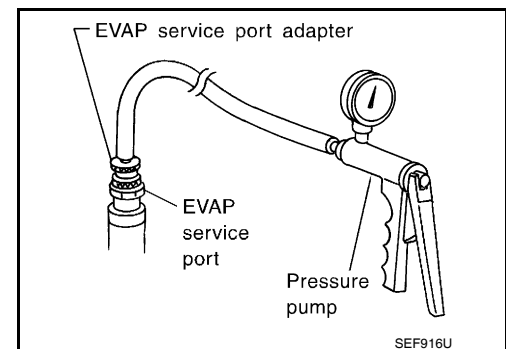
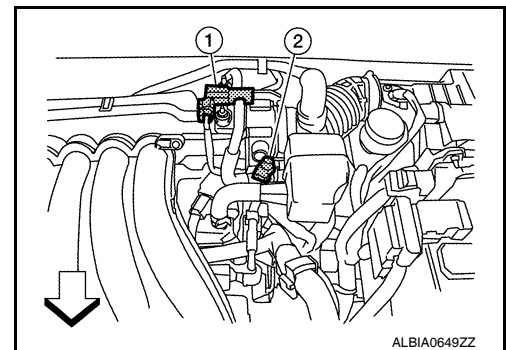
To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

For the location of EVAP service port (2), refer to [EC-43. "Description"](#).

- EVAP canister purge volume control solenoid valve (1)
- ←: Vehicle front

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



With CONSULT-III>>GO TO 6.

Without CONSULT-III>>GO TO 7.

6. CHECK FOR EVAP LEAK

With CONSULT-III

1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-III.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

CAUTION:

- **Never use compressed air or a high pressure pump.**
- **Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.**

DTC P0442 EVAP CONTROL SYSTEM

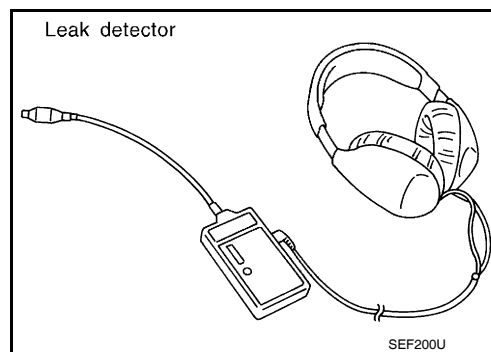
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-43. "Description"](#).

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace.



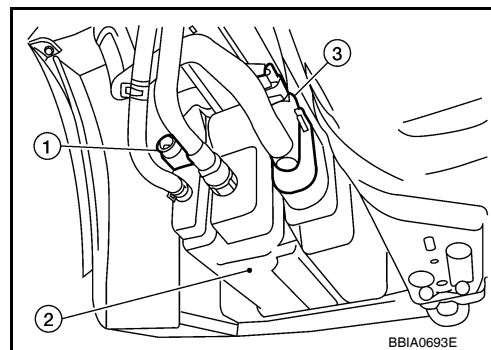
7. CHECK FOR EVAP LEAK

⊗ Without CONSULT-III

1. Turn ignition switch OFF.
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

CAUTION:

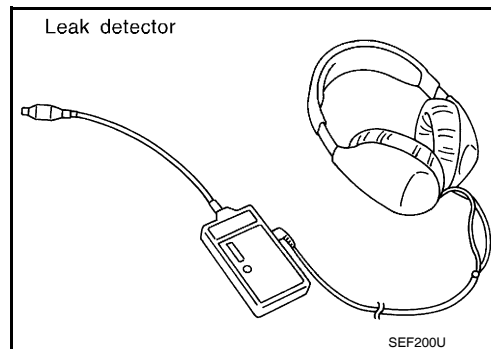
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-43. "Description"](#).

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace.



8. CHECK DRAIN FILTER

Refer to [EC-342. "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
NG >> Replace drain filter. Refer to [FL-14. "Removal and Installation"](#).

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following,

- EVAP canister vent control valve is installed properly. Refer to [FL-14. "Removal and Installation"](#).
- EVAP canister vent control valve. Refer to [EC-361. "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14. "Removal and Installation"](#).

DTC P0442 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

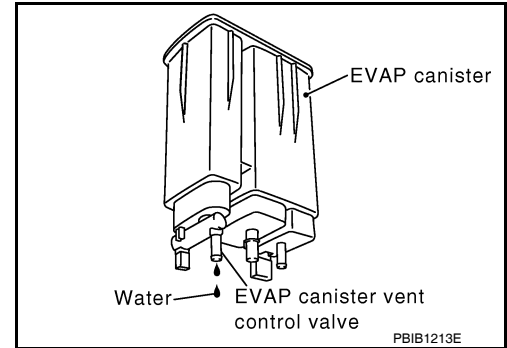
1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 11.

No (With CONSULT-III)>>GO TO 13.

No (Without CONSULT-III)>>GO TO 14.



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 1.9 kg (4.2 lb).

OK or NG

OK (With CONSULT-III)>>GO TO 13.

OK (Without CONSULT-III)>>GO TO 14.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose connected to EVAP canister for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to [FL-14. "Removal and Installation"](#).

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

ⓑ With CONSULT-III

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK >> GO TO 16.

NG >> GO TO 15.

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

ⓧ Without CONSULT-III

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.

OK or NG

OK >> GO TO 17.

NG >> GO TO 15.

DTC P0442 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

15. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-120, "Vacuum Hose Drawing"](#).

OK or NG

OK >> GO TO 16.

NG >> Repair or reconnect the hose.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-356, "Component Inspection"](#).

OK or NG

OK >> GO TO 17.

NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18, "Component"](#).

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-287, "Component Inspection"](#).

OK or NG

OK >> GO TO 18.

NG >> Replace fuel level sensor unit. Refer to [FL-6, "Removal and Installation"](#).

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-378, "Component Inspection"](#).

OK or NG

OK >> GO TO 19.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

19. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.

Refer to [EC-43](#).

OK or NG

OK >> GO TO 20.

NG >> Repair or reconnect the hose.

20. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 21.

21. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-47](#).

OK or NG

OK >> GO TO 22.

NG >> Repair or replace hoses and tubes.

22. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 23.

NG >> Repair or replace hoses, tubes or filler neck tube.

23. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-50, "Component Inspection"](#).

OK or NG

OK >> GO TO 24.

NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-10, "Component"](#).

DTC P0442 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

24. CHECK FUEL LEVEL SENSOR

Refer to [FL-6](#).

OK or NG

OK >> GO TO 25.

NG >> Replace fuel level sensor unit. Refer to [FL-6, "Removal and Installation"](#).

25. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

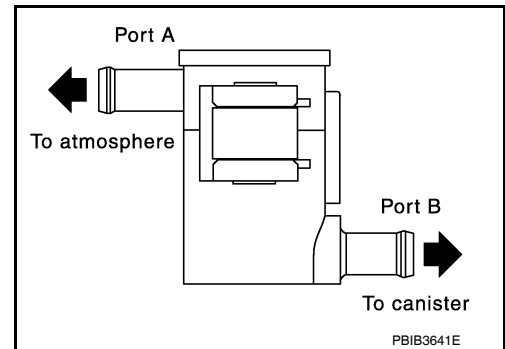
>> **INSPECTION END**

Component Inspection

INFOID:000000006580014

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to [FL-14, "Removal and Installation"](#).



DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE
 < SERVICE INFORMATION > **[MR20DE (FOR CALIFORNIA)]**

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:000000006580015

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
ABS actuator and electric unit (control unit) Combination meter	Vehicle speed*2		

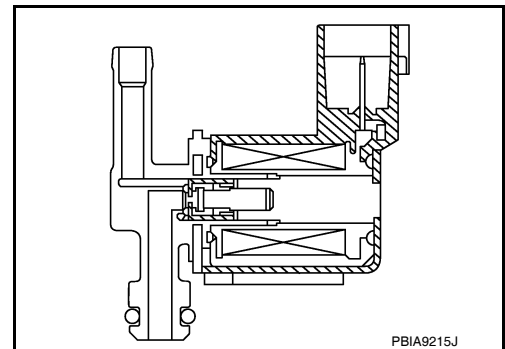
*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

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

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580016

Specification data are reference values.

Monitor item	Condition	Specification
PURG VOL C/V	<ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	Idle (Accelerator pedal is not depressed even slightly, after engine starting)
		2,000 rpm
		0 - 50%

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

On Board Diagnosis Logic

INFOID:000000006580017

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0443 0443	EVAP canister purge volume control solenoid valve	A)	The canister purge flow is detected during the vehicle is stopped while the engine is running, even when EVAP canister purge volume control solenoid valve is completely closed.	<ul style="list-style-type: none">• EVAP control system pressure sensor• EVAP canister purge volume control solenoid valve (EVAP canister purge volume control solenoid valve is stuck open.)• EVAP canister vent control valve• Drain filter• EVAP canister• Hoses (Hoses are connected incorrectly or clogged.)
		B)	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	

DTC Confirmation Procedure

INFOID:000000006580018

Perform PROCEDURE FOR MALFUNCTION A first.

If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.

NOTE:

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

PROCEDURE FOR MALFUNCTION A

TESTING CONDITION:

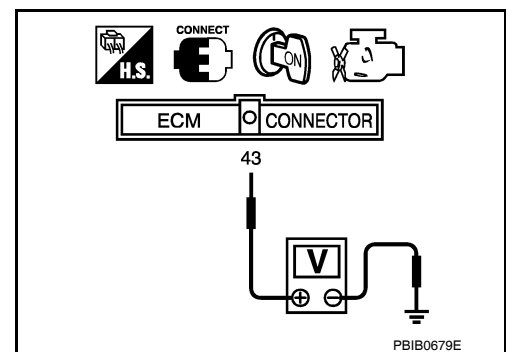
- Perform "DTC Confirmation Procedure" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Always perform test at a temperature of 5 to 60°C (41 to 140°F).
- Cool the vehicle so that engine coolant temperature becomes same level as ambient temperature.

WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Check that the following condition are met.
FUEL T/TMP SE: 0 – 35°C (32 – 95°F)
3. Start engine and wait at least 60 seconds.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-347. "Diagnosis Procedure"](#).

WITH GST

1. Turn ignition switch ON.
2. Set voltmeter probes to ECM terminal 43 (FTT sensor signal) and ground.
3. Check that the voltage is 3.1 – 4.2 V.
4. Start engine and wait at least 60 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-347. "Diagnosis Procedure"](#).



PROCEDURE FOR MALFUNCTION B

NOTE:

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

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-III

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. Touch "START".
6. Start engine and let it idle until "TESTING" on CONSULT-III changes to "COMPLETED". (It will take approximately 10 seconds.)
If "TESTING" is not displayed after 5 minutes, retry from step 2.
7. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-347, "Diagnosis Procedure"](#).

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. Start engine and let it idle for at least 20 seconds.
4. Select Service \$07 with GST.
5. If 1st trip DTC is detected, go to [EC-347, "Diagnosis Procedure"](#).

A

EC

C

D

E

F

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DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [MR20DE (FOR CALIFORNIA)]

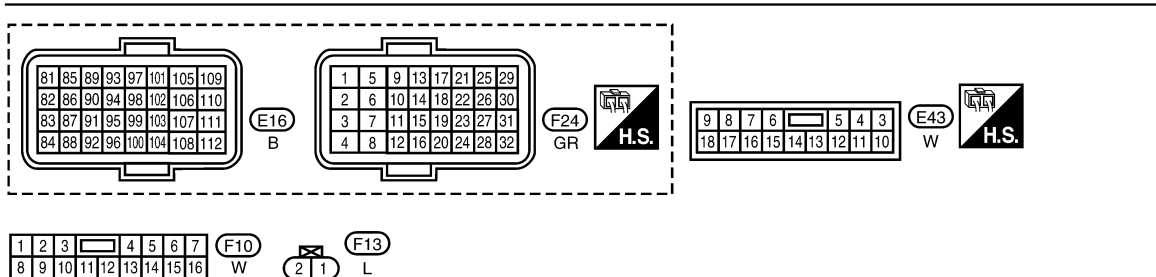
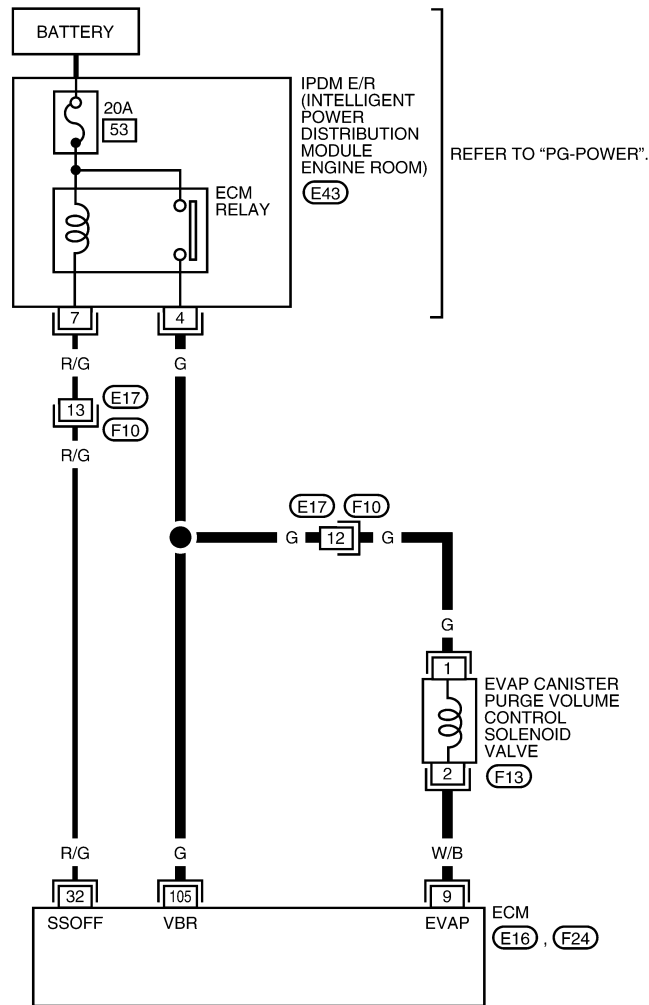
< SERVICE INFORMATION >

INFOID:00000006580019

Wiring Diagram

EC-PGC/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



ABBWA0654GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

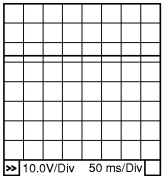
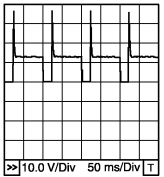
CAUTION:

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
9	W/B	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> Idle speed Accelerator pedal: Not depressed even slightly, after engine starting. 	BATTERY VOLTAGE (11 - 14 V)★  <small>10.0V/Div 50 ms/Div</small> PBIB0050E
			[Engine is running] <ul style="list-style-type: none"> Engine speed: About 2,000 rpm (More than 100 seconds after starting engine) 	Approximately 10 V★  <small>10.0 V/Div 50 ms/Div</small> PBIB0520E
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none"> For a few seconds after turning ignition switch OFF 	0 - 1.0 V
			[Ignition switch: OFF] <ul style="list-style-type: none"> More than a few seconds after turning ignition switch OFF 	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

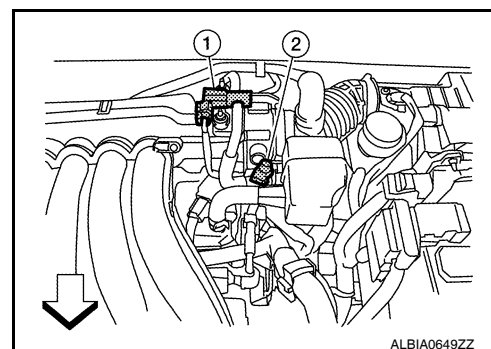
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006580020

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve
 - (1) harness connector.
 - EVAP service port (2)
 - ↙: Vehicle front
3. Turn ignition switch ON.



DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[MR20DE (FOR CALIFORNIA)]

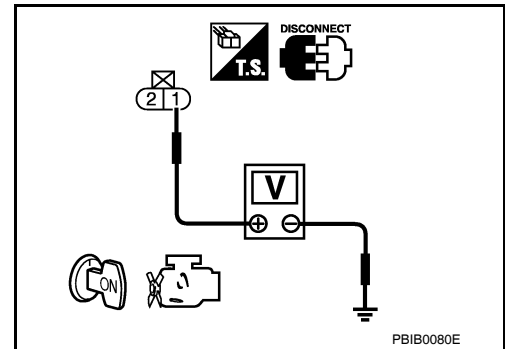
< SERVICE INFORMATION >

4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

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

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 9 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

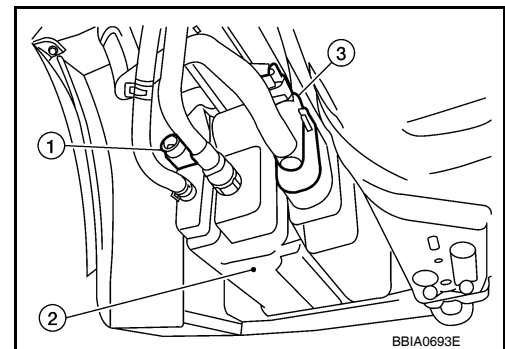
4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check connectors for water.



Water should not exist.

OK or NG

- OK >> GO TO 5.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-378, "Component Inspection"](#).

OK or NG

- OK (With CONSULT-III) >> GO TO 6.
- OK (Without CONSULT-III) >> GO TO 7.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Turn ignition switch OFF.

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Reconnect harness connectors disconnected.
3. Start engine.
4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.
NG >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-350, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18, "Component"](#).

8. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 9.
NG >> Clean the rubber tube using an air blower.

9. CHECK DRAIN FILTER

Refer to [EC-335, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
NG >> Replace drain filter. Refer to [FL-14, "Removal and Installation"](#).

10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-361, "Component Inspection"](#).

OK or NG

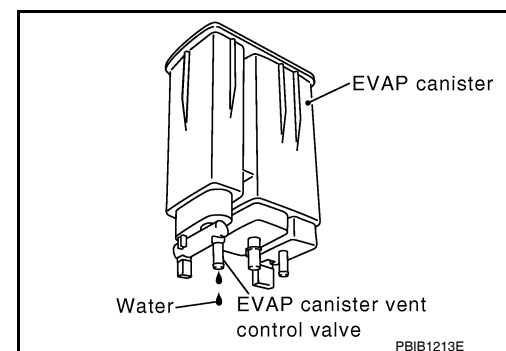
- OK >> GO TO 11.
NG >> Replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).

11. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Does water drain from the EVAP canister?

YES or NO

- YES >> GO TO 12.
NO >> GO TO 14.



12. 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 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 14.
NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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-14, "Removal and Installation"](#).

14. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

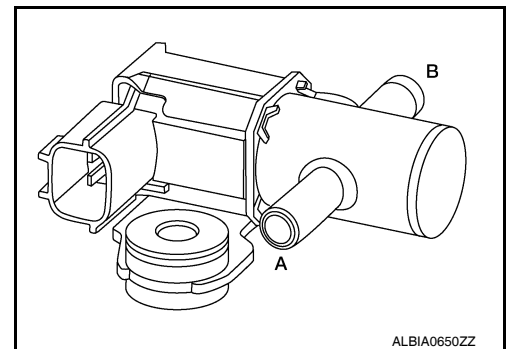
INFOID:000000006580021

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Ⓟ WITH CONSULT-III

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

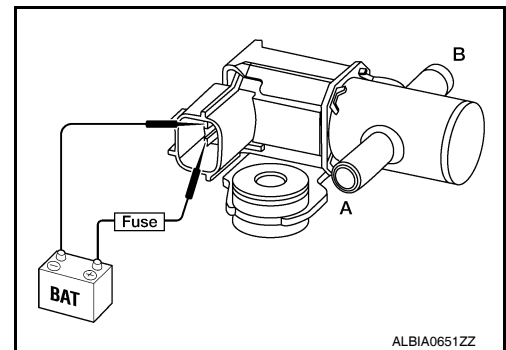
Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No



ⓧ WITHOUT CONSULT-III

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	Yes
No supply	No



DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:000000006580023

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
ABS actuator and electric unit (control unit)	Vehicle speed*2		
Combination meter			

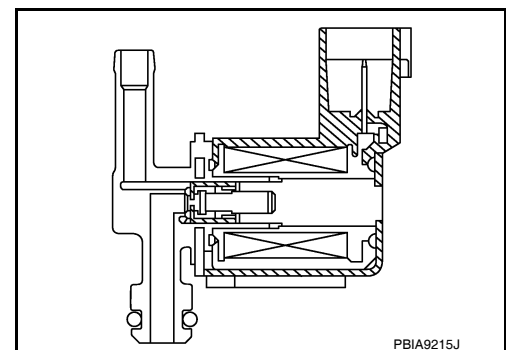
*1: The ECM determines the start signal status by the signal of engine speed and battery voltage.

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

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580024

Specification data are reference values.

Monitor item	Condition	Specification
PURG VOL C/V	<ul style="list-style-type: none"> Engine: After warming up Shift lever: N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	Idle (Accelerator pedal is not depressed even slightly, after engine starting)
		2,000 rpm

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

On Board Diagnosis Logic

INFOID:000000006580025

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444 0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	<ul style="list-style-type: none">• Harness or connectors (EVAP canister purge volume control solenoid valve circuit is open or shorted.)• EVAP canister purge volume control solenoid valve
P0445 0445	EVAP canister purge volume control solenoid valve circuit shorted	An excessively high voltage signal is sent to ECM through the valve	<ul style="list-style-type: none">• Harness or connectors (EVAP canister purge volume control solenoid valve circuit is shorted.)• EVAP canister purge volume control solenoid valve

DTC Confirmation Procedure

INFOID:000000006580026

NOTE:

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

TESTING CONDITION:

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

1. Start engine and let it idle for at least 13 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-354. "Diagnosis Procedure"](#).

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

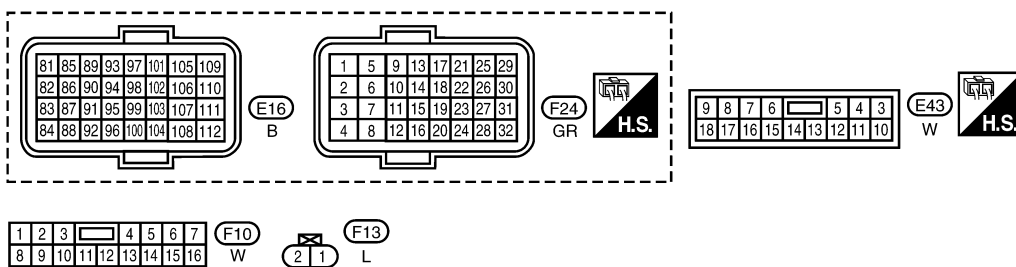
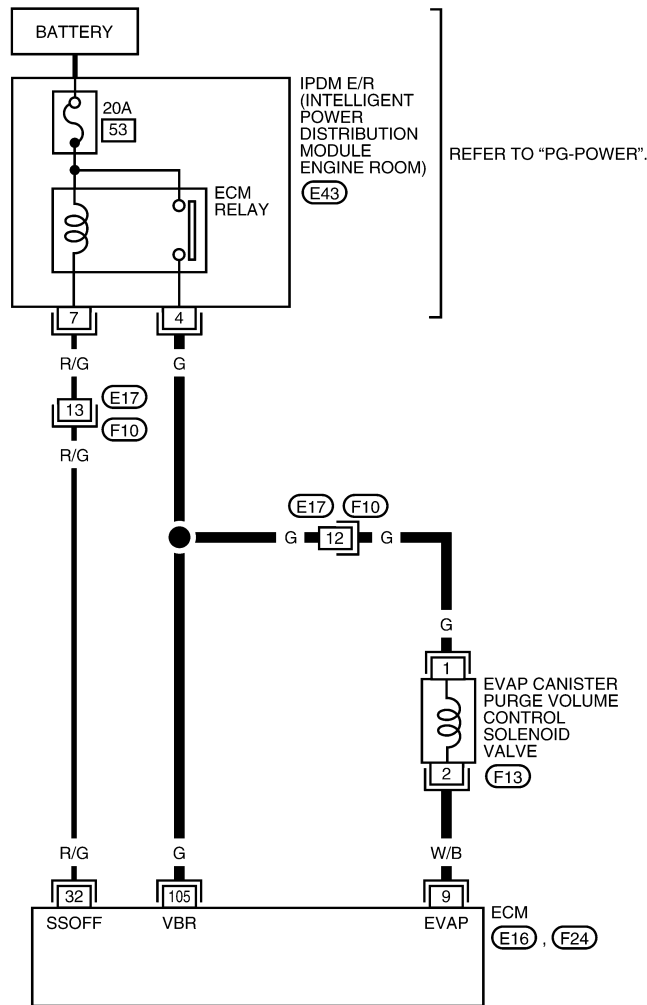
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006608792

EC-PGC/V-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0654GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

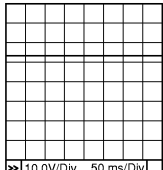
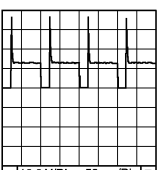
CAUTION:

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
9	W/B	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting. 	BATTERY VOLTAGE (11 - 14 V)★  <small>10.0V/Div 50 ms/Div</small> PBIB0050E
			[Engine is running] <ul style="list-style-type: none"> • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine) 	Approximately 10 V★  <small>10.0 V/Div 50 ms/Div</small> PBIB0520E
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none"> • For a few seconds after turning ignition switch OFF 	0 - 1.0 V
			[Ignition switch: OFF] <ul style="list-style-type: none"> • More than a few seconds after turning ignition switch OFF 	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

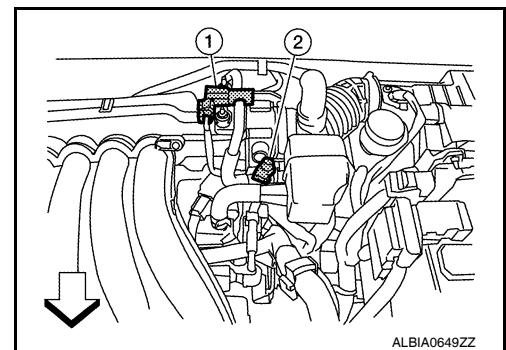
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006580028

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve
 - (1) harness connector.
 - EVAP canister port (2)
 - ↙: Vehicle front
3. Turn ignition switch ON.



DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[MR20DE (FOR CALIFORNIA)]

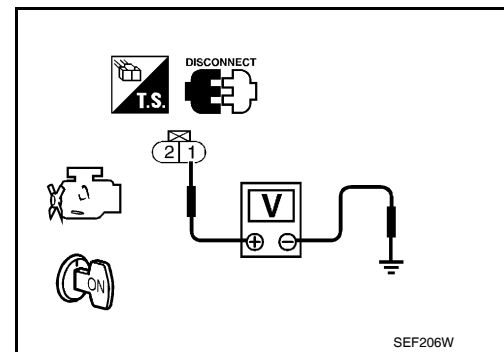
< SERVICE INFORMATION >

4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

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

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 9 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK (With CONSULT-III) >> GO TO 4.
- OK (Without CONSULT-III) >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-356. "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18. "Component"](#).

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

INFOID:000000006580029

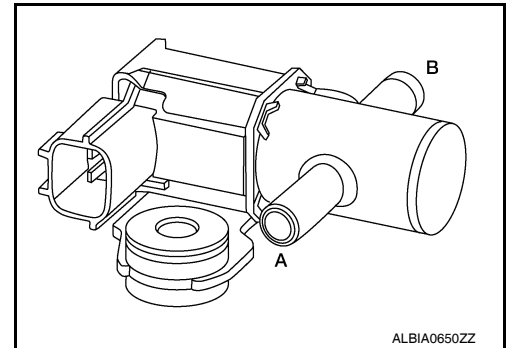
Component Inspection

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Ⓜ WITH CONSULT-III

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

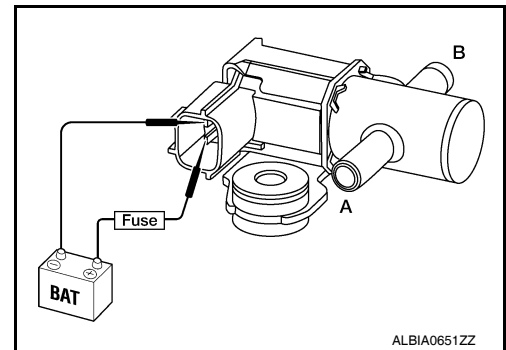
Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No



⊗ WITHOUT CONSULT-III

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	Yes
No supply	No



DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

Component Description

INFOID:000000006580031

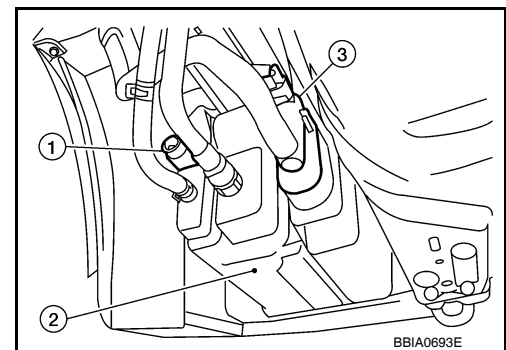
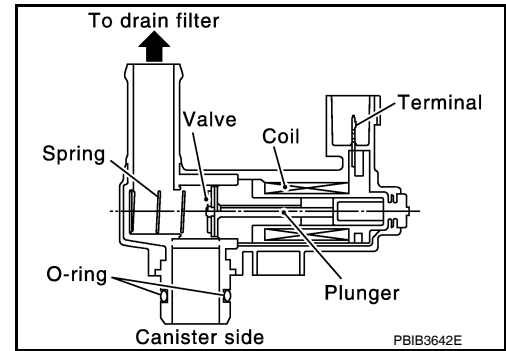
The EVAP canister vent control valve (3) is located on the EVAP canister (2) and is used to seal the canister vent.

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 diagnoses.

- This illustration is a view from under vehicle
- EVAP control system pressure sensor (1)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580032

Specification data are reference values.

Monitor item	Condition	Specification
VENT CONT/V	• Ignition switch: ON	OFF

On Board Diagnosis Logic

INFOID:000000006580033

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0447 0447	EVAP canister vent control valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	<ul style="list-style-type: none"> • Harness or connectors (EVAP canister vent control valve circuit is open or shorted.) • EVAP canister vent control valve • Drain filter

DTC Confirmation Procedure

INFOID:000000006580034

NOTE:

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

TESTING CONDITION:

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

1. Start engine and wait at least 8 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-359, "Diagnosis Procedure"](#).

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

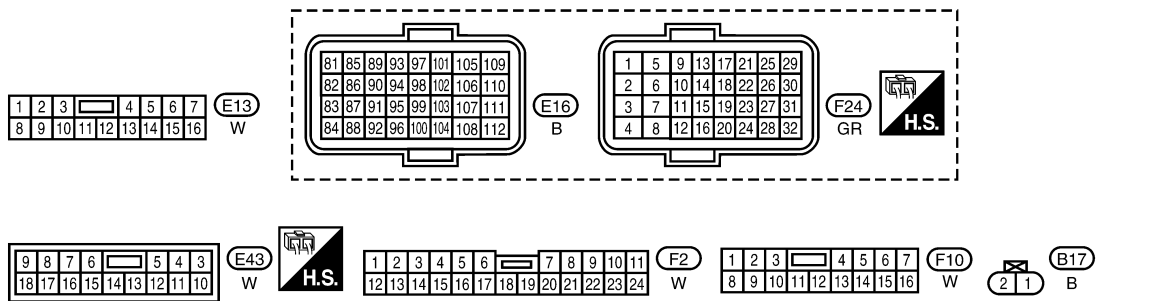
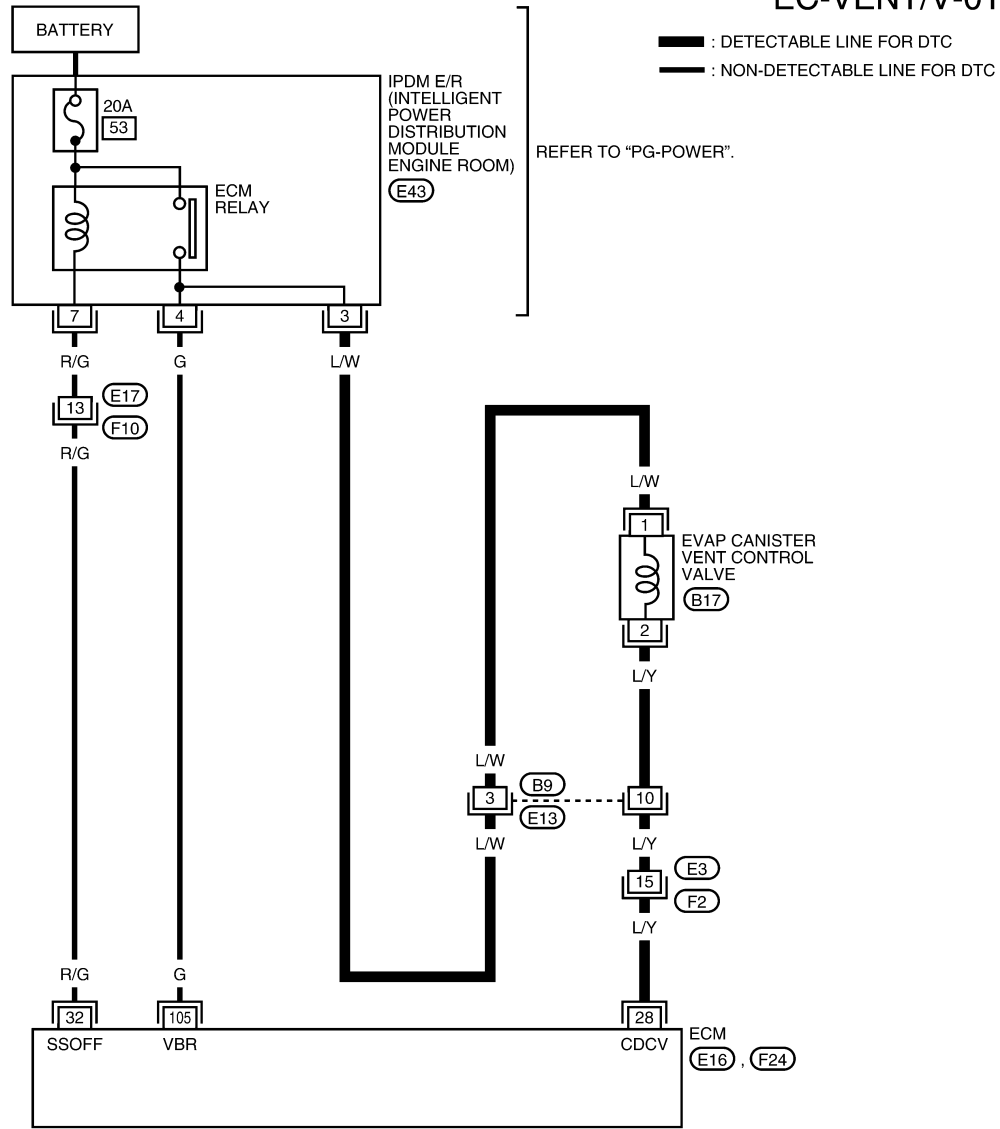
< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

INFOID:000000006580035

Wiring Diagram

EC-VENT/V-01



ABBWA0655GB

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

CAUTION:

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

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
28	L/Y	EVAP canister vent control valve	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580036

1. INSPECTION START

1. Do you have CONSULT-III?

Yes or No

Yes >> GO TO 2.

No >> GO TO 3.

2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

Ⓜ **With CONSULT-III**

- Turn ignition switch OFF and then turn ON.
- Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-III.
- Touch "ON/OFF" on CONSULT-III screen.
- Check for operating sound of the valve.

Clicking noise should be heard.

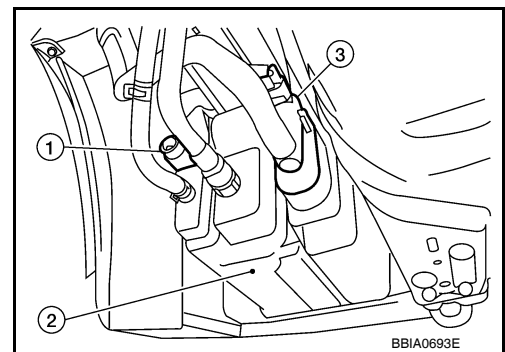
OK or NG

OK >> GO TO 8.

NG >> GO TO 3.

3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect EVAP canister vent control valve (3) harness connector.
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
- Turn ignition switch ON.



DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[MR20DE (FOR CALIFORNIA)]

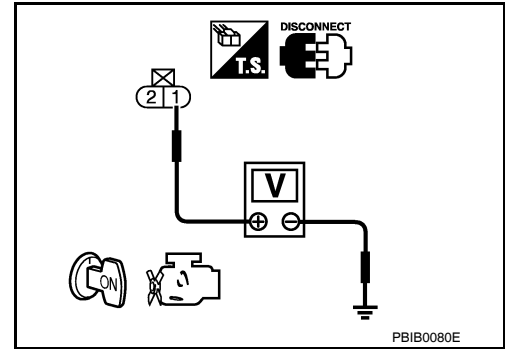
< SERVICE INFORMATION >

4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness for open or short between EVAP canister vent control valve and IPDM E/R

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

5. CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 28 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between EVAP canister vent control valve and ECM

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

7. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 8.
- NG >> Clean the rubber tube using an air blower.

8. CHECK DRAIN FILTER

Refer to [EC-335, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace drain filter. Refer to [FL-14, "Removal and Installation"](#).

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-361, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

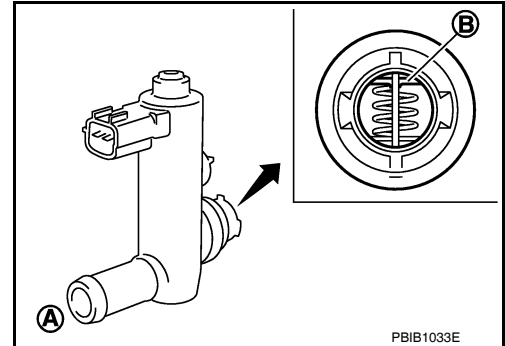
Component Inspection

INFOID:000000006580037

EVAP CANISTER VENT CONTROL VALVE

④ WITH CONSULT-III

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
If NG, replace EVAP canister vent control valve.
If OK, go to next step. Refer to [FL-14, "Removal and Installation"](#).
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.



5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. Check air passage continuity and operation delay time.
Make sure new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

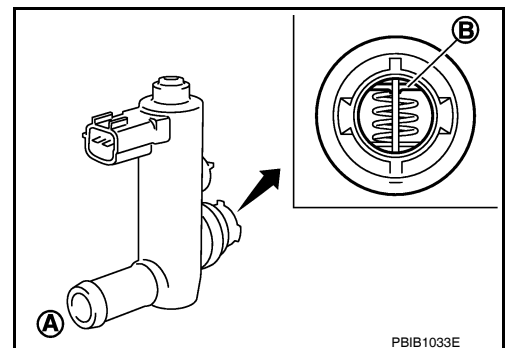
Operation takes less than 1 second.

If NG, go to next step.

7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.
If NG, replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).

⊗ WITHOUT CONSULT-III

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Check air passage continuity and operation delay time under the following conditions.

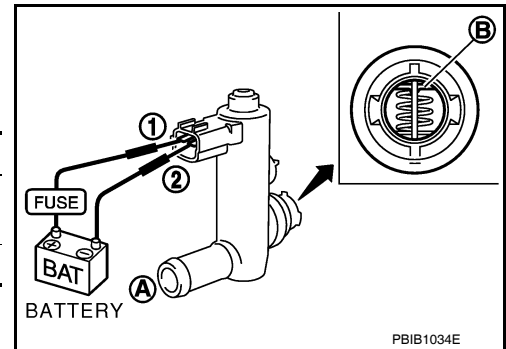
Make sure new O-ring is installed properly.

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.

If NG, go to next step.

4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
5. Perform step 3 again.
If NG, replace EVAP canister vent control valve. Refer to [FL-14. "Removal and Installation"](#).



DTC P0448 EVAP CANISTER VENT CONTROL VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

Component Description

INFOID:000000006580038

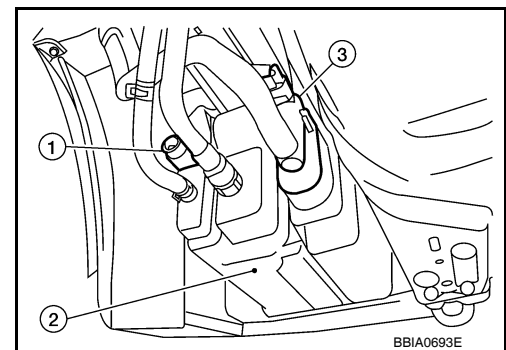
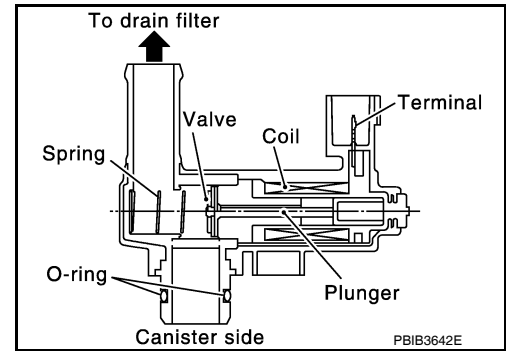
The EVAP canister vent control valve (3) is located on the EVAP canister (2) and is used to seal the canister vent.

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 diagnoses.

- This illustration is a view from under vehicle
- EVAP control system pressure sensor (1)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580039

Specification data are reference values.

Monitor item	Condition	Specification
VENT CONT/V	• Ignition switch: ON	OFF

On Board Diagnosis Logic

INFOID:000000006580040

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0448 0448	EVAP canister vent control valve close	EVAP canister vent control valve remains closed under specified driving conditions.	<ul style="list-style-type: none"> • EVAP canister vent control valve • EVAP control system pressure sensor and the circuit • Blocked rubber tube to EVAP canister vent control valve • EVAP canister is saturated with water • Drain filter

DTC Confirmation Procedure

INFOID:000000006580041

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

WITH CONSULT-III

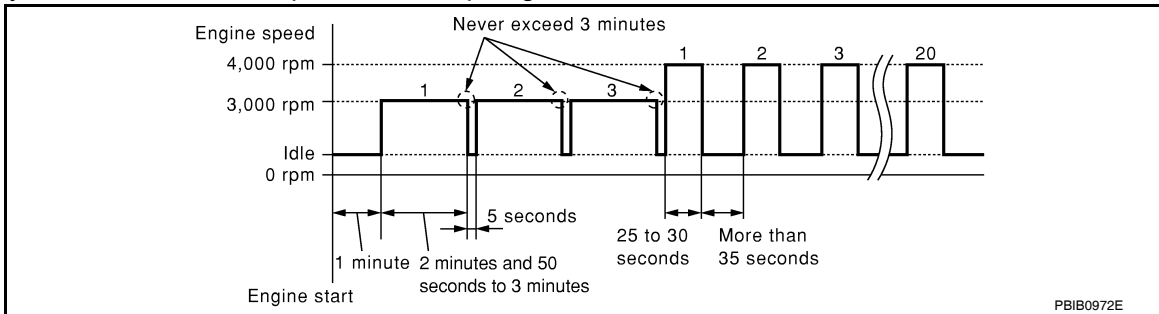
1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

4. Start engine and let it idle for at least 1 minute.
5. Repeat next procedures three times.
 - a. Increase the engine speed up to 3,000 to 3,500 rpm and keep it for 2 minutes and 50 seconds to 3 minutes.
Never exceed 3 minutes.
 - b. Fully released accelerator pedal and keep engine idle for about 5 seconds.
6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-366, "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to the next step.
8. Repeat next procedure 20 times.
 - a. Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.
 - b. Fully released accelerator pedal and keep engine idle for at least 35 seconds.



9. Check 1st trip DTC.
10. If 1st trip DTC is detected, go to [EC-366, "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "WITH CONSULT-III" above.

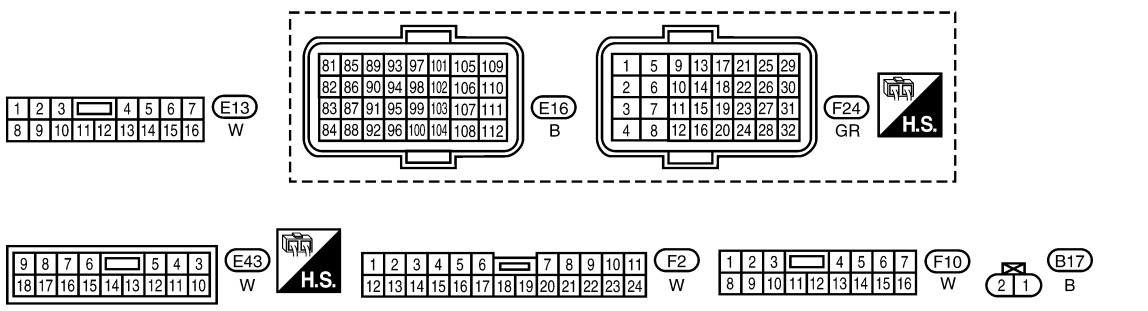
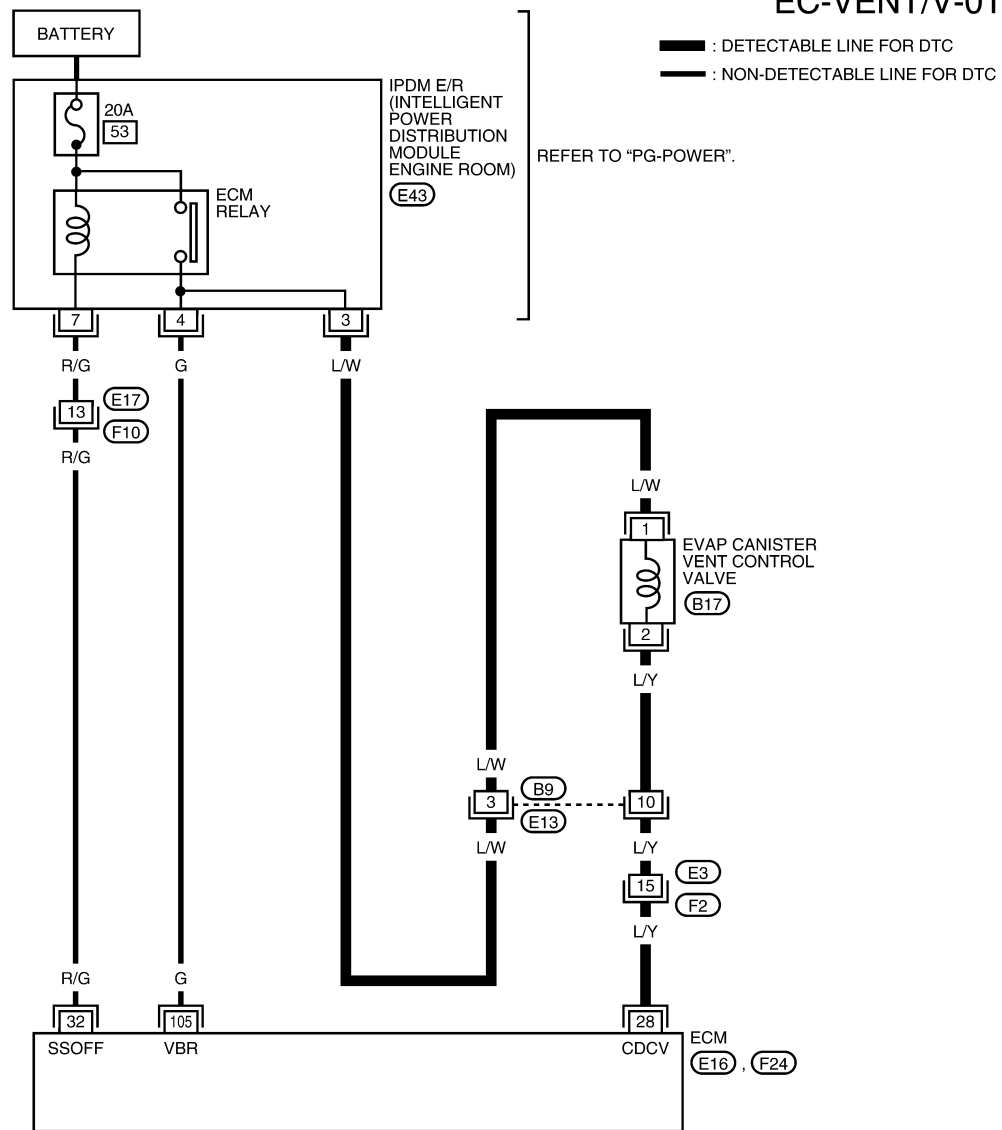
DTC P0448 EVAP CANISTER VENT CONTROL VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

INFOID:000000006608793

Wiring Diagram



ABBWA0655GB

Specification data are reference values and are measured between each terminal and ground.
CAUTION:
 Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

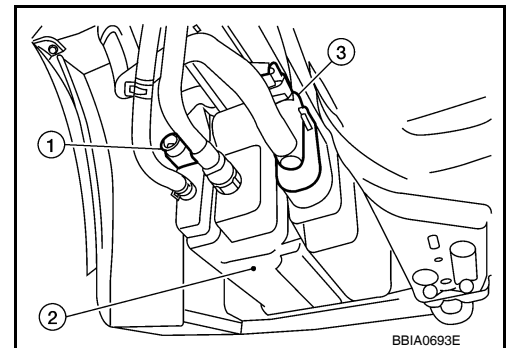
TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
28	L/Y	EVAP canister vent control valve	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580043

1. CHECK RUBBER TUBE

1. Turn ignition switch OFF.
2. Disconnect rubber tube connected to EVAP canister vent control valve (3).
3. Check the rubber tube for clogging.
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)



OK or NG

- OK >> GO TO 2.
NG >> Clean rubber tube using an air blower.

2. CHECK DRAIN FILTER

Refer to [EC-335. "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
NG >> Replace drain filter. Refer to [FL-14. "Removal and Installation"](#).

3. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-367. "Component Inspection"](#).

OK or NG

- OK >> GO TO 4.
NG >> Replace EVAP canister vent control valve. Refer to [FL-14. "Removal and Installation"](#).

4. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

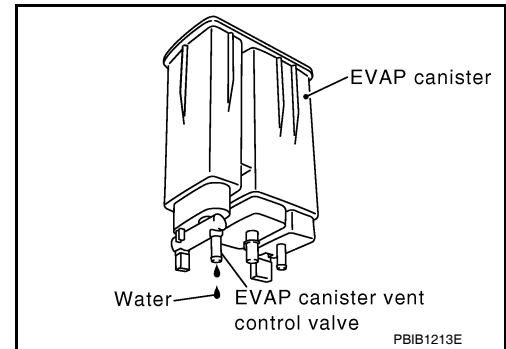
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 5.
- No >> GO TO 7.



5. 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 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

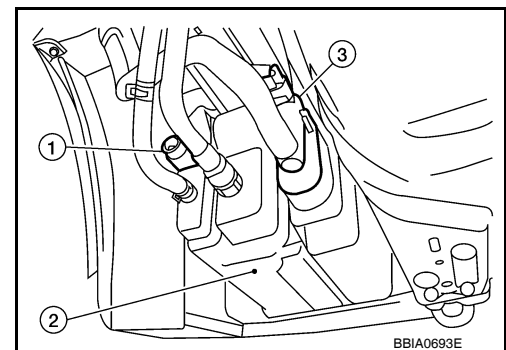
Check the following.

- 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-14, "Removal and Installation"](#).

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check connectors for water.



Water should not exist.

OK or NG

- OK >> GO TO 8.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-386, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580044

EVAP CANISTER VENT CONTROL VALVE

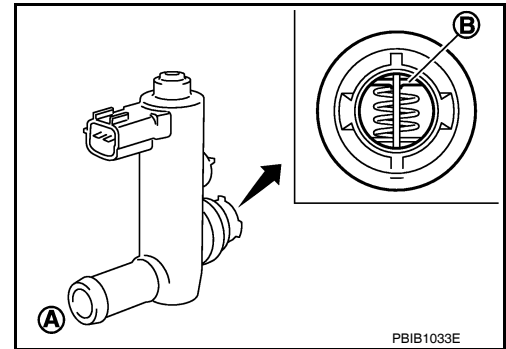
DTC P0448 EVAP CANISTER VENT CONTROL VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Ⓟ WITH CONSULT-III

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
If NG, replace EVAP canister vent control valve.
If OK, go to next step. Refer to [FL-14. "Removal and Installation"](#).
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.



5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. Check air passage continuity and operation delay time.
Make sure new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

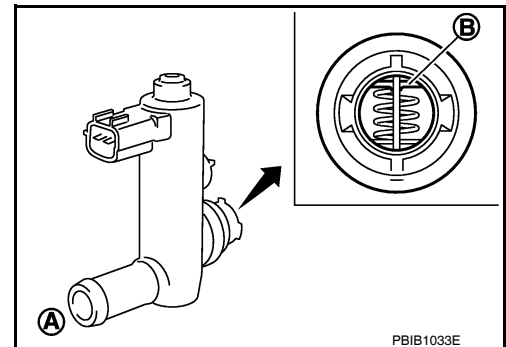
Operation takes less than 1 second.

If NG, go to next step.

7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.
If NG, replace EVAP canister vent control valve. Refer to [FL-14. "Removal and Installation"](#).

ⓧ WITHOUT CONSULT-III

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



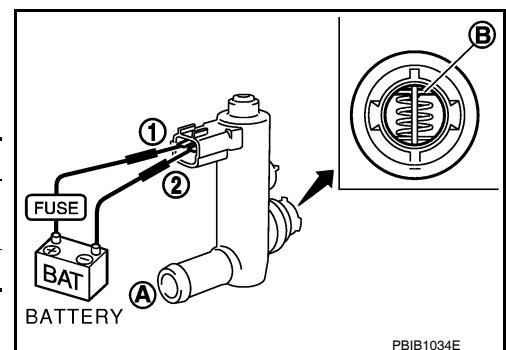
3. Check air passage continuity and operation delay time under the following conditions.
Make sure new O-ring is installed properly.

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.

If NG, go to next step.

4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
5. Perform step 3 again.
If NG, replace EVAP canister vent control valve. Refer to [FL-14. "Removal and Installation"](#).



DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

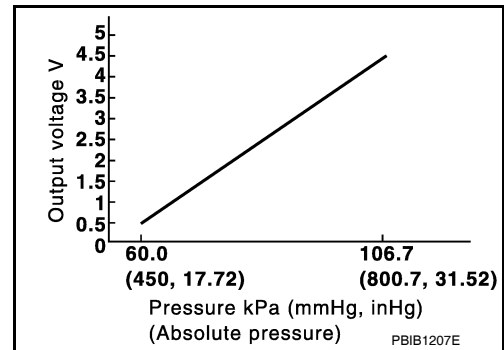
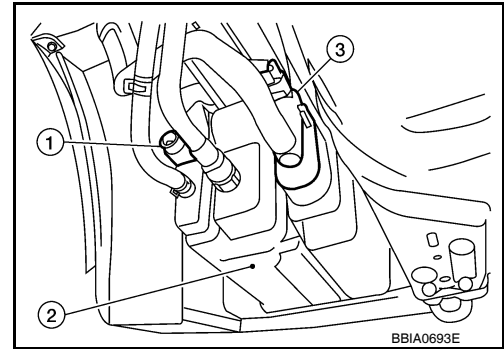
DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

Component Description

INFOID:000000006580045

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

- This illustration is a view from under vehicle
- EVAP canister (2)
- EVAP canister vent control valve (3)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580046

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	• Ignition switch: ON	Approx. 1.8 - 4.8 V

On Board Diagnosis Logic

INFOID:000000006580047

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0451 0451	EVAP control system pressure sensor performance	ECM detects a sloshing signal from the EVAP control system pressure sensor	<ul style="list-style-type: none"> • Harness or connectors [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • Tumble control valve position sensor

DTC Confirmation Procedure

INFOID:000000006580048

NOTE:

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

1. Start engine and wait at least 40 seconds.

DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

NOTE:

Do not depress accelerator pedal even slightly.

2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-370, "Diagnosis Procedure"](#).

Diagnosis Procedure

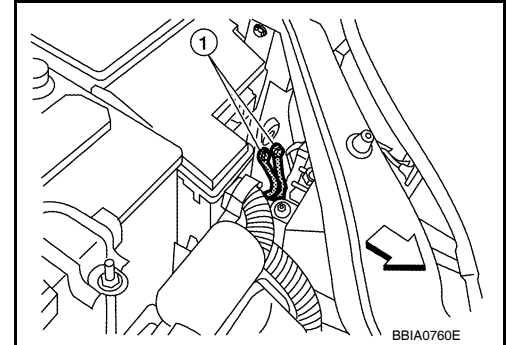
INFOID:000000006580049

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↶ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



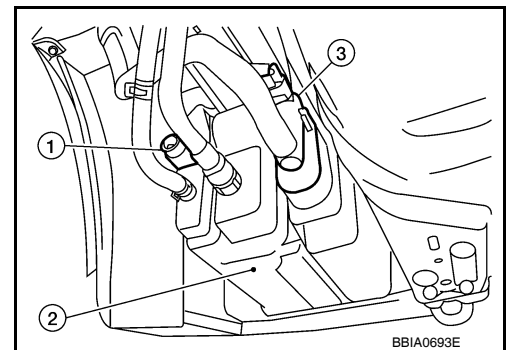
2. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR FOR WATER

1. Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check sensor harness connector for water.

Water should not exist.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace harness connector.



3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-371, "Component Inspection"](#).

OK or NG

- OK >> GO TO 4.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

4. CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
69	Tumble control valve position sensor terminal 1	EC-480, "Wiring Diagram"
74	Refrigerant pressure sensor terminal 3	EC-564, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-316, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-374, "Wiring Diagram"
102	APP sensor terminal 5	EC-507, "Wiring Diagram"

OK or NG

- OK >> GO TO 5.
- NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK TUMBLE CONTROL VALVE POSITION SENSOR

Refer to [EC-481, "Diagnosis Procedure"](#).

DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 6.

NG >> Replace intake manifold adapter. Refer to [EM-18. "Component"](#).

6. CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28](#).

OK or NG

OK >> GO TO 7.

NG >> Replace refrigerant pressure sensor. Refer to [MTC-92. "Removal and Installation for Refrigerant Pressure Sensor"](#).

7. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-378. "Component Inspection"](#).

OK or NG

OK >> GO TO 8.

NG >> Replace crankshaft position sensor (POS). Refer to [EM-80. "Component"](#).

8. CHECK APP SENSOR

Refer to [EC-510. "Component Inspection"](#).

OK or NG

OK >> GO TO 10.

NG >> GO TO 9.

9. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4. "Removal and Installation"](#).

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

For wiring diagram, refer to [EC-374. "Wiring Diagram"](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580050

EVAP CONTROL SYSTEM PRESSURE SENSOR

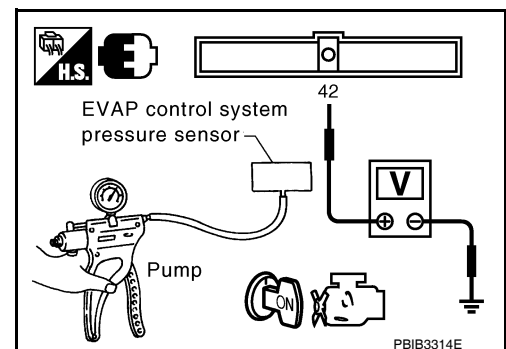
1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister. **Always replace O-ring with a new one.**
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage
Not applied	1.8 - 4.8 V
-26.7 (-200, -7.87)	2.1 to 2.5 V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).

4. If NG, replace EVAP control system pressure sensor. Refer to [FL-14. "Removal and Installation"](#).



DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

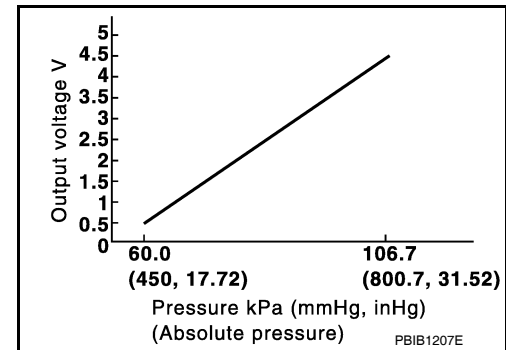
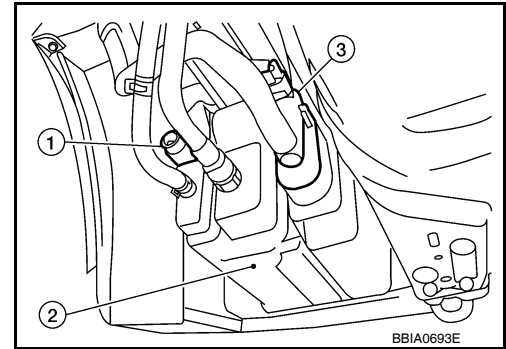
DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

Component Description

INFOID:000000006580051

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

- This illustration is a view from under vehicle
- EVAP canister (2)
- EVAP canister vent control valve (3)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580052

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	• Ignition switch: ON	Approx. 1.8 - 4.8 V

On Board Diagnosis Logic

INFOID:000000006580053

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0452 0452	EVAP control system pressure sensor low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is open or sorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • Tumble control valve position sensor

DTC Confirmation Procedure

INFOID:000000006580054

NOTE:

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TESTING CONDITION:

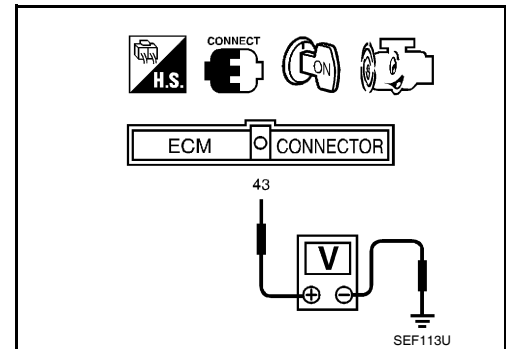
Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-375, "Diagnosis Procedure"](#).

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 43 (Fuel tank temperature sensor signal) and ground is less than 4.2 V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select Service \$07 with GST.
If 1st trip DTC is detected, go to [EC-375, "Diagnosis Procedure"](#).



DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

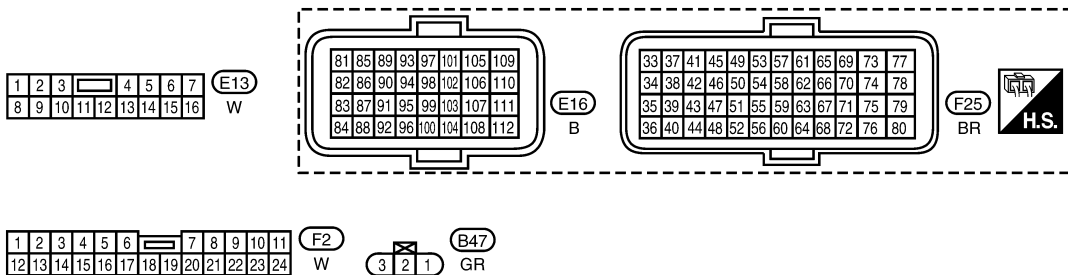
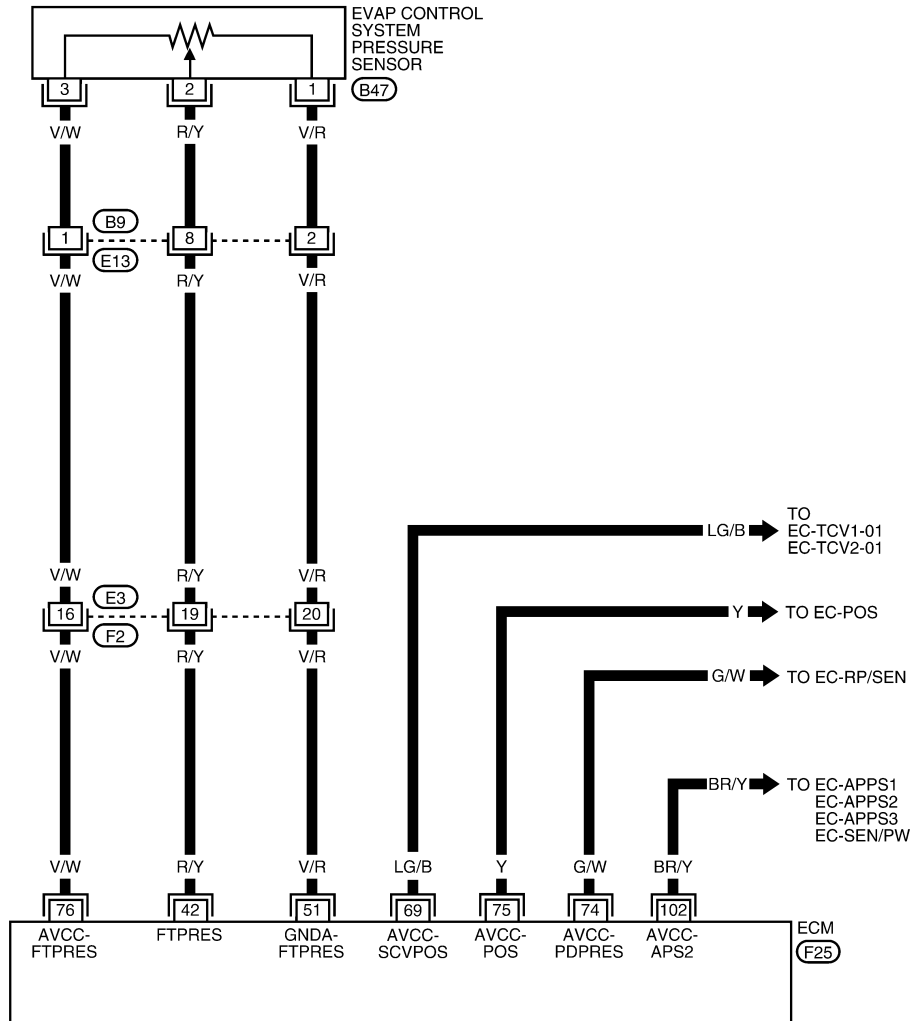
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006580055

Wiring Diagram

EC-PRE/SE-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0220GB

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

CAUTION:

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

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
42	R/Y	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8 V
51	V/R	Sensor ground (EVAP control system pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
69	LG/B	Sensor power supply (Tumble control valve position sensor)	[Ignition switch: ON]	Approximately 5 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

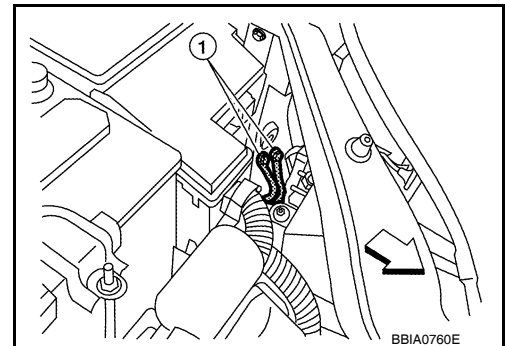
INFOID:000000006580056

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↶ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



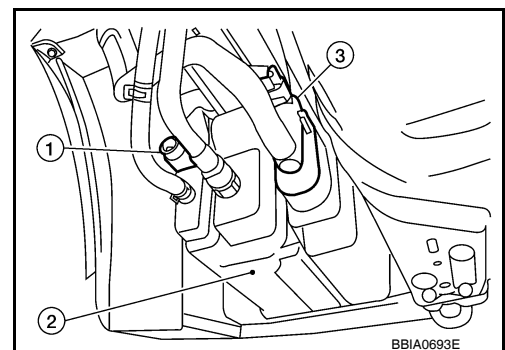
2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check sensor harness connector for water.

Water should not exist.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace harness connector.



3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR20DE (FOR CALIFORNIA)]

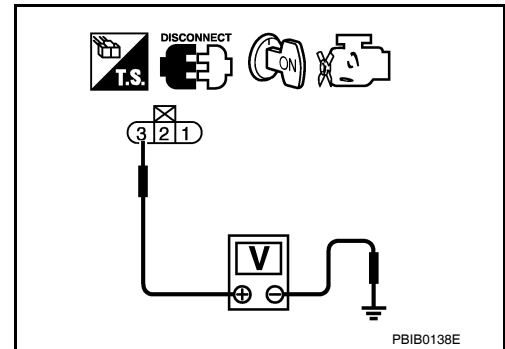
< SERVICE INFORMATION >

2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 12.
- NG >> GO TO 4.



PBIB0138E

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 3 and ECM terminal 76. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open or short between EVAP control system pressure sensor and ECM

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

6. CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
69	Tumble control valve position sensor terminal 1	EC-480, "Wiring Diagram"
74	Refrigerant pressure sensor terminal 3	EC-564, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-316, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-374, "Wiring Diagram"
102	APP sensor terminal 5	EC-507, "Wiring Diagram"

OK or NG

- OK >> GO TO 7.
- NG >> Repair short to ground or short to power in harness or connectors.

7. CHECK TUMBLE CONTROL VALVE POSITION SENSOR

Refer to [EC-481, "Diagnosis Procedure"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace intake manifold adapter. Refer to [EM-18, "Component"](#).

8. CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace refrigerant pressure sensor. Refer to [MTC-92](#).

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

9. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-378, "Component Inspection"](#).

OK or NG

OK >> GO TO 10.

NG >> Replace crankshaft position sensor (POS). Refer to [.EM-80](#)

10. CHECK APP SENSOR

Refer to [EC-510, "Component Inspection"](#).

OK or NG

OK >> GO TO 17.

NG >> GO TO 11.

11. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> INSPECTION END

12. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 51. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 14.

NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open or short between EVAP control system pressure sensor and ECM

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

14. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 42 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 16.

NG >> GO TO 15.

15. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open or short between ECM and EVAP control system pressure sensor

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

16. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-378, "Component Inspection"](#).

OK or NG

OK >> GO TO 17.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

17. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580057

EVAP CONTROL SYSTEM PRESSURE SENSOR

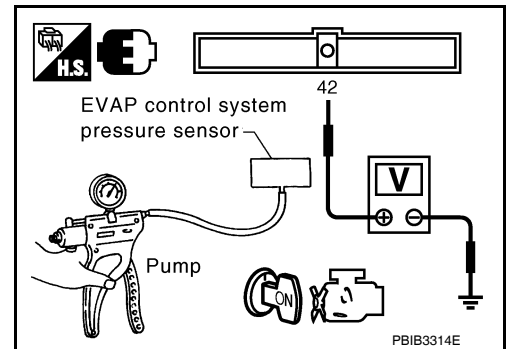
1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage
Not applied	1.8 - 4.8 V
-26.7 (-200, -7.87)	2.1 to 2.5 V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).

4. If NG, replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).



DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

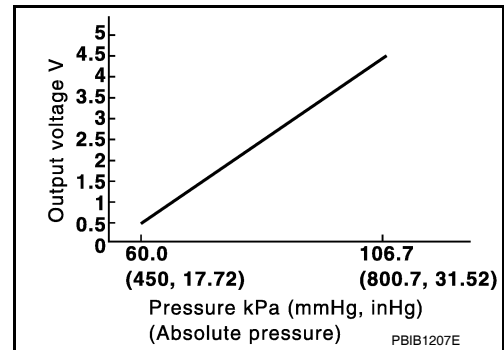
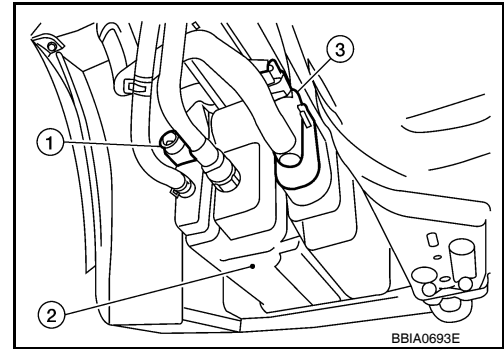
DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

Component Description

INFOID:000000006580058

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

- This illustration is a view from under vehicle
- EVAP canister (2)
- EVAP canister vent control valve (3)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580059

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	• Ignition switch: ON	Approx. 1.8 - 4.8 V

On Board Diagnosis Logic

INFOID:000000006580060

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0453 0453	EVAP control system pressure sensor high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is open or sorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • EVAP canister vent control valve • EVAP canister • Drain filter • Rubber hose to EVAP canister vent control valve • Tumble control valve position sensor

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC Confirmation Procedure

INFOID:000000006580061

NOTE:

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

TESTING CONDITION:

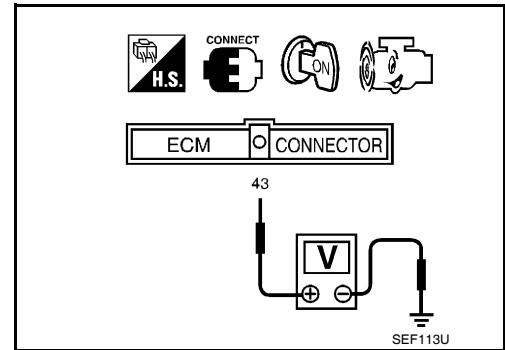
Always perform test at a temperature of 5°C (41°F) or more.

④ WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Wait at least 10 seconds.
7. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-382, "Diagnosis Procedure"](#).

⑤ WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 43 (Fuel tank temperature sensor signal) and ground is less than 4.2 V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Wait at least 10 seconds.
5. Select Service \$07 with GST.
If 1st trip DTC is detected, go to [EC-382, "Diagnosis Procedure"](#).



DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

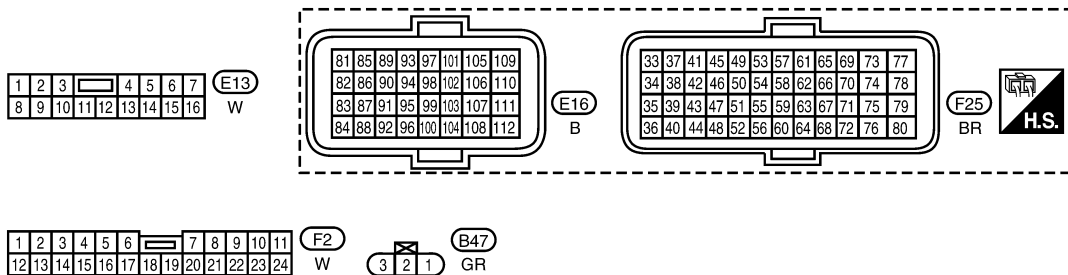
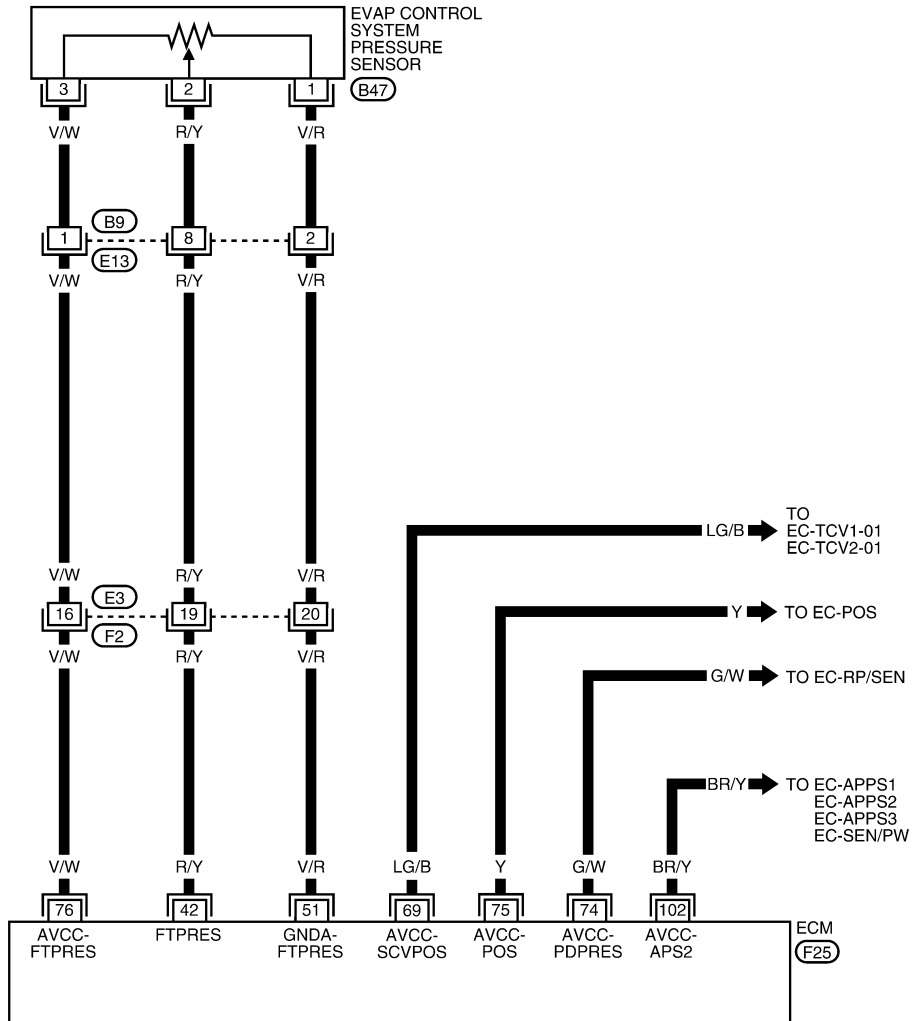
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:00000006580062

EC-PRE/SE-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



ABBWA0220GB

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

CAUTION:

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

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
42	R/Y	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8 V
51	V/R	Sensor ground (EVAP control system pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
69	LG/B	Sensor power supply (Tumble control valve position sensor)	[Ignition switch: ON]	Approximately 5 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

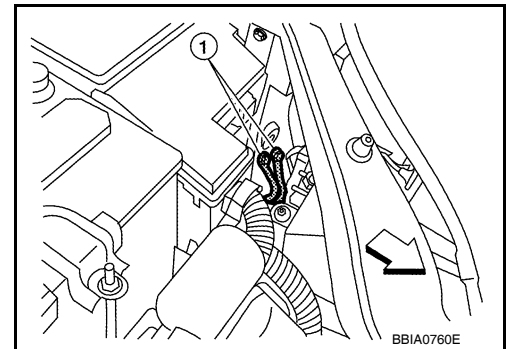
INFOID:000000006580063

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↶ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



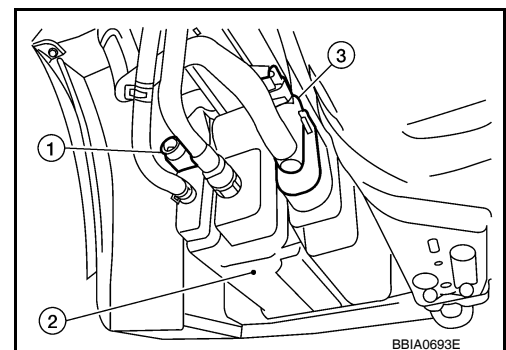
2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check sensor harness connector for water.

Water should not exist.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace harness connector.



3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR20DE (FOR CALIFORNIA)]

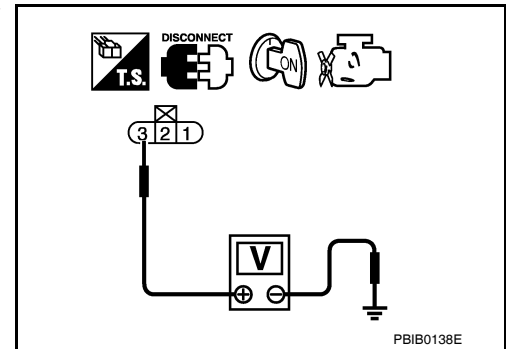
< SERVICE INFORMATION >

2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 12.
- NG >> GO TO 4.



4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 3 and ECM terminal 76. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open or short between EVAP control system pressure sensor and ECM

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

6. CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
69	Tumble control valve position sensor terminal 1	EC-480, "Wiring Diagram"
74	Refrigerant pressure sensor terminal 3	EC-564, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-316, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-374, "Wiring Diagram"
102	APP sensor terminal 5	EC-507, "Wiring Diagram"

OK or NG

- OK >> GO TO 7.
- NG >> Repair short to ground or short to power in harness or connectors.

7. CHECK TUMBLE CONTROL VALVE POSITION SENSOR

Refer to [EC-481, "Diagnosis Procedure"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace intake manifold adapter. Refer to [EM-19, "Removal and Installation"](#).

8. CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28](#).

OK or NG

- OK >> GO TO 9.

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

NG >> Replace refrigerant pressure sensor. Refer to [MTC-92. "Removal and Installation for Refrigerant Pressure Sensor"](#).

9. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-378. "Component Inspection"](#).

OK or NG

OK >> GO TO 10.

NG >> Replace crankshaft position sensor (POS). Refer to [EM-80. "Component"](#).

10. CHECK APP SENSOR

Refer to [EC-510. "Component Inspection"](#).

OK or NG

OK >> GO TO 23.

NG >> GO TO 11.

11. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4. "Removal and Installation"](#).

>> **INSPECTION END**

12. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 51. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 14.

NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open or short between EVAP control system pressure sensor and ECM

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

14. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 42 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 16.

NG >> GO TO 15.

15. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open or short between ECM and EVAP control system pressure sensor

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

16. CHECK RUBBER TUBE

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging, vent and kinked.

OK or NG

OK >> GO TO 17.

NG >> Clean the rubber tube using an air blower, repair or replace rubber tube.

17. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-361, "Component Inspection"](#).

OK or NG

OK >> GO TO 18.

NG >> Replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-386, "Component Inspection"](#).

OK or NG

OK >> GO TO 19.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

19. CHECK DRAIN FILTER

Refer to [EC-335, "Component Inspection"](#).

OK or NG

OK >> GO TO 20.

NG >> Replace drain filter. Refer to [FL-14, "Removal and Installation"](#).

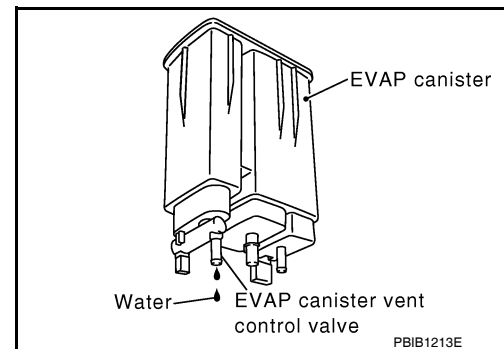
20. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 21.

No >> GO TO 23.



21. 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 1.9 kg (4.2 lb).

OK or NG

OK >> GO TO 23.

NG >> GO TO 22.

22. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose connected to EVAP canister for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to [FL-14, "Removal and Installation"](#).

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

23. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

Component Inspection

INFOID:000000006580064

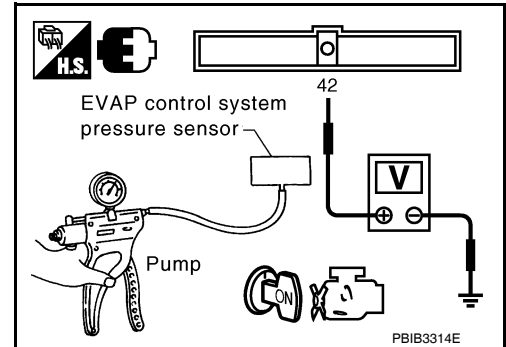
EVAP CONTROL PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage
Not applied	1.8 - 4.8 V
-26.7 (-200, -7.87)	2.1 to 2.5 V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
 - Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).
4. If NG, replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).



DTC P0455 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

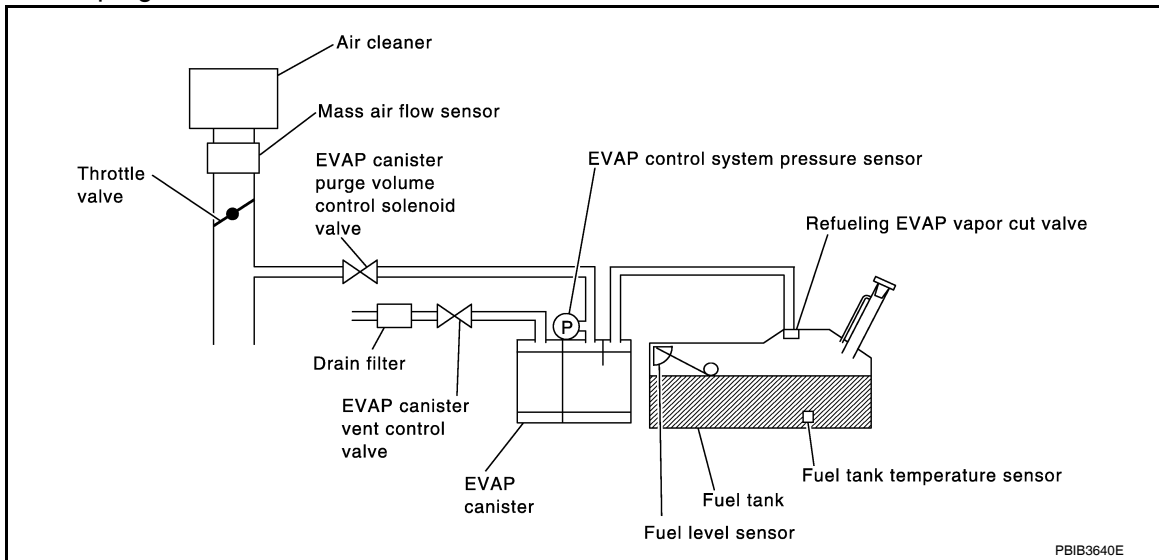
[MR20DE (FOR CALIFORNIA)]

DTC P0455 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

INFOID:000000006580065

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in EVAP system between the fuel tank and EVAP canister purge volume control solenoid valve.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0455 0455	EVAP control system gross leak detected	<ul style="list-style-type: none"> EVAP control system has a very large leak such as fuel filler cap fell off. EVAP control system does not operate properly. 	<ul style="list-style-type: none"> Fuel filler cap remains open or fails to close. Incorrect fuel tank vacuum relief valve Incorrect fuel filler cap used Foreign matter caught in fuel filler cap Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve Foreign matter caught in EVAP canister vent control valve. EVAP canister or fuel tank leaks EVAP purge line (pipe and rubber tube) leaks EVAP purge line rubber tube bent. Loose or disconnected rubber tube EVAP canister vent control valve and the circuit Drain filter EVAP canister purge volume control solenoid valve and the circuit Fuel tank temperature sensor O-ring of EVAP canister vent control valve is missing or damaged. EVAP control system pressure sensor Refueling EVAP vapor cut valve ORVR system leaks

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC Confirmation Procedure

INFOID:000000006580066

CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

DTC P0455 EVAP CONTROL SYSTEM

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

NOTE:

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

TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedure.

Ⓜ WITH CONSULT-III

1. Tighten fuel filler cap securely until reteaching sound is heard.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
5. Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 100°C (32 - 212°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
6. Select “EVP SML LEAK P0442/P1442” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-III.
Follow the instruction displayed.
NOTE:
If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-92. "Basic Inspection"](#).
7. Make sure that “OK” is displayed.
If “NG” is displayed, select “SELF-DIAG RESULTS” mode with CONSULT-III and make sure that “EVAP GROSS LEAK [P0455]” is displayed. If it is displayed, refer to [EC-388. "Diagnosis Procedure"](#).
If P0442 is displayed, perform Diagnostic Procedure for DTC P0442, [EC-337. "Diagnosis Procedure"](#).

Ⓜ WITH GST

NOTE:

Be sure to read the explanation of Driving Pattern on [EC-59. "Emission-related Diagnostic Information"](#) before driving vehicle.

1. Start engine.
 2. Drive vehicle according to Driving Pattern, [EC-59. "Emission-related Diagnostic Information"](#).
 3. Stop vehicle.
 4. Turn ignition switch OFF, wait at least 10 seconds and then turn ignition switch ON.
 5. Select SERVICE \$07 with GST.
- If P0441 is displayed on the screen, go to [EC-332. "Diagnosis Procedure"](#) for DTC P0441.
 - If P0442 is displayed on the screen, go to [EC-337. "Diagnosis Procedure"](#) for DTC P0442.
 - If P0455 is displayed on the screen, go to [EC-388. "Diagnosis Procedure"](#).

Diagnosis Procedure

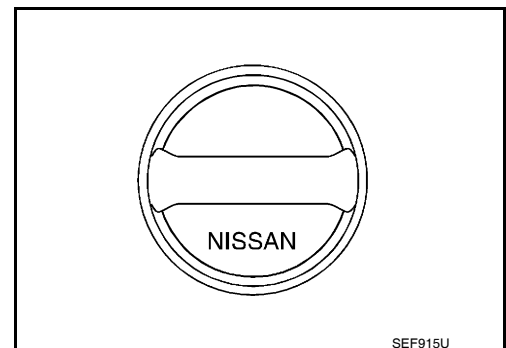
INFOID:000000006580067

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap.



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

DTC P0455 EVAP CONTROL SYSTEM

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until rereaching sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-45, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

5. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection.

Refer to [EC-43](#).

OK or NG

- OK >> GO TO 6.
NG >> Repair or reconnect the hose.

6. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 7.

7. CHECK DRAIN FILTER

Refer to [EC-392, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
NG >> Replace drain filter. Refer to [FL-14, "Removal and Installation"](#).

8. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control is installed properly.
Refer to [FL-14, "Removal and Installation"](#).
- EVAP canister vent control valve.
Refer to [EC-361, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14, "Removal and Installation"](#).

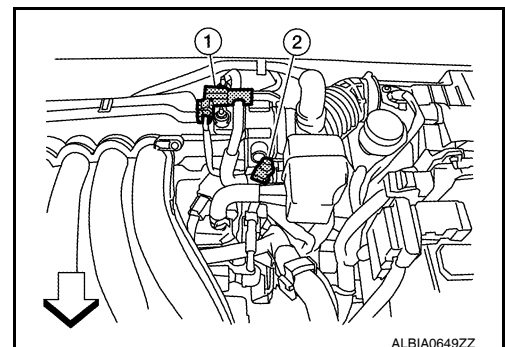
9. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely. For the location of EVAP service port (2), refer to [EC-43, "Description"](#).

- EVAP canister purge volume control solenoid valve (1)
- ⇐: Vehicle front

NOTE:

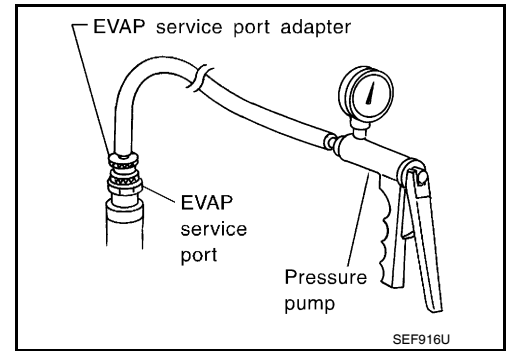
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



DTC P0455 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]



With CONSULT-III>>GO TO 10.

Without CONSULT-III>>GO TO 11.

10.CHECK FOR EVAP LEAK

With CONSULT-III

1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-III.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

CAUTION:

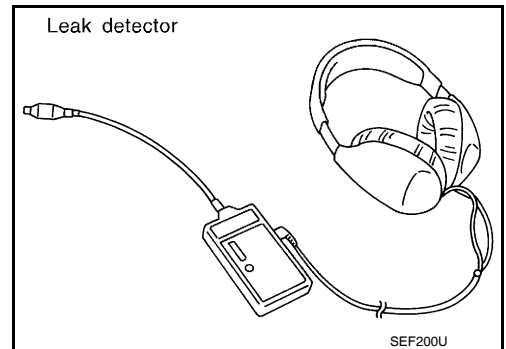
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-43, "Description"](#).

OK or NG

OK >> GO TO 12.

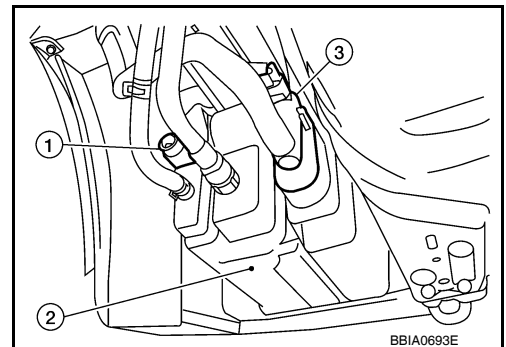
NG >> Repair or replace.



11.CHECK FOR EVAP LEAK

Without CONSULT-III

1. Turn ignition switch OFF.
 2. Apply 12 volts DC to EVAP canister vent control valve (3). The valve will close. (Continue to apply 12 volts until the end of test.)
- This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)



3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

CAUTION:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

DTC P0455 EVAP CONTROL SYSTEM

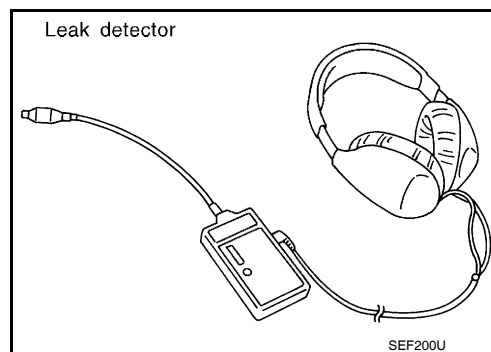
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-43, "Description"](#).

OK or NG

- OK >> GO TO 13.
- NG >> Repair or replace.



12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

- Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
- Start engine.
- Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
- Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
- Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Stop engine.
- Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
- Start engine and let it idle for at least 80 seconds.
- Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 14.

14. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-120, "Vacuum Hose Drawing"](#).

OK or NG

- OK (With CONSULT-III) >> GO TO 15.
- OK (Without CONSULT-III) >> GO TO 16.
- NG >> Repair or reconnect the hose.

15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

- Start engine.
- Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 16.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-356, "Component Inspection"](#).

DTC P0455 EVAP CONTROL SYSTEM

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 17.

NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18, "Component"](#).

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-287, "Component Inspection"](#).

OK or NG

OK >> GO TO 18.

NG >> Replace fuel level sensor unit. Refer to [FL-6, "Removal and Installation"](#).

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-378, "Component Inspection"](#).

OK or NG

OK >> GO TO 19.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

19. CHECK EVAP/ORVR LINE

Check refueling EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-47](#).

OK or NG

OK >> GO TO 20.

NG >> Repair or replace hoses and tubes.

20. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 21.

NG >> Repair or replace hoses, tubes or filler neck tube.

21. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-50, "Component Inspection"](#).

OK or NG

OK >> GO TO 22.

NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-14, "Removal and Installation"](#).

22. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580068

DRAIN FILTER

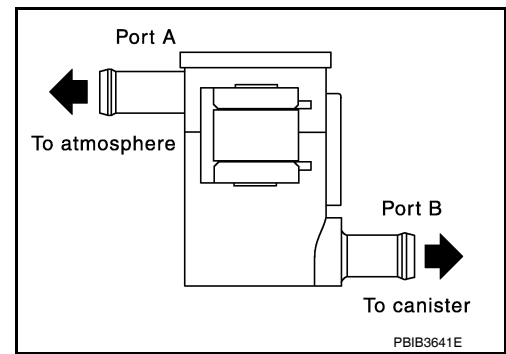
1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.

DTC P0455 EVAP CONTROL SYSTEM

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< SERVICE INFORMATION >

4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to [FL-14. "Removal and Installation"](#).



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DTC P0456 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

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DTC P0456 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

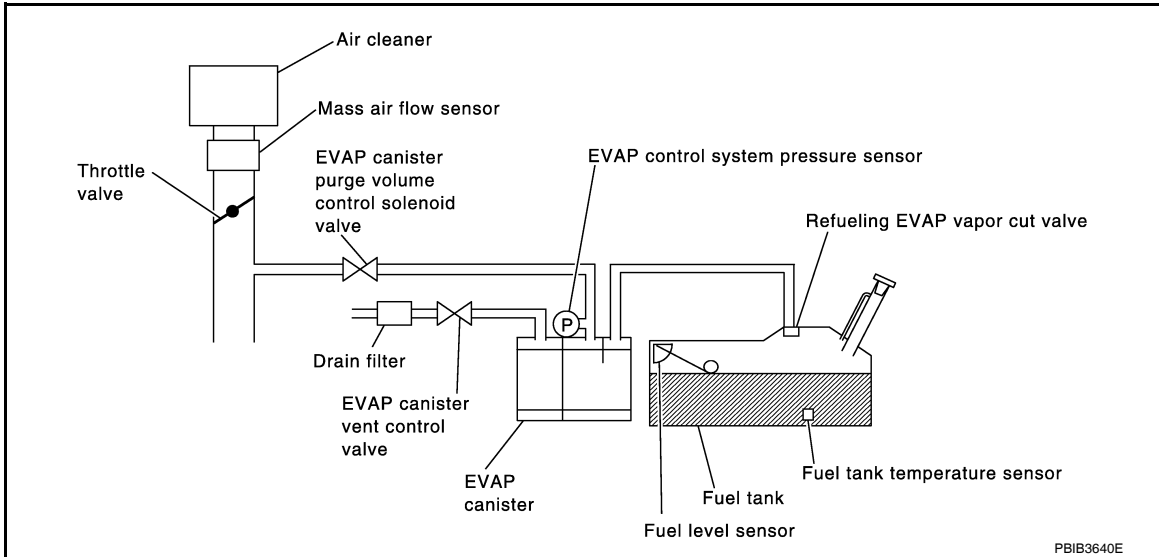
INFOID:00000006580069

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold vacuum in the same way as conventional EVAP small leak diagnosis.

If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.

If ECM judges there are no leaks, the diagnosis will be OK.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0456 0456	Evaporative emission control system very small leak (negative pressure check)	<ul style="list-style-type: none"> EVAP system has a very small leak. EVAP system does not operate properly. 	<ul style="list-style-type: none"> Incorrect fuel tank vacuum relief valve Incorrect fuel filler cap used Fuel filler cap remains open or fails to close. Foreign matter caught in fuel filler cap Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. Foreign matter caught in EVAP canister vent control valve EVAP canister or fuel tank leaks EVAP purge line (pipe and rubber tube) leaks EVAP purge line rubber tube bent Loose or disconnected rubber tube EVAP canister vent control valve and the circuit EVAP canister purge volume control solenoid valve and the circuit Fuel tank temperature sensor Drain filter O-ring of EVAP canister vent control valve is missing or damaged EVAP canister is saturated with water EVAP control system pressure sensor Refueling EVAP vapor cut valve ORVR system leaks Fuel level sensor and the circuit Foreign matter caught in EVAP canister purge volume control solenoid valve

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC P0456 EVAP CONTROL SYSTEM

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< SERVICE INFORMATION >

DTC Confirmation Procedure

INFOID:000000006580070

NOTE:

- If DTC P0456 is displayed with P0442, first perform trouble diagnosis for DTC P0456.
- After repair, make sure that the hoses and clips are installed properly.
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Open engine hood before conducting following procedure.
- If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.
 - Fuel filler cap is removed.
 - Refilled or drained the fuel.
 - EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

Ⓜ WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Make sure the following conditions are met.
 - FUEL LEVEL SE: 0.25 - 1.4 V**
 - COOLAN TEMP/S: 0 - 32°C (32 - 90°F)**
 - FUEL T/TMP SE: 0 - 35°C (32 - 95°F)**
 - INT/A TEMP SE: More than 0°C (32°F)**If NG, turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "EVAP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.
6. Make sure that "OK" is displayed.
If "NG" is displayed, refer to [EC-396, "Diagnosis Procedure"](#).

NOTE:

If the engine speed cannot be maintained within the range displayed on CONSULT-III screen, go to [EC-92, "Basic Inspection"](#).

Overall Function Check

INFOID:000000006580071

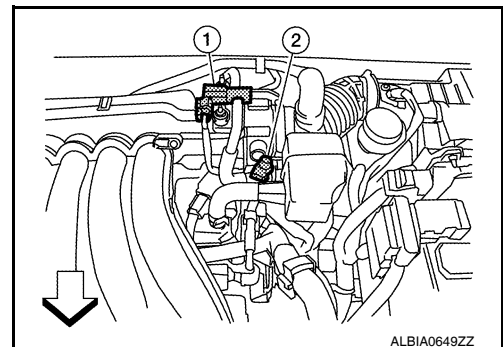
Ⓜ WITH GST

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a 1st trip DTC might not be confirmed.

CAUTION:

- Never use compressed air, doing so may damage the EVAP system.
- Do not start engine.
- Do not exceeded 4.12 kPa (0.042 kg/cm², 0.6 psi).

1. Attach the EVAP service port adapter securely to the EVAP service port (2).
 - EVAP canister purge volume control solenoid valve (1)
- ↙: Vehicle front



DTC P0456 EVAP CONTROL SYSTEM

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< SERVICE INFORMATION >

2. Set the pressure pump and a hose.
3. Also set the pressure pump with pressure gauge to the EVAP service port adapter.
4. Turn ignition switch ON.
5. Connect GST and select Service \$08.
6. Using Service \$08 control the EVAP canister vent control valve (close).
7. Apply pressure and make sure the following conditions are satisfied.

Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)

Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg).

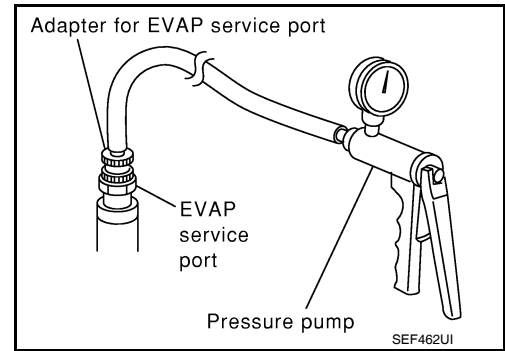
If NG, go to [EC-396, "Diagnosis Procedure"](#).

If OK, go to next step.

8. Disconnect GST.
9. Start engine and warm it up to normal operating temperature.
10. Turn ignition switch OFF and wait at least 10 seconds.
11. Restart engine and let it idle for 90 seconds.
12. Keep engine speed at 2,000 rpm for 30 seconds.
13. Turn ignition switch OFF.

NOTE:

For more information, refer to GST Instruction Manual.



Diagnosis Procedure

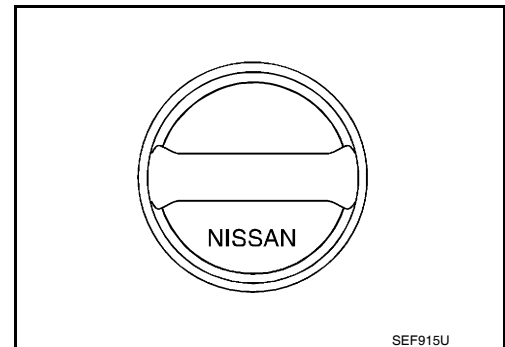
INFOID:000000006580072

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap.



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until rereaching sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-45, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

DTC P0456 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

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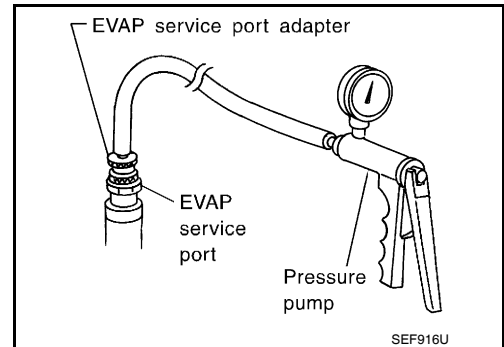
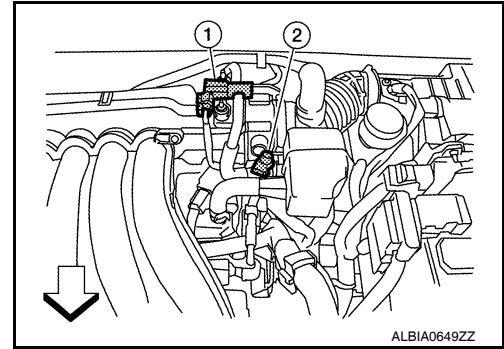
5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely. For the location of EVAP service port (2), refer to [EC-43, "Description"](#).

- EVAP canister purge volume control solenoid valve (1)
- ←: Vehicle front

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



With CONSULT-III>>GO TO 6.
Without CONSULT-III>>GO TO 7.

6. CHECK FOR EVAP LEAK

With CONSULT-III

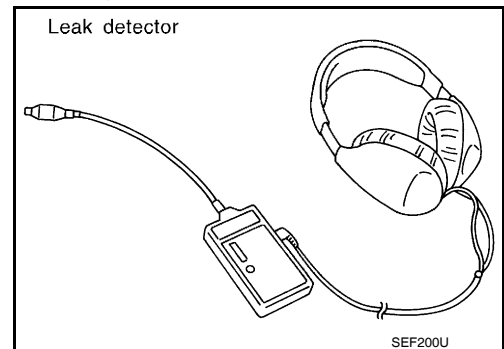
1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-III.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

CAUTION:

- **Never use compressed air or a high pressure pump.**
 - **Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.**
4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-43, "Description"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace.



7. CHECK FOR EVAP LEAK

Without CONSULT-III

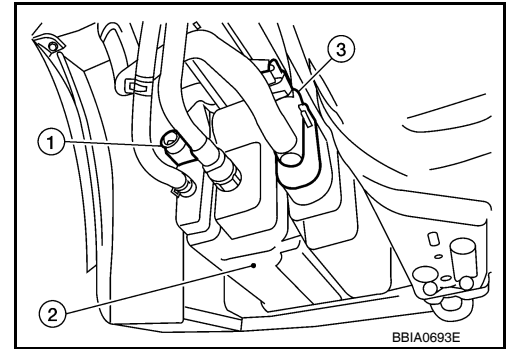
1. Turn ignition switch OFF.

DTC P0456 EVAP CONTROL SYSTEM

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Apply 12 V DC to EVAP canister vent control valve (3). The valve will close. (Continue to apply 12 V until the end of test.)
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)



3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

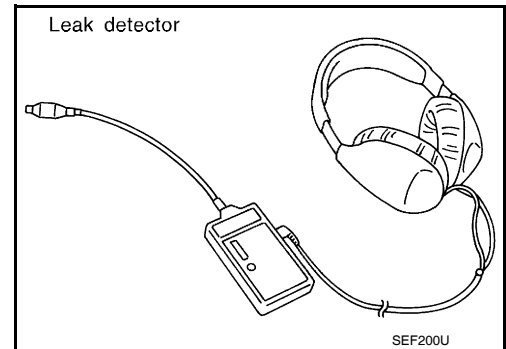
CAUTION:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-43, "Description"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace.



8. CHECK DRAIN FILTER

Refer to [EC-401, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace drain filter. Refer to [FL-14, "Removal and Installation"](#).

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly. Refer to [FL-14, "Removal and Installation"](#).
- EVAP canister vent control valve. Refer to [EC-361, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
- NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14, "Removal and Installation"](#).

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

DTC P0456 EVAP CONTROL SYSTEM

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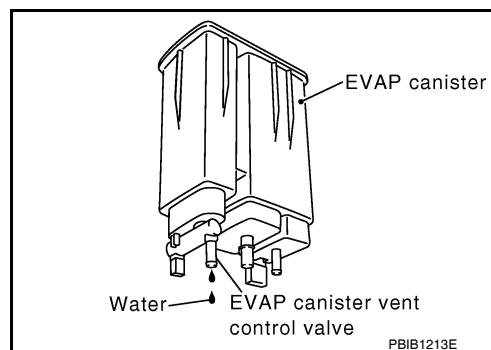
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 11.

No (With CONSULT-III)>>GO TO 13.

No (Without CONSULT-III)>>GO TO 14.



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 1.9 kg (4.2 lb).

OK or NG

OK (With CONSULT-III)>>GO TO 13.

OK (Without CONSULT-III)>>GO TO 14.

NG >> 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-14, "Removal and Installation"](#).

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK >> GO TO 16.

NG >> GO TO 15.

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-III

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.

OK or NG

OK >> GO TO 17.

NG >> GO TO 15.

15. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-120, "Vacuum Hose Drawing"](#).

OK or NG

DTC P0456 EVAP CONTROL SYSTEM

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- OK >> GO TO 16.
- NG >> Repair or reconnect the hose.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-356, "Component Inspection"](#).

OK or NG

- OK >> GO TO 17.
- NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18, "Component"](#).

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-287, "Component Inspection"](#).

OK or NG

- OK >> GO TO 18.
- NG >> Replace fuel level sensor unit. Refer to [FL-6, "Removal and Installation"](#).

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-378, "Component Inspection"](#).

OK or NG

- OK >> GO TO 19.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

19. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-43, "Description"](#).

OK or NG

- OK >> GO TO 20.
- NG >> Repair or reconnect the hose.

20. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 21.

21. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-47](#).

OK or NG

- OK >> GO TO 22.
- NG >> Repair or replace hoses and tubes. Refer to [EC-43, "Description"](#).

22. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

- OK >> GO TO 23.
- NG >> Repair or replace hose, tube or filler neck tube. Refer to [EC-43, "Description"](#).

23. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-50, "Component Inspection"](#).

OK or NG

- OK >> GO TO 24.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-14, "Removal and Installation"](#).

24. CHECK FUEL LEVEL SENSOR

Refer to [FL-6, "Component"](#).

OK or NG

- OK >> GO TO 25.

DTC P0456 EVAP CONTROL SYSTEM

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< SERVICE INFORMATION >

NG >> Replace fuel level sensor unit. Refer to [FL-6. "Removal and Installation"](#).

25. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

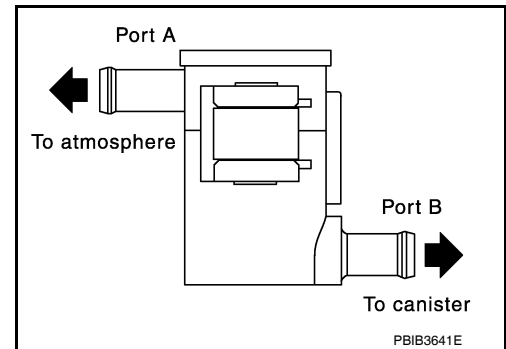
>> **INSPECTION END**

Component Inspection

INFOID:000000006580073

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to [FL-14. "Removal and Installation"](#).



DTC P0460 FUEL LEVEL SENSOR

< SERVICE INFORMATION >

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DTC P0460 FUEL LEVEL SENSOR

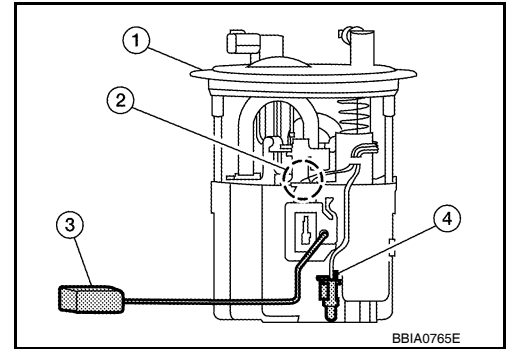
Component Description

INFOID:000000006580074

The fuel level sensor (3) 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 through 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 level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel tank temperature sensor (4)



On Board Diagnosis Logic

INFOID:000000006580075

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 [EC-421](#).

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0460 0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Fuel level sensor circuit is open or shorted)• Combination meter• Fuel level sensor

DTC Confirmation Procedure

INFOID:000000006580076

NOTE:

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

1. Start engine and wait maximum of 2 consecutive minutes.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-402, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580077

1. CHECK FUEL GAUGE OPERATION

Refer to [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

OK or NG

- OK >> GO TO 2.
- NG >> Follow the instruction of [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to [DI-19, "Fuel Level Sensor Signal Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace malfunctioning parts.

DTC P0460 FUEL LEVEL SENSOR

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3.CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

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DTC P0461 FUEL LEVEL SENSOR

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DTC P0461 FUEL LEVEL SENSOR

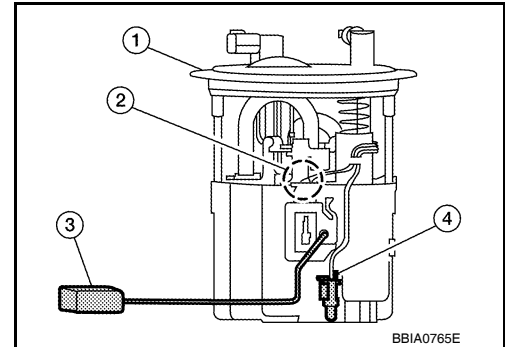
Component Description

INFOID:000000006580079

The fuel level sensor (3) 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 through 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 level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel tank temperature sensor (4)



On Board Diagnosis Logic

INFOID:000000006580080

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 [EC-421](#).

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven. Driving long distances naturally affect fuel gauge level.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461 0461	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 distance.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Fuel level sensor circuit is open or shorted)• Combination meter• Fuel level sensor

Overall Function Check

INFOID:000000006580081

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

WARNING:

When performing following procedure, be sure to observe the handling of the fuel.

Refer to [FL-5](#).

TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

Diagnosis Procedure

INFOID:000000006580082

1. CHECK FUEL GAUGE OPERATION

Refer to [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

OK or NG

OK >> GO TO 2.

NG >> Follow the instruction of [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to [DI-19, "Fuel Level Sensor Signal Inspection"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning parts.

DTC P0461 FUEL LEVEL SENSOR

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3.CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

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DTC P0462, P0463 FUEL LEVEL SENSOR

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[MR20DE (FOR CALIFORNIA)]

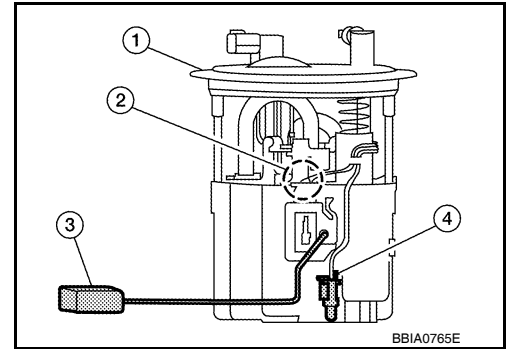
DTC P0462, P0463 FUEL LEVEL SENSOR

Component Description

INFOID:000000006580084

The fuel level sensor (3) 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 through 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 level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel tank temperature sensor (4)



On Board Diagnosis Logic

INFOID:000000006580085

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 [EC-421](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Fuel level sensor circuit is open or shorted)• Combination meter• Fuel level sensor
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006580086

NOTE:

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

TESTING CONDITION:

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

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-406, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580087

1. CHECK FUEL GAUGE OPERATION

Refer to [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

OK or NG

- OK >> GO TO 2.
- NG >> Follow the instruction of [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to [DI-19, "Fuel Level Sensor Signal Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace malfunctioning parts.

DTC P0462, P0463 FUEL LEVEL SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

3.CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

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DTC P0500 VSS

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0500 VSS

Description

INFOID:000000006580089

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-421](#).

The vehicle speed signal is sent from "ABS actuator and electric unit (control unit)" or combination meter through CAN communication line.

On Board Diagnosis Logic

INFOID:000000006580090

DTC No.	Trouble diagnosis	DTC detecting condition	Possible cause
P0500	Vehicle speed sensor	At 20 km/h (13 MPH), ECM detects the following status continuously for 5 seconds or more: The difference between a vehicle speed calculated by a secondary speed sensor transmitted from TCM to ECM via CAN communication and the vehicle speed indicated on the combination meter exceeds 15km/h (10 MPH).	<ul style="list-style-type: none">• Harness or connector (The CAN communication line is open or shorted.)• Combination meter• ABS actuator and electric unit (control unit)• Wheel sensor• TCM• Secondary speed sensor

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode.

Detected item	Engine operating condition in fail-safe mode
Vehicle speed sensor	When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (High) while engine is running.

DTC Confirmation Procedure

INFOID:000000006580091

1. 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.

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

1. Start engine.
2. Shift the selector lever to D range and wait at least for 2 seconds.
3. 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 [EC-408, "Diagnosis Procedure"](#)
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006580093

1. CHECK DTC WITH TCM

DTC P0500 VSS

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Check DTC with TCM. Refer to [CVT-47, "CONSULT-III Function \(TRANSMISSION\)"](#).

Is the inspection result normal?

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 [BRC-20, "CONSULT-III Function \(ABS\)"](#) (ABS models) or [BRC-58, "CONSULT-III Function \(ABS\)"](#) (VDC models).

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 [DI-15, "CONSULT-III Function \(METER/M&A\)"](#).

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 [CVT-78, "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-25, "Wheel Sensor System"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [EC-153, "Diagnosis Procedure"](#).

NO >> Replace or replace error-detected parts.

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DTC P0506 ISC SYSTEM

Description

INFOID:000000006580094

NOTE:

If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

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 ECM calculates the actual engine speed from signals of crankshaft position sensor (POS) and camshaft position sensor (PHASE).

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.).

On Board Diagnosis Logic

INFOID:000000006580095

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0506 0506	Idle speed control system RPM lower than expected	The idle speed is less than the target idle speed by 100 rpm or more.	<ul style="list-style-type: none"> • Electric throttle control actuator • Intake air leak

DTC Confirmation Procedure

INFOID:000000006580096

NOTE:

- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform [EC-99, "Idle Air Volume Learning"](#), before conducting DTC Confirmation Procedure. For the target idle speed, refer to the [EC-570](#).**

TESTING CONDITION:

- **Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.**
 - **Always perform the test at a temperature above -10°C (14°F).**
1. Start engine and warm it up to normal operating temperature.
 2. Turn ignition switch OFF and wait at least 10 seconds.
 3. Start engine and run it for at least 1 minute at idle speed.
 4. Check 1st trip DTC.
 5. If 1st trip DTC is detected, go to [EC-410, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580097

1. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 2.
NG >> Discover air leak location and repair.

2. REPLACE ECM

1. Stop engine.
2. Replace ECM.
3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-171, "ECM Re-communicating Function"](#).
4. Perform [EC-98, "VIN Registration"](#).
5. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).
6. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).
7. Perform [EC-99, "Idle Air Volume Learning"](#).

DTC P0506 ISC SYSTEM

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

>> **INSPECTION END**

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DTC P0507 ISC SYSTEM

Description

INFOID:000000006580098

NOTE:

If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

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 ECM calculates the actual engine speed from signals of camshaft position sensor (POS) and camshaft position sensor (PHASE).

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.).

On Board Diagnosis Logic

INFOID:000000006580099

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0507 0507	Idle speed control system RPM higher than expected	The idle speed is more than the target idle speed by 200 rpm or more.	<ul style="list-style-type: none"> • Electric throttle control actuator • Intake air leak • PCV system

DTC Confirmation Procedure

INFOID:000000006580100

NOTE:

- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform [EC-99, "Idle Air Volume Learning"](#), before conducting DTC Confirmation Procedure. For the target idle speed, refer to the [EC-570](#).**

TESTING CONDITION:

- **Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.**
- **Always perform the test at a temperature above -10°C (14°F).**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and run it for at least 1 minute at idle speed.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-412, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580101

1.CHECK PCV HOSE CONNECTION

Confirm that PCV hose is connected correctly.

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace.

2.CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 3.
NG >> Discover air leak location and repair.

3.REPLACE ECM

1. Stop engine.
2. Replace ECM.

DTC P0507 ISC SYSTEM

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).
4. Perform [EC-98, "VIN Registration"](#).
5. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).
6. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).
7. Perform [EC-99, "Idle Air Volume Learning"](#).

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DTC P050A, P050B, P050E COLD START CONTROL

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P050A, P050B, P050E COLD START CONTROL

Description

INFOID:000000006607812

ECM controls ignition timing and engine idle speed when engine is started with prewarming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

On Board Diagnosis Logic

INFOID:000000006607813

If DTC P050A, P050B or 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 050A	Cold start idle air control system performance	ECM does not control engine idle speed properly when engine is started with pre-warming up condition.	<ul style="list-style-type: none">• Lack of intake air volume• Fuel injection system• ECM
P050B 050B	Cold start ignition timing performance	ECM does not control ignition timing properly when engine is started with pre-warming up condition.	
P050E 050E	Cold start engine exhaust temperature 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.	

DTC Confirmation Procedure

INFOID:000000006607814

NOTE:

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

TESTING CONDITION:

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

1. PERFORM DTC CONFIRMATION PROCEDURE-I

WITH CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Select "DATA MONITOR" mode with CONSULT-III.
4. Check the indication of "COOLAN TEMP/S".

WITH GST

Follow the procedure "WITH CONSULT-III" above.

Is the value of "COOLAN TEMP/S" between 15°C (59°F) and 36°C (97°F)?

YES >> GO TO 2.

NO-1 [If it is below 15°C (59°F)]>>Warm up the engine unit the value of "COOLAN TEMP/S" reaches 15°C (59°F) or more. Retry from step 1.

NO-2 [If it is above 36°C (97°F)]>>Cool engine down to less than 36°C (97°F). Retry from step 1.

2. PERFORM DTC CONFIRMATION PROCEDURE-II

WITH CONSULT-III

1. Set the select lever in N range.
2. Start the engine and warm up in idle with the value of "COOLAN TEMP/S" between 15°C (59°F) and 40°C (104°F) for more than 15 seconds.
3. Check 1st trip DTC.

WITH GST

Follow the procedure "WITH CONSULT-III" above.

Is 1st trip DTC detected?

YES >> Go to [EC-415, "Diagnosis Procedure"](#).

NO >> INSPECTION END

DTC P050A, P050B, P050E COLD START CONTROL

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

INFOID:000000006607815

Diagnosis Procedure

1. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-99, "Idle Air Volume Learning"](#).

Is Idle Air Volume Learning carried out successfully?

Yes or No

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

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning part

3. CHECK FUEL INJECTION SYSTEM FUNCTION

Perform [EC-272, "DTC Confirmation Procedure"](#) for DTC P0171.

OK or NG

OK >> GO TO 4.

NG >> Go to [EC-275, "Diagnosis Procedure"](#) for DTC P0171.

4. PERFORM DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. **Perform DTC Confirmation Procedure.**
See [EC-414, "DTC Confirmation Procedure"](#).
3. Is the 1st trip DTC P050A, P050B, P050E displayed again?

Yes or No

Yes >> GO TO 5.

No >> **INSPECTION END**

5. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).
3. Perform [EC-98, "VIN Registration"](#).
4. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-99, "Idle Air Volume Learning"](#).

>> INSPECTION END

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DTC P0603 ECM POWER SUPPLY

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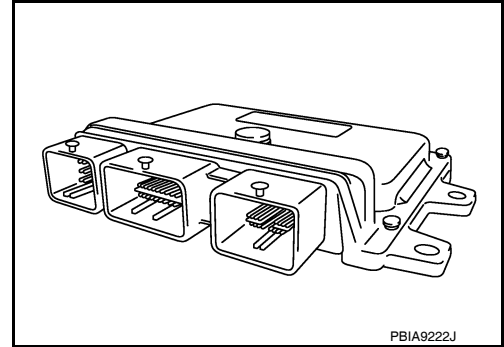
[MR20DE (FOR CALIFORNIA)]

DTC P0603 ECM POWER SUPPLY

Component Description

INFOID:000000006580102

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.



On Board Diagnosis Logic

INFOID:000000006580103

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0603 0603	ECM power supply circuit	ECM back-up RAM system does not function properly.	<ul style="list-style-type: none">• Harness or connectors [The ECM power supply (back-up) circuit is open or shorted.]• ECM

DTC Confirmation Procedure

INFOID:000000006580104

NOTE:

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

1. Turn ignition switch ON and wait at least 10 seconds.
2. Turn ignition switch OFF and wait at least 5 minutes.
3. Turn ignition switch ON and wait at least 10 seconds.
4. Repeat steps 2 and 3 for five times.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-418. "Diagnosis Procedure"](#).

DTC P0603 ECM POWER SUPPLY

[MR20DE (FOR CALIFORNIA)]

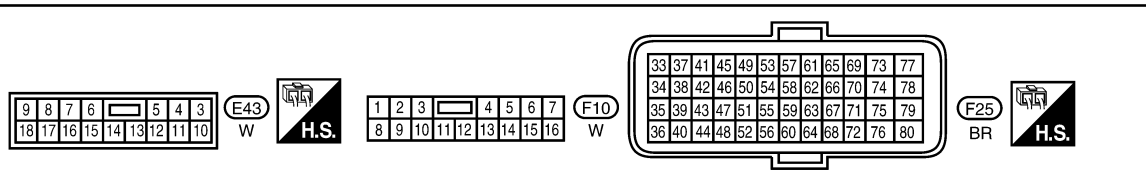
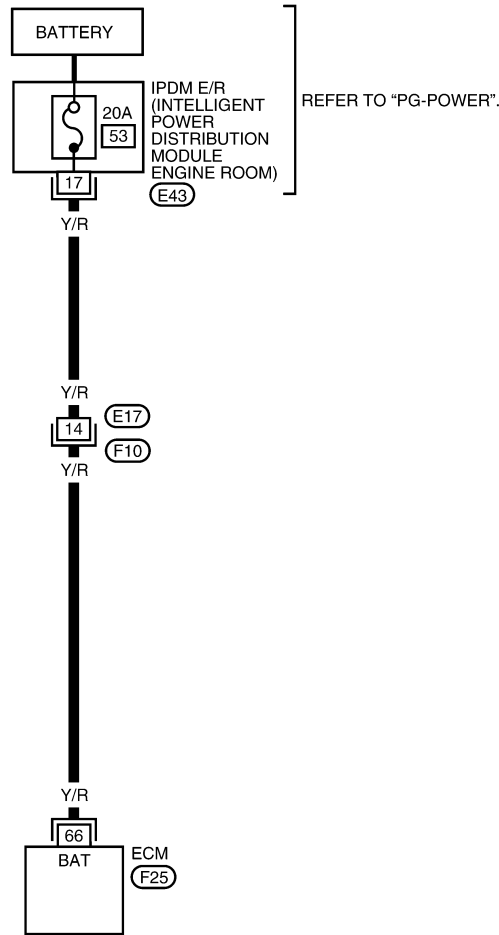
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Wiring Diagram

INFOID:000000006580105

EC-ECM/PW-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



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

CAUTION:

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

DTC P0603 ECM POWER SUPPLY

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
66	Y/R	Power supply for ECM (Back-up)	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580106

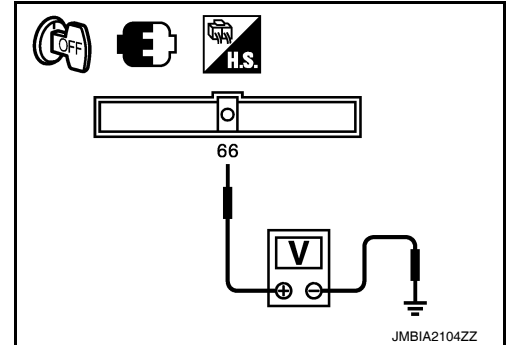
1. CHECK ECM POWER SUPPLY

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal 66 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- 20 A fuse
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace harness or connectors.

4. PERFORM DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC Confirmation Procedure.
See [EC-416](#). "[DTC Confirmation Procedure](#)".
3. Is the 1st trip DTC P0603 displayed again?

Yes or No

- Yes >> GO TO 5.
No >> **INSPECTION END**

5. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171](#). "[ECM Re-communicating Function](#)".
3. Perform [EC-98](#). "[VIN Registration](#)".
4. Perform [EC-98](#). "[Accelerator Pedal Released Position Learning](#)".
5. Perform [EC-98](#). "[Throttle Valve Closed Position Learning](#)".
6. Perform [EC-99](#). "[Idle Air Volume Learning](#)".

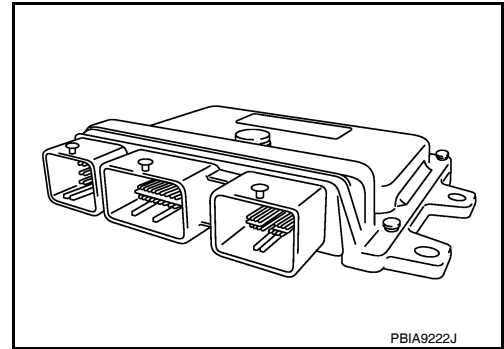
>> **INSPECTION END**

DTC P0605 ECM

Component Description

INFOID:000000006580107

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



On Board Diagnosis Logic

INFOID:000000006580108

This self-diagnosis has one or two trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	• ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

FAIL-SAFE MODE

ECM enters fail-safe mode when malfunction A is detected.

Detected items	Engine operation condition in fail-safe mode
Malfunction A	<ul style="list-style-type: none"> ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. ECM deactivates ASCD operation.

DTC Confirmation Procedure

INFOID:000000006580109

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

NOTE:

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

PROCEDURE FOR MALFUNCTION A

- Turn ignition switch ON.
- Check 1st trip DTC.
- If 1st trip DTC is detected, go to [EC-420. "Diagnosis Procedure"](#).

PROCEDURE FOR MALFUNCTION B

- Turn ignition switch ON and wait at least 1 second.
- Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
- Check 1st trip DTC.
- If 1st trip DTC is detected, go to [EC-420. "Diagnosis Procedure"](#).

PROCEDURE FOR MALFUNCTION C

- Turn ignition switch ON and wait at least 1 second.
- Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
- Repeat step 2 for 32 times.

< SERVICE INFORMATION >

4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-420, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580110

1.INSPECTION START

1. Erase DTC.
2. **Perform DTC Confirmation Procedure.**
See [EC-419, "DTC Confirmation Procedure"](#).
3. Is the 1st trip DTC P0605 displayed again?

Yes or No

- Yes >> GO TO 2.
No >> **INSPECTION END**

2.REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS(NATS) system and registration of all NVIS(NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).
3. Perform [EC-98, "VIN Registration"](#).
4. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-99, "Idle Air Volume Learning"](#).

>> **INSPECTION END**

DTC P0607 ECM

Description

INFOID:000000006580111

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.

On Board Diagnosis Logic

INFOID:000000006580112

**This self-diagnosis has the one trip detection logic (CVT).
The MIL will not light up for this self-diagnosis (M/T).**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0607 0607	CAN communication bus	When detecting error during the initial diagnosis for CAN controller of each control unit.	• ECM

DTC Confirmation Procedure

INFOID:000000006580113

1. Turn ignition switch ON.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-421, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580114

1.INSPECTION START

1. Erase DTC.
2. Perform DTC Confirmation Procedure.
See [EC-421, "DTC Confirmation Procedure"](#).
3. Is the 1st trip DTC P0607 displayed again?

Yes or No

Yes >> GO TO 2.

No >> **INSPECTION END**

2.REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).
3. Perform [EC-98, "VIN Registration"](#).
4. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-99, "Idle Air Volume Learning"](#).

>> **INSPECTION END**

DTC P0643 SENSOR POWER SUPPLY

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0643 SENSOR POWER SUPPLY

On Board Diagnosis Logic

INFOID:000000006580115

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0643 0643	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	<ul style="list-style-type: none">• Harness or connectors (APP sensor 1 circuit is shorted.) (Throttle position sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.]• Accelerator pedal position sensor• Throttle position sensor• Camshaft position sensor (PHASE)

FAIL-SAFE MODE

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

Engine operation condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006580116

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-424. "Diagnosis Procedure"](#).

DTC P0643 SENSOR POWER SUPPLY

< SERVICE INFORMATION >

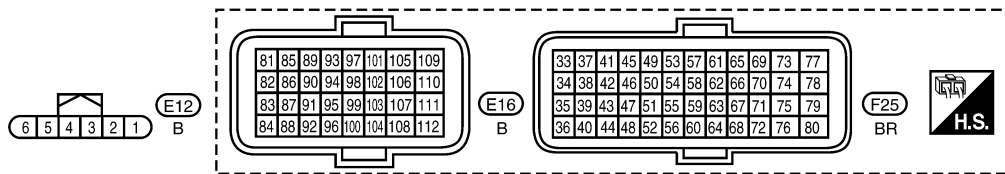
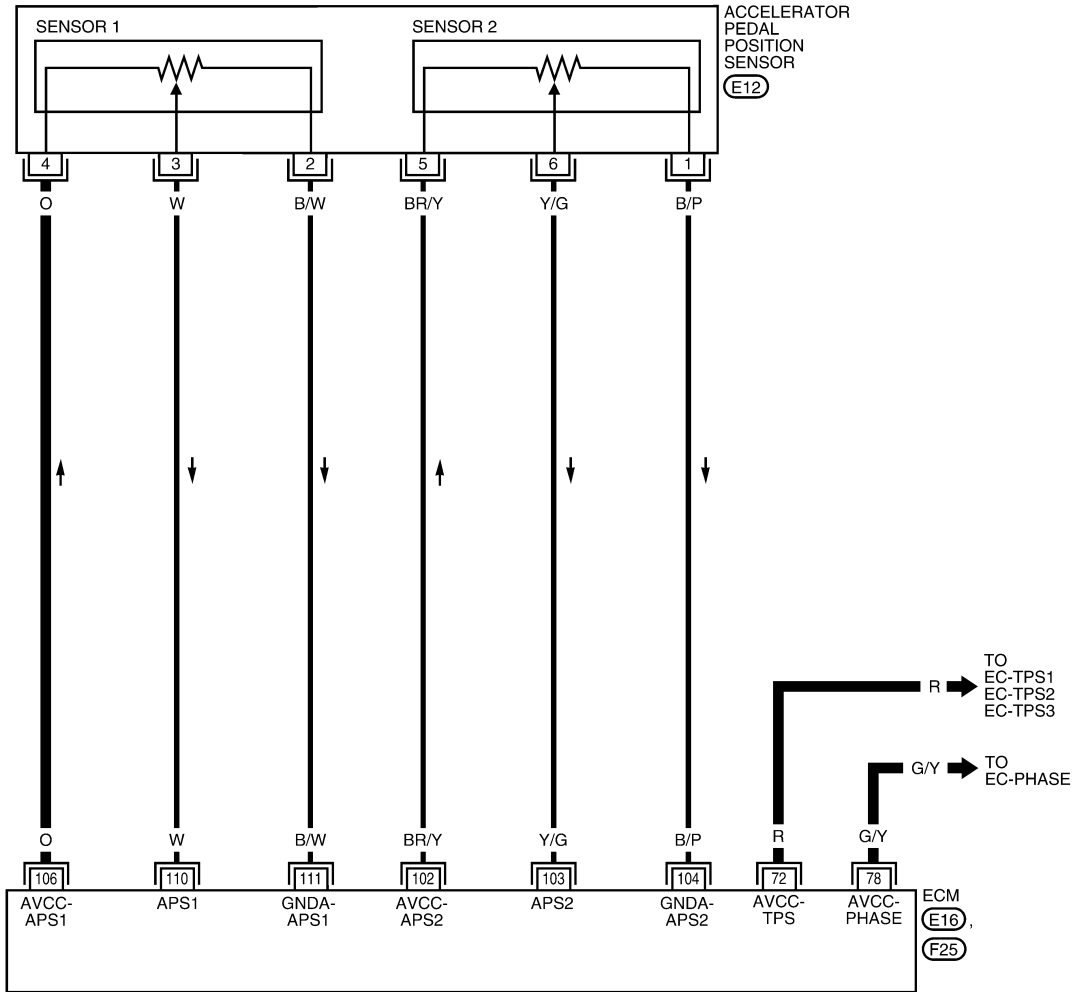
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580117

EC-SEN/PW-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



AABWA0291GB

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

CAUTION:

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

DTC P0643 SENSOR POWER SUPPLY

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
72	R	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V
78	G/Y	Sensor power supply [Camshaft position sensor (PHASE)]	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
103	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	B/P	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
106	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
110	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006580118

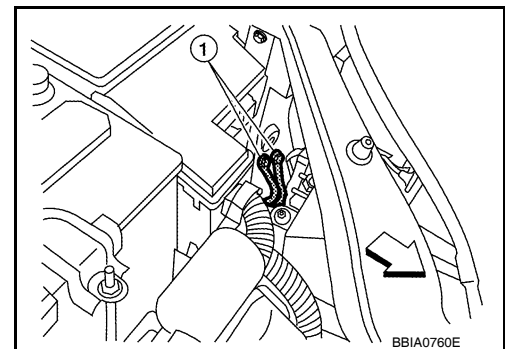
1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).

- ⇐ : Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



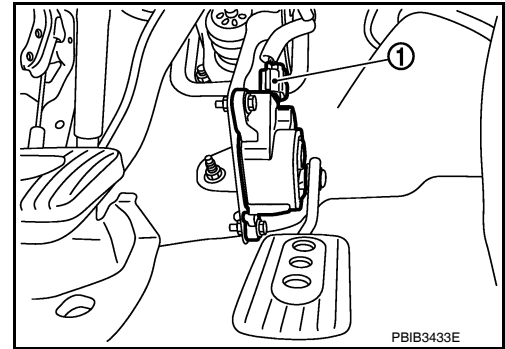
2. CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

DTC P0643 SENSOR POWER SUPPLY

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

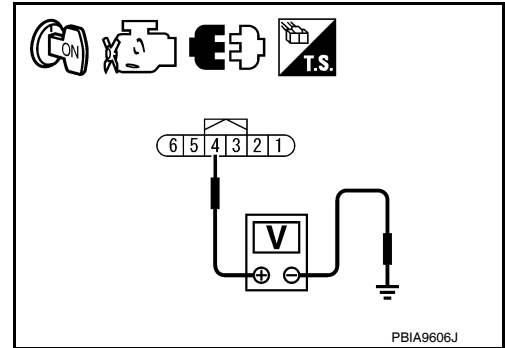


3. Check voltage between APP sensor terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 7.
NG >> GO TO 3.



3.CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
72	Throttle position sensor terminal 1	EC-513. "Wiring Diagram"
78	Camshaft position sensor (PHASE) terminal 1	EC-322. "Wiring Diagram"
106	APP sensor terminal 4	EC-423. "Wiring Diagram"

OK or NG

- OK >> GO TO 4.
NG >> Repair short to ground or short to power in harness or connectors.

4.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-325. "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace camshaft position sensor (PHASE). Refer to [EM-50. "Removal and Installation"](#).

5.CHECK THROTTLE POSITION SENSOR

Refer to [EC-515. "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
NG >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18. "Component"](#).

>> **INSPECTION END**

7.CHECK APP SENSOR

Refer to [EC-523. "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.

DTC P0643 SENSOR POWER SUPPLY

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

NG >> GO TO 8.

8. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> **INSPECTION END**

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

DTC P0850 PNP SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P0850 PNP SWITCH

Component Description

INFOID:000000006580119

When the shift lever position is Neutral, park/neutral position (PNP) switch is ON. (M/T)
When the shift lever position is P or N, transmission range switch is ON. (CVT)
ECM detects the position because the continuity of the line (the ON signal) exists.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580120

Specification data are reference values.

Monitor item	Condition	Specification
P/N POSI SW	• Ignition switch: ON	Shift lever: P or N (CVT), Neutral (M/T) ON
		Shift lever: Except above OFF

On Board Diagnosis Logic

INFOID:000000006580121

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0850 0850	Park/neutral position switch	The signal of the park/neutral position (PNP) signal is not changed in the process of engine starting and driving.	<ul style="list-style-type: none">• Harness or connectors [Park/neutral position (PNP) signal circuit is open or shorted.]• Park/neutral position (PNP) switch (M/T)• Transmission range switch (CVT)

DTC Confirmation Procedure

INFOID:000000006580122

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

WITH CONSULT-III

1. Turn ignition switch ON.
2. Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT-III. Then check the "P/N POSI SW" signal under the following conditions.

Position (Shift lever)	Known-good signal
N or P position (CVT) Neutral position (M/T)	ON
Except above	OFF

If NG, go to [EC-430, "Diagnosis Procedure"](#).

If OK, go to following step.

3. Select "DATA MONITOR" mode with CONSULT-III.
4. Start engine and warm it up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	More than 1,100 rpm (CVT) More than 1,500 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	2.0 - 31.8 msec
VHCL SPEED SE	More than 64km/h (29 MPH)
Shift lever	Suitable position

6. Check 1st trip DTC.

DTC P0850 PNP SWITCH

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

7. If 1st trip DTC is detected, go to [EC-430, "Diagnosis Procedure"](#).

Overall Function Check

INFOID:000000006580123

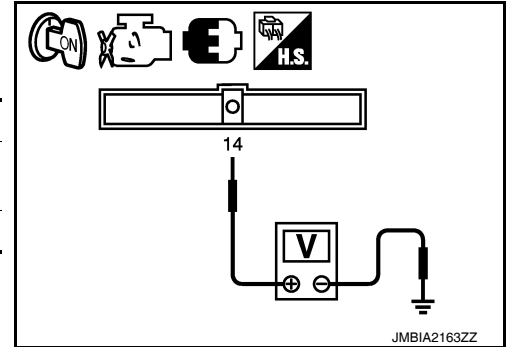
Use this procedure to check the overall function of the park/neutral position (PNP) signal circuit. During this check, a 1st trip DTC might not be confirmed.

Ⓢ WITH GST

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 14 (PNP signal) and ground under the following conditions.

Condition (Shift lever)	Voltage (Known-good data)
P or N position (CVT) Neutral position (M/T)	BATTERY VOLTAGE (11 - 14 V)
Except above	Approx. 0

3. If NG, go to [EC-430, "Diagnosis Procedure"](#).



DTC P0850 PNP SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

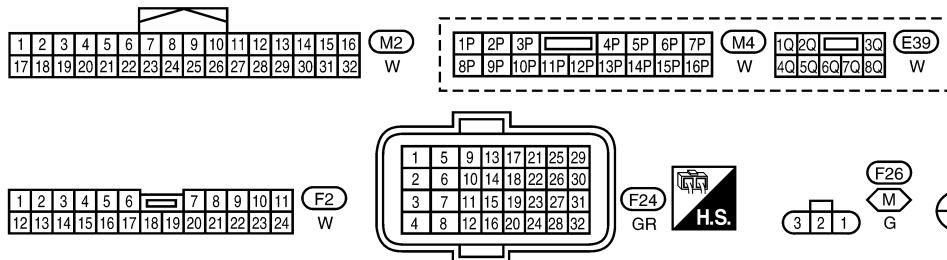
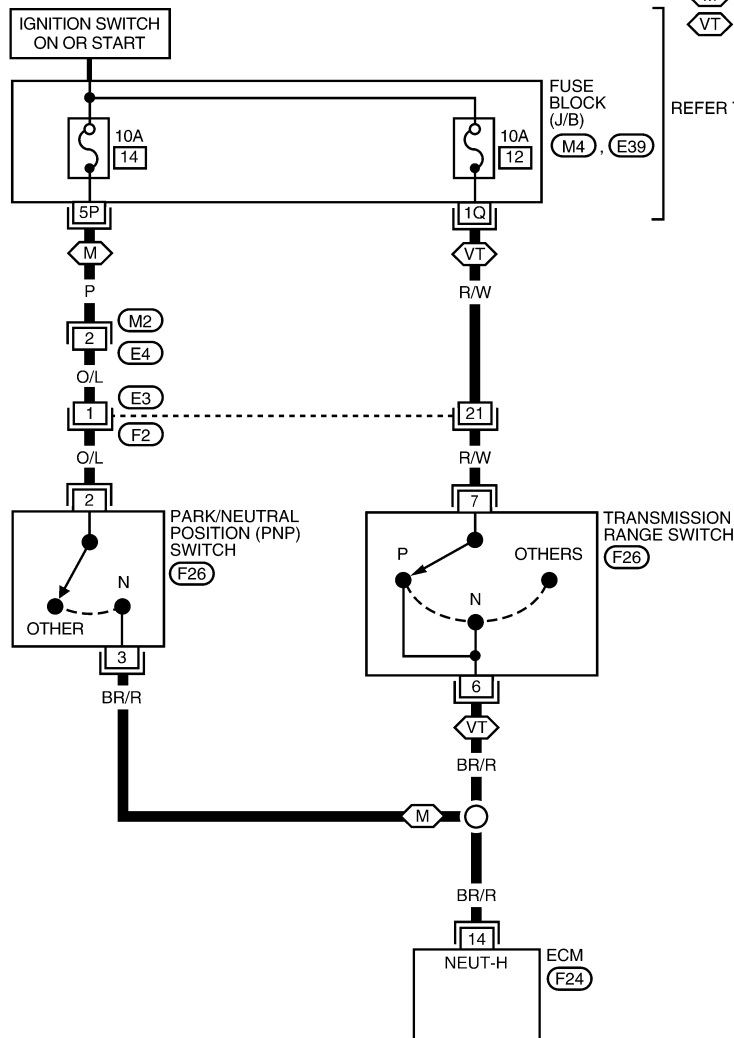
INFOID:000000006580124

Wiring Diagram

EC-TR/SW-01

- : DETECTABLE LINE FOR DTC
- - -** : NON-DETECTABLE LINE FOR DTC
- (M)** : WITH M/T
- (VT)** : WITH CVT

REFER TO "PG-POWER".



ABBWA0656GB

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

CAUTION:

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

DTC P0850 PNP SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	BR/R	PNP signal	[Ignition switch: ON] <ul style="list-style-type: none">• Shift lever: P or N (CVT), Neutral (M/T)	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON] <ul style="list-style-type: none">• Except above	Approximately 0 V

Diagnosis Procedure

INFOID:000000006580125

M/T MODELS

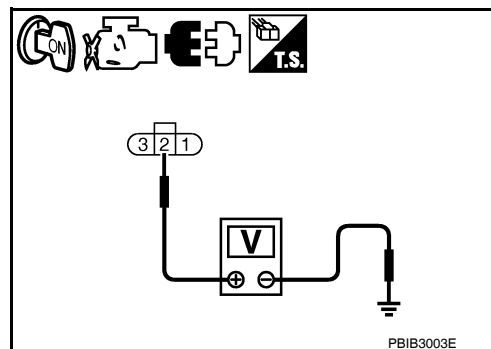
1. CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect PNP switch harness connector.
3. Turn ignition switch ON.
4. Check voltage between PNP switch terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M2, E4
- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between PNP switch and fuse

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

3. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between PNP switch terminal 3 and ECM terminal 14. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK PNP SWITCH

Refer to [MT-144, "Checking"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace PNP switch. Refer to [MT-149, "Disassembly and Assembly"](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

DTC P0850 PNP SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

>> INSPECTION END

CVT MODELS

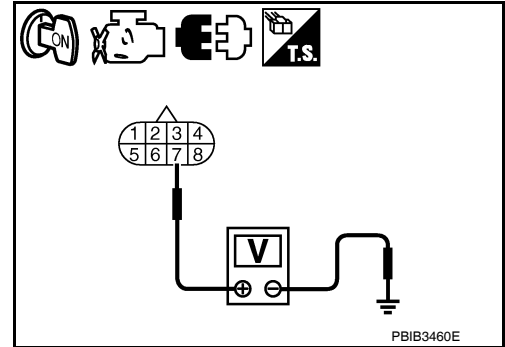
1. CHECK TRANSMISSION RANGE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect transmission range switch harness connector.
3. Turn ignition switch ON.
4. Check voltage between transmission range switch terminal 7 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between transmission range switch and fuse

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

3. CHECK PNP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between transmission range switch terminal 6 and ECM terminal 14. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK TRANSMISSION RANGE SWITCH

Refer to [CVT-64. "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace transmission range switch. Refer to [CVT-185. "Transmission Range Switch"](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

DTC P1148 CLOSED LOOP CONTROL

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P1148 CLOSED LOOP CONTROL

On Board Diagnosis Logic

INFOID:000000006580126

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1148 1148	Closed loop control function	The closed loop control function does not operate even when vehicle is driving in the specified condition.	<ul style="list-style-type: none">• Harness or connectors [Air fuel ratio (A/F) sensor 1 circuit is open or shorted.]• Air fuel ratio (A/F) sensor 1• Air fuel ratio (A/F) sensor 1 heater

NOTE:

DTC P1148 is displayed with another DTC for air fuel ratio (A/F) sensor 1. Perform the trouble diagnosis for the corresponding DTC.

DTC P1212 TCS COMMUNICATION LINE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P1212 TCS COMMUNICATION LINE

Description

INFOID:000000006580127

NOTE:

- If DTC P1212 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to [EC-164](#).
- If DTC P1212 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-421](#).

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.

On Board Diagnosis Logic

INFOID:000000006580128

Freeze frame data is not stored in the ECM for this self-diagnosis.

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212 1212	TCS communication line	ECM can not receive the information from “ABS actuator and electric unit (control unit)” continuously.	<ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted.)• ABS actuator and electric unit (control unit)• Dead (Weak) battery

DTC Confirmation Procedure

INFOID:000000006580129

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

1. Start engine and let it idle for at least 10 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-433, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580130

Go to [BRC-45, "How to Perform Trouble Diagnosis for Quick and Accurate Repair"](#).

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P1217 ENGINE OVER TEMPERATURE

System Description

INFOID:000000006580131

SYSTEM DESCRIPTION

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 [EC-421](#).

Cooling Fan Control

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	Cooling fan control	<ul style="list-style-type: none"> • IPDM E/R (Cooling fan relays-1, -2 and -3) • Cooling fan relays-4 and -5
Battery	Battery voltage*1		
ABS actuator and electric unit (control unit)	Vehicle speed*2		
Combination meter			
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner ON signal*2		
Refrigerant pressure sensor	Refrigerant pressure		

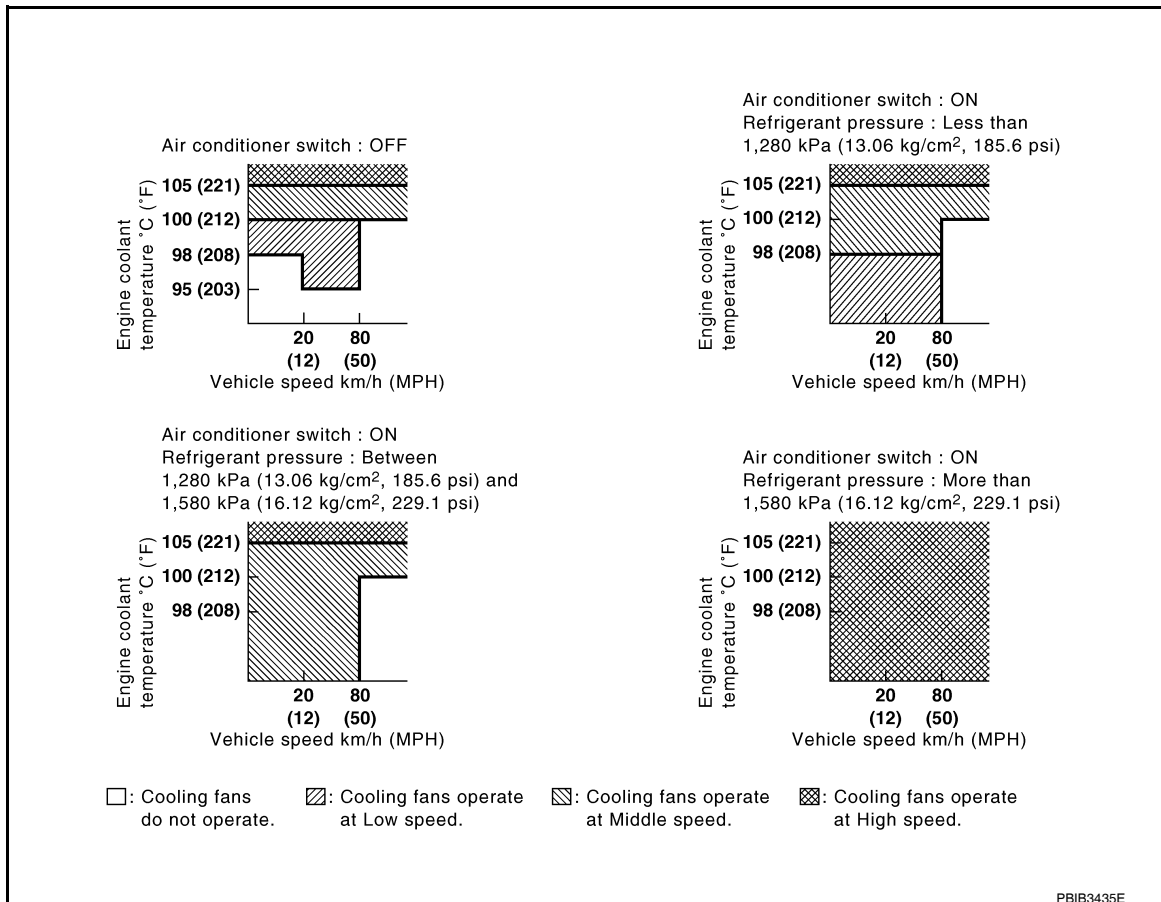
*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

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

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

Models with A/C



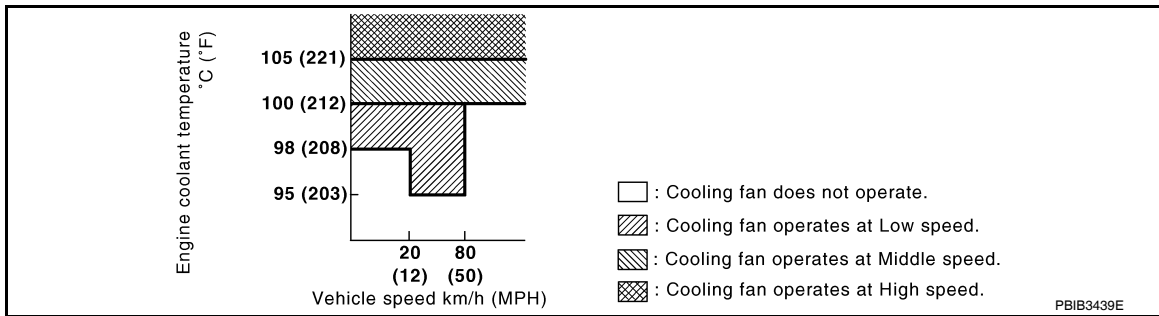
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DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Models without A/C



Cooling Fan Relay Operation

The ECM controls cooling fan relays through CAN communication line.

Cooling fan speed	Cooling fan relay				
	1	2	3	4	5
Stop (OFF)	OFF	OFF	OFF	OFF	OFF
Low (LOW)	OFF	OFF	OFF	ON	OFF
Middle (MID)	ON	OFF	OFF	OFF	ON
High (HI)	ON	ON	ON	OFF	ON

COMPONENT DESCRIPTION

Cooling Fan Motor

The cooling fan operates at each speed when the current flows in the cooling fan motor as follows.

Cooling fan speed	Cooling fan motor terminals	
	(+)	(-)
Middle (MID)	1	3 and 4
	2	3 and 4
	1 and 2	3
	1 and 2	4
High (HI)	1 and 2	3 and 4

The cooling fan operates at low (LOW) speed when cooling fan motors-1 and -2 are circuited in series under middle speed condition.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580132

Specification data are reference values.

Monitor item	Condition	Specification
AIR COND SIG	Air conditioner switch: OFF	OFF
	Air conditioner switch: ON (Compressor operates.)	ON
COOLING FAN	Engine coolant temperature: 97°C (207°F) or less	OFF
	Engine coolant temperature: Between 98°C (208°F) and 99°C (210°F).	LOW
	Engine coolant temperature: Between 100°C (212°F) and 104°C (219°F).	MIDDLE
	Engine coolant temperature: 105°C (221°F) or more	HIGH

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

On Board Diagnosis Logic

INFOID:000000006580133

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.

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 1217	Engine over temperature (Overheat)	<ul style="list-style-type: none">Cooling fan does not operate properly (Overheat).Cooling fan system does not operate properly (Overheat).Engine coolant was not added to the system using the proper filling method.Engine coolant is not within the specified range.	<ul style="list-style-type: none">Harness or connectors (Cooling fan circuit is open or shorted.)Cooling fan motorIPDM E/R (Cooling fan relays-1, -2 and -3)Cooling fan relays-4 and -5Radiator hoseRadiatorReservoir tankRadiator capWater pumpThermostatWater control valve <p>For more information, refer to EC-444, "Main 13 Causes of Overheating".</p>

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [MA-19, "ENGINE COOLANT : Changing Engine Coolant"](#). Also, replace the engine oil. Refer to [MA-23, "ENGINE OIL : Changing Engine Oil"](#).

- Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-16, "Engine Cooling System"](#).
- After refilling coolant, run engine to ensure that no water-flow noise is emitted.

Overall Function Check

INFOID:000000006580134

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

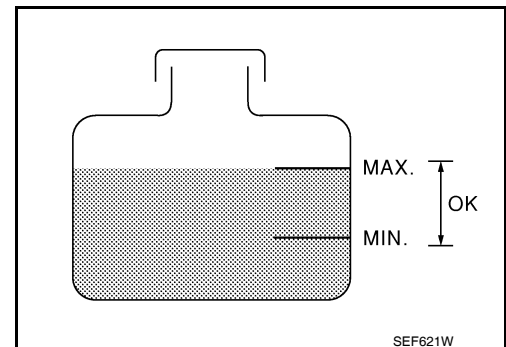
WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the reservoir tank or 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.

④ WITH CONSULT-III

- Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-440, "Diagnosis Procedure"](#).
- Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-440, "Diagnosis Procedure"](#).
- Turn ignition switch ON.



- Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III.
- If the results are NG, go to [EC-440, "Diagnosis Procedure"](#).

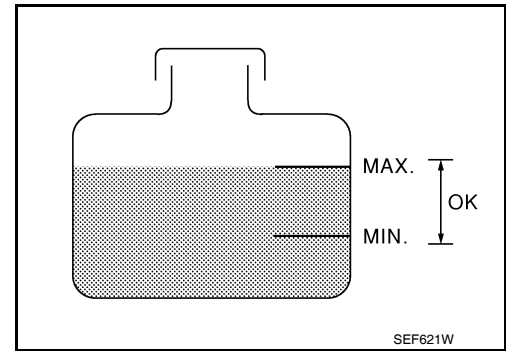
④ WITH GST

DTC P1217 ENGINE OVER TEMPERATURE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-440, "Diagnosis Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-440, "Diagnosis Procedure"](#).
3. Perform IPDM E/R auto active test and check cooling fan motor operation. Refer to [PG-21, "Auto Active Test"](#).
4. If NG, go to [EC-440, "Diagnosis Procedure"](#).



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DTC P1217 ENGINE OVER TEMPERATURE




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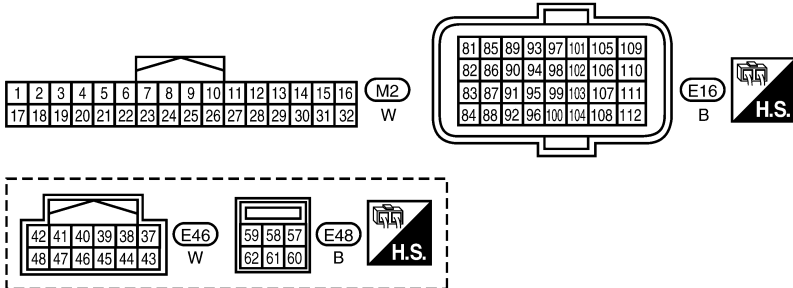
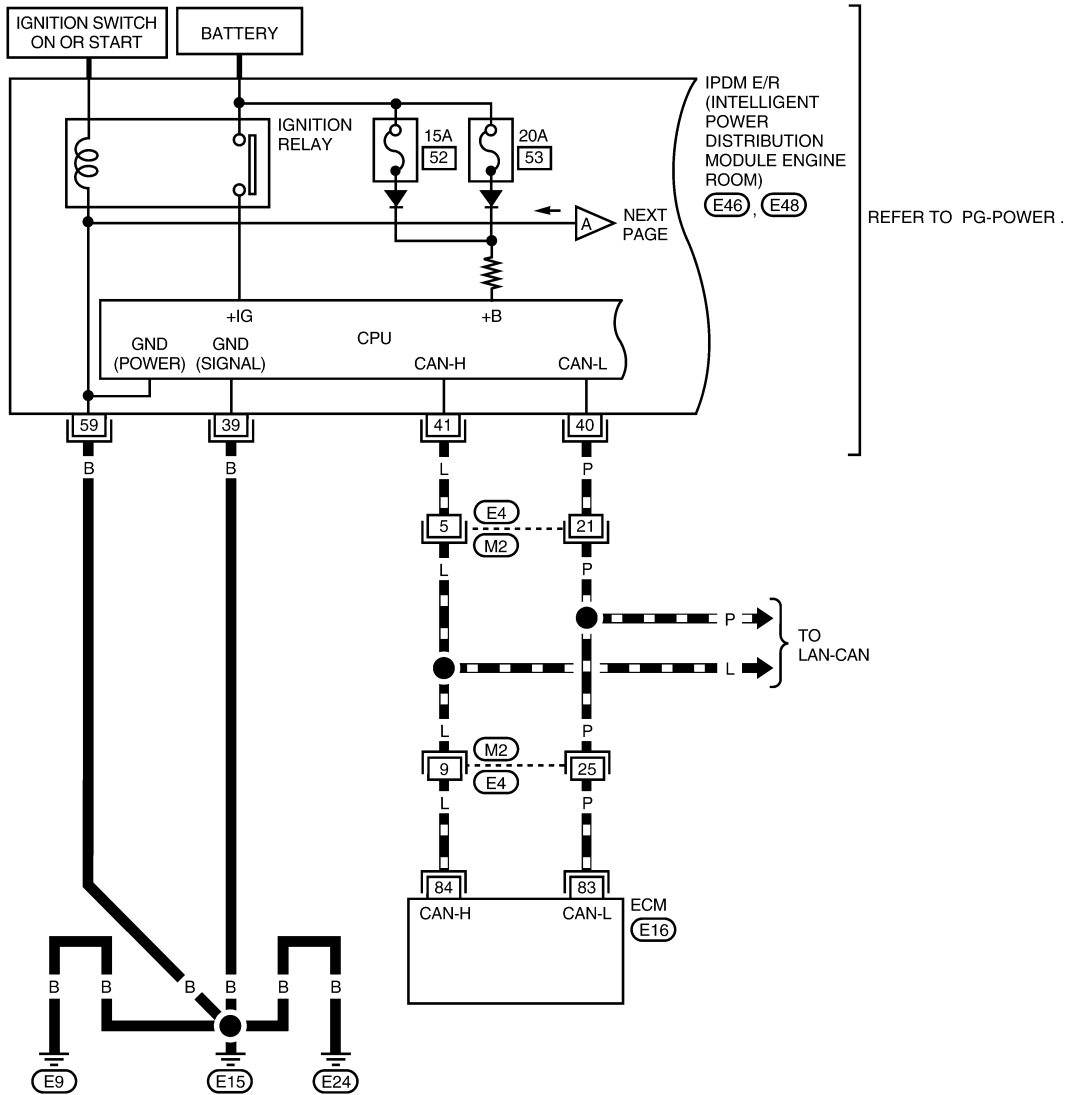
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006580135

Wiring Diagram

EC-COOL/F-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE

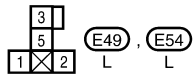
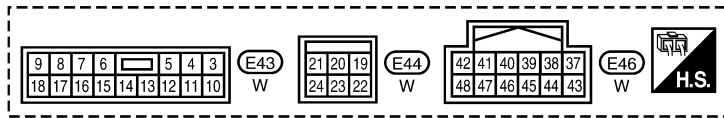
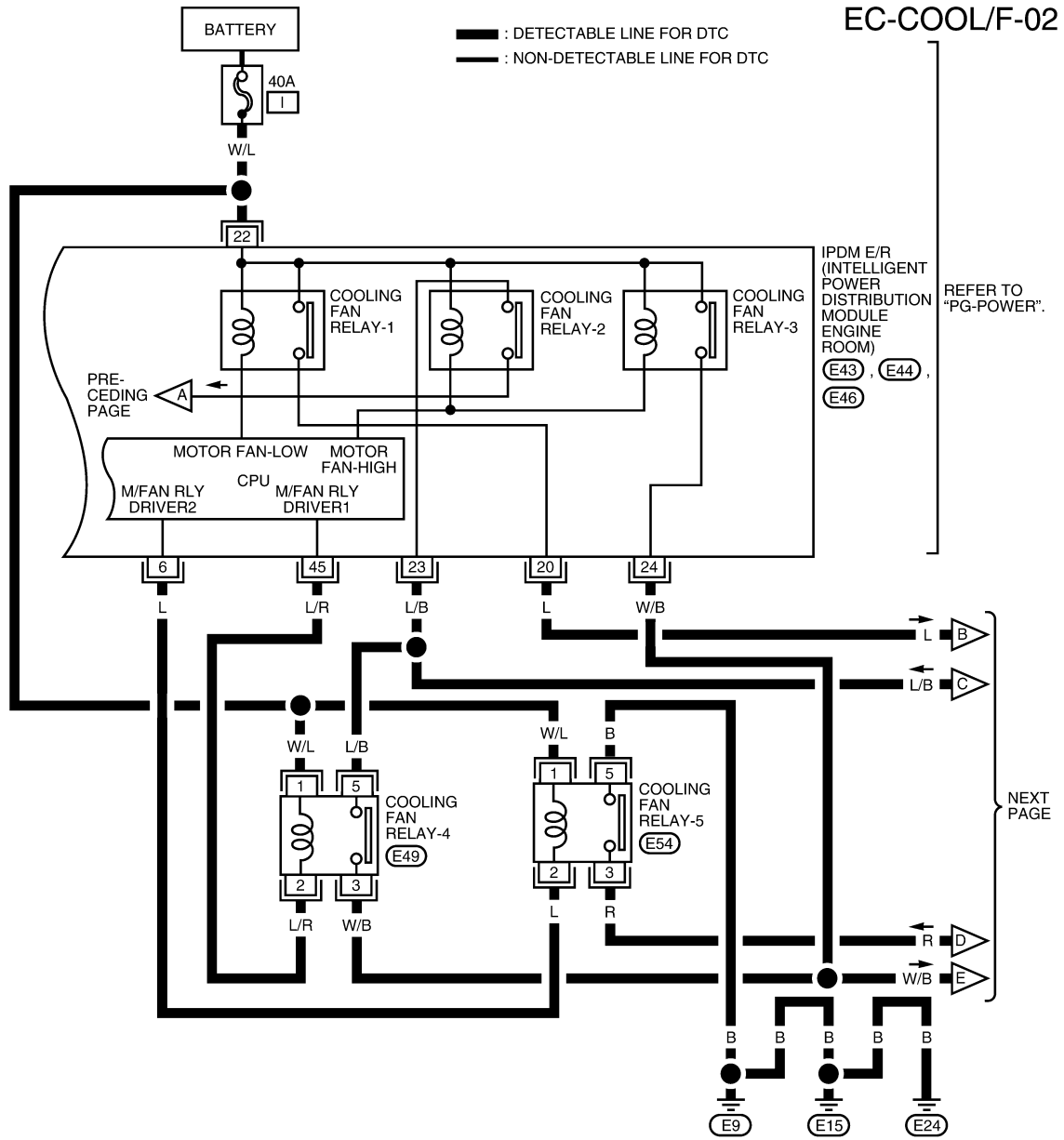


BBWA2891E

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]



BBWA2892E

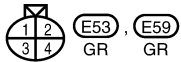
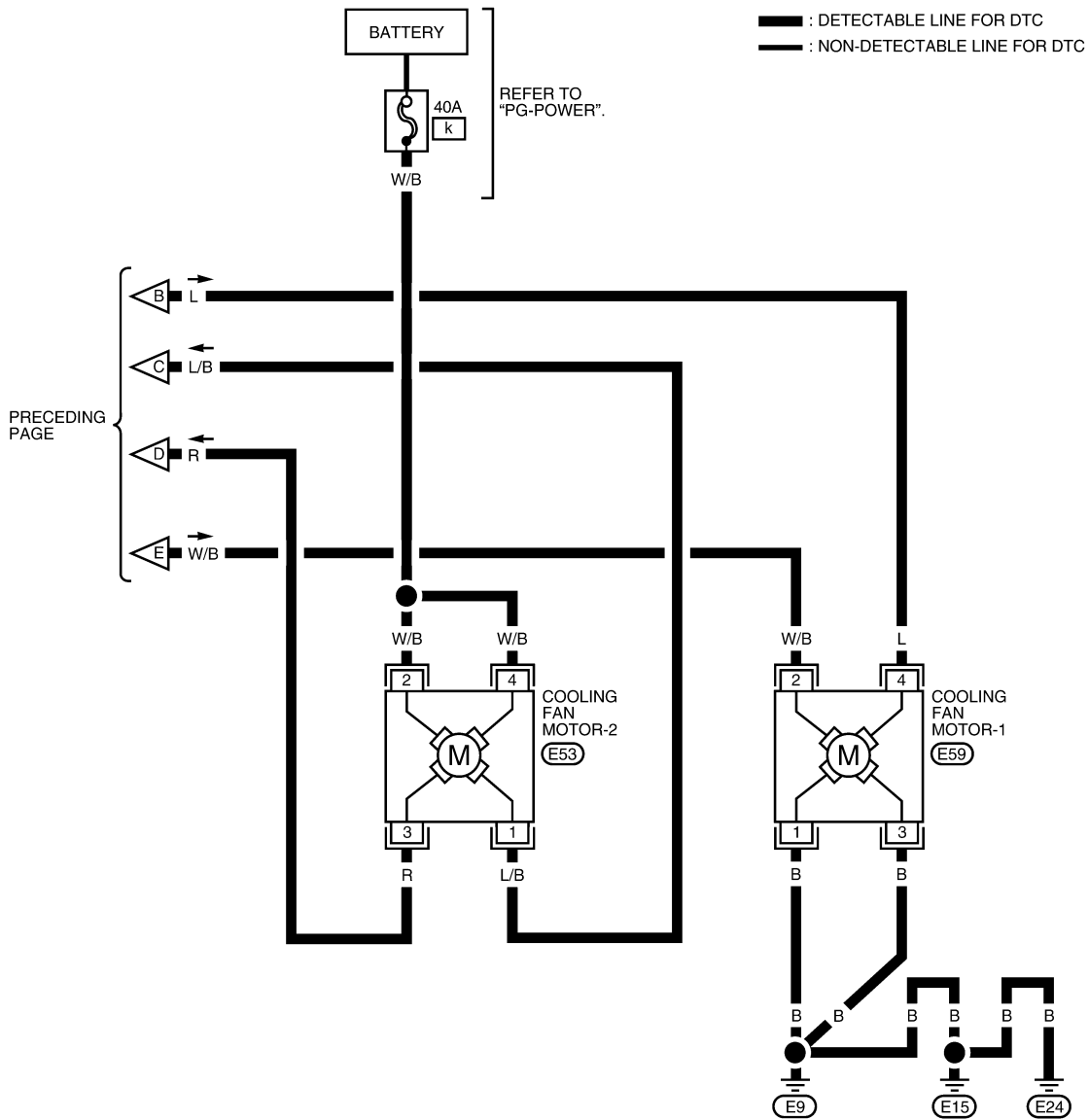
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DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

EC-COOL/F-03



BBWA2893E

INFOID:000000006580136

Diagnosis Procedure

1. INSPECTION START

Do you have CONSULT-III?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

2. CHECK COOLING FAN OPERATION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that cooling fans-1 and -2 operates at each speed (LOW/MID/HI).

OK or NG

- OK >> GO TO 4.
NG >> Check cooling fan control circuit. (Refer to "PROCEDURE A".)

3. CHECK COOLING FAN OPERATION

Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motor operation.
Refer to [PG-21, "Auto Active Test"](#).
2. Make sure that cooling fans-1 and -2 operates at each speed (Low/Middle/High).

OK or NG

- OK >> GO TO 4.
NG >> Check cooling fan control circuit. (Refer to "PROCEDURE A".)

4. CHECK COOLING SYSTEM FOR LEAK

Refer to [CO-11, "Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Check the following for leak.
- Hose
 - Radiator
 - Water pump

5. CHECK RADIATOR CAP

Refer to [CO-15, "Component"](#).

OK or NG

- OK >> GO TO 6.
NG >> Replace radiator cap. Refer to [CO-15, "Removal and Installation"](#).

6. CHECK COMPONENT PARTS

Check the following.

- Thermostat. (Refer to [CO-21](#).)
- Water control valve. (Refer to [CO-24](#).)
- Engine coolant temperature sensor. (Refer to [EC-210](#).)

OK or NG

- OK >> GO TO 7.
NG >> Replace malfunctioning component parts.

7. CHECK MAIN 13 CAUSES

If the cause cannot be isolated, go to [EC-444, "Main 13 Causes of Overheating"](#).

>> **INSPECTION END**

PROCEDURE A

1. CHECK IPDM E/R POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E44.

DTC P1217 ENGINE OVER TEMPERATURE

[MR20DE (FOR CALIFORNIA)]

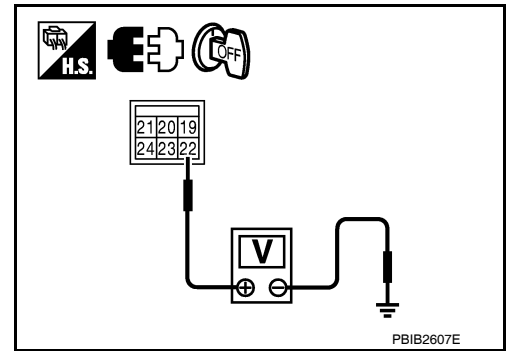
< SERVICE INFORMATION >

3. Check voltage between IPDM E/R terminal 22 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

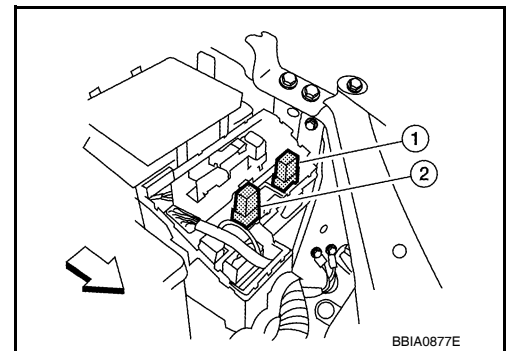
Check the following.

- 40 A fusible link
- Harness for open or short between IPDM E/R and battery

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

3. CHECK COOLING FAN RELAYS POWER SUPPLY CIRCUIT

1. Disconnect cooling fan relays-4 (2) and -5 (1).
- ⇐: Vehicle front

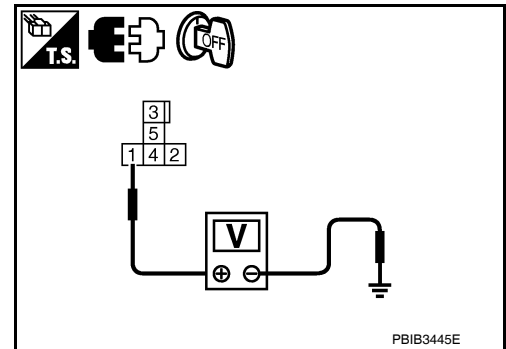


2. Check voltage between cooling fan relays-4, -5 terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

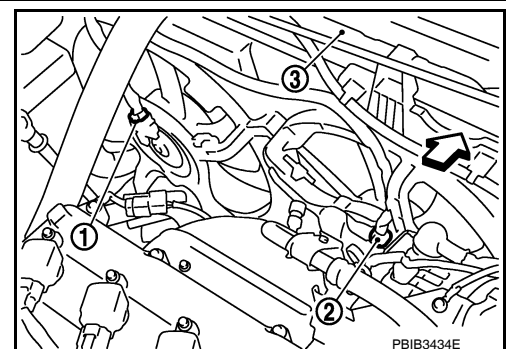
OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to power or short to ground in harness or connectors.



4. CHECK COOLING FAN MOTORS POWER SUPPLY CIRCUIT

1. Disconnect cooling fan motor-2 harness connector (2).
- ⇐: Vehicle front
 - Cooling fan motor-1 harness connector (1)
 - Radiator (3)



DTC P1217 ENGINE OVER TEMPERATURE

[MR20DE (FOR CALIFORNIA)]

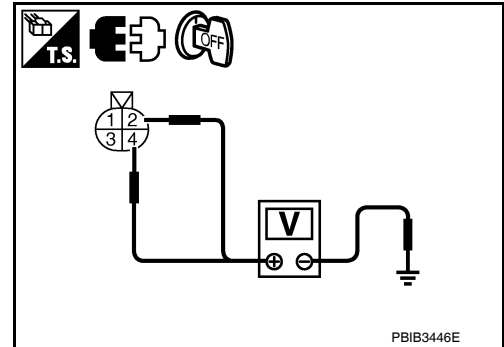
< SERVICE INFORMATION >

2. Check voltage between cooling fan motor-2 terminal 2, 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

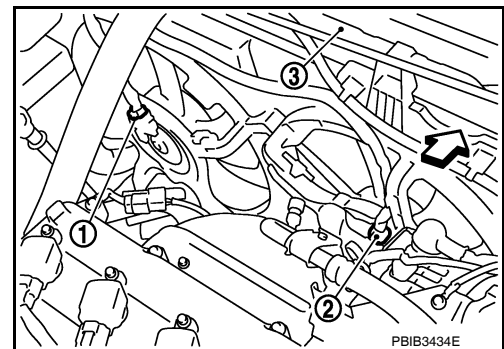
Check the following.

- 40 A fusible link
- Harness for open or short between cooling fan motor-2 and battery

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

6. CHECK COOLING FAN MOTORS CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connectors E46 and E48.
3. Disconnect cooling fan motor-1 harness connector (1).
 - ⇐: Vehicle front
 - Cooling fan motor-2 harness connector (2)
 - Radiator (3)
4. Check harness continuity between the following;
cooling fan relay-4 terminal 2 and IPDM E/R terminal 45,
cooling fan relay-4 terminal 5 and IPDM E/R terminal 23,
cooling fan relay-5 terminal 2 and IPDM E/R terminal 6,
cooling fan relay-5 terminal 5 and ground,
cooling fan relay-4 terminal 3 and cooling fan motor-1 terminal 2,
cooling fan motor-1 terminal 2 and IPDM E/R terminal 24,
cooling fan motor-1 terminal 4 and IPDM E/R terminal 20,
cooling fan motor-1 terminal 1, 3 and ground.
IPDM E/R terminal 39, 59 and ground.



Continuity should exist.

cooling fan relay-4 terminal 5 and cooling fan motor-2 terminal 1,
cooling fan relay-5 terminal 3 and cooling fan motor-2 terminal 3,
cooling fan motor-2 terminal 1 and cooling fan relay-4 terminal 5,
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between cooling fan relay-4 and IPDM E/R
- Harness for open or short between cooling fan relay-5 and IPDM E/R
- Harness for open or short between cooling fan relay-4 and cooling fan motor-1
- Harness for open or short between cooling fan relay-4 and cooling fan motor-2
- Harness for open or short between cooling fan relay-5 and cooling fan motor-2
- Harness for open or short between cooling fan relay-5 and ground
- Harness for open or short between cooling fan motor-1 and ground

DTC P1217 ENGINE OVER TEMPERATURE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Harness for open or short between IPDM E/R and ground

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

8. CHECK GROUND CONNECTIONS

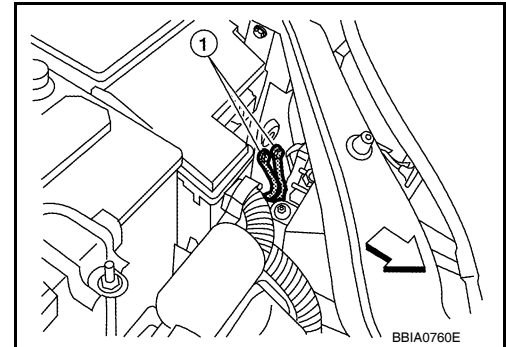
Loosen and retighten ground screw on the body.

Refer to [EC-158, "Ground Inspection"](#).

- ↵: Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 9.
- NG >> Repair or replace ground connections.



9. CHECK COOLING FAN RELAYS-4 AND -5

Refer to [EC-445, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
- NG >> Replace malfunctioning cooling fan relay. Refer to [PG-56, "Electrical Units Location"](#).

10. CHECK COOLING FAN MOTORS-1 AND -2

Refer to [EC-445, "Component Inspection"](#).

OK or NG

- OK >> GO TO 11.
- NG >> Replace malfunctioning cooling fan motor. Refer to [CO-17, "Removal and Installation"](#).

11. CHECK INTERMITTENT INCIDENT

Perform [EC-153](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-28, "Removal and Installation of IPDM E/R"](#).
- NG >> Repair or replace harness or connector.

Main 13 Causes of Overheating

INFOID:000000006580137

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> • Blocked radiator • Blocked condenser • Blocked radiator grille • Blocked bumper 	<ul style="list-style-type: none"> • Visual 	No blocking	—
	2	<ul style="list-style-type: none"> • Coolant mixture 	<ul style="list-style-type: none"> • Coolant tester 	See MA-16, "Engine Cooling System" .	
	3	<ul style="list-style-type: none"> • Coolant level 	<ul style="list-style-type: none"> • Visual 	Coolant up to MAX level in reservoir tank and radiator filler neck	See CO-11, "Inspection" .
	4	<ul style="list-style-type: none"> • Radiator cap 	<ul style="list-style-type: none"> • Pressure tester 	See CO-11 .	
ON*2	5	<ul style="list-style-type: none"> • Coolant leaks 	<ul style="list-style-type: none"> • Visual 	No leaks	See CO-11, "Inspection" .
ON*2	6	<ul style="list-style-type: none"> • Thermostat 	<ul style="list-style-type: none"> • Touch the upper and lower radiator hoses 	Both hoses should be hot	See CO-21 , and CO-24
ON*1	7	<ul style="list-style-type: none"> • Cooling fan 	<ul style="list-style-type: none"> • CONSULT-III 	Operating	See trouble diagnosis for DTC P1217 (EC-440, "Diagnosis Procedure").
OFF	8	<ul style="list-style-type: none"> • Combustion gas leak 	<ul style="list-style-type: none"> • Color checker chemical tester 4 Gas analyzer 	Negative	—

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Engine	Step	Inspection item	Equipment	Standard	Reference page
ON*3	9	• Coolant temperature gauge	• Visual	Gauge less than 3/4 when driving	—
		• Coolant overflow to reservoir tank	• Visual	No overflow during driving and idling	See CO-12, "Changing Engine Coolant" .
OFF*4	10	• Coolant return from reservoir tank to radiator	• Visual	Should be initial level in reservoir tank	See CO-11, "Inspection" .
OFF	11	• Water control valve	• Remove and inspect the valve	Within the specified value	See CO-24
OFF	12	• Cylinder head	• Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-65 .
	13	• Cylinder block and pistons	• Visual	No scuffing on cylinder walls or piston	See EM-80 .

*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-7](#).

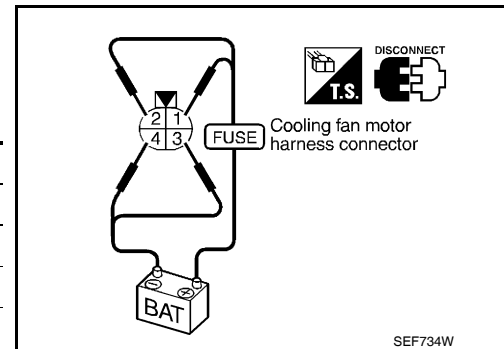
Component Inspection

INFOID:000000006580138

COOLING FAN MOTORS-1 AND -2

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

Cooling fan speed	Cooling fan motor terminals	
	(+)	(-)
Middle (MID)	1	3 and 4
	2	3 and 4
	1 and 2	3
	1 and 2	4
High (HI)	1 and 2	3 and 4



Cooling fan motor should operate.

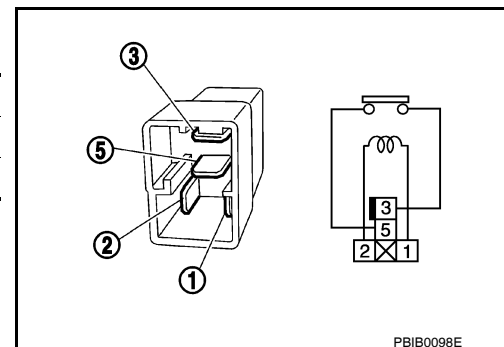
If NG, replace cooling fan motor. Refer to [CO-17, "Removal and Installation"](#).

COOLING FAN RELAYS-4 AND -5

Check continuity between terminals 3 and 4.

Conditions	Continuity
12 V direct current supply between terminal 1 and 2	Yes
No current supply	No

If NG, replace cooling fan motor. Refer to [CO-17, "Removal and Installation"](#).



DTC P1225 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

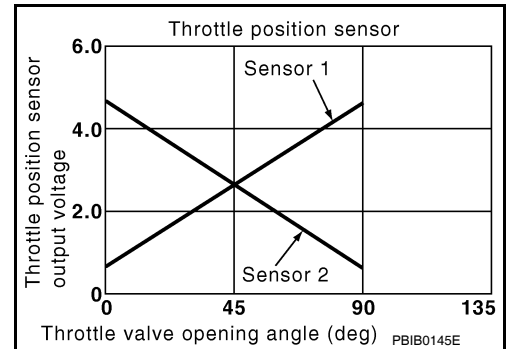
DTC P1225 TP SENSOR

Component Description

INFOID:000000006580139

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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.



On Board Diagnosis Logic

INFOID:000000006580140

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance	Closed throttle position learning value is excessively low.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

INFOID:000000006580141

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Check 1st trip DTC.
4. If 1st trip DTC is detected, go to [EC-446. "Diagnosis Procedure"](#).

Diagnosis Procedure

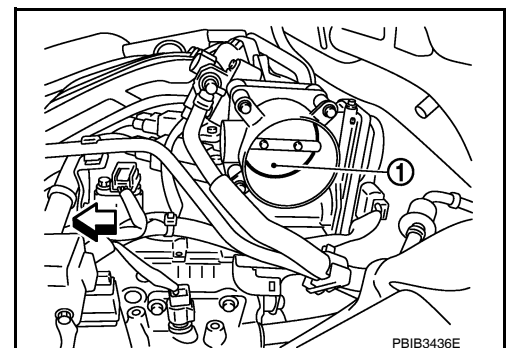
INFOID:000000006580142

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - : Vehicle front
 - Illustration shows the view with intake air duct removed.

OK or NG

- OK >> GO TO 2.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EM-18. "Component"](#).



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18. "Component"](#).

>> INSPECTION END

DTC P1226 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

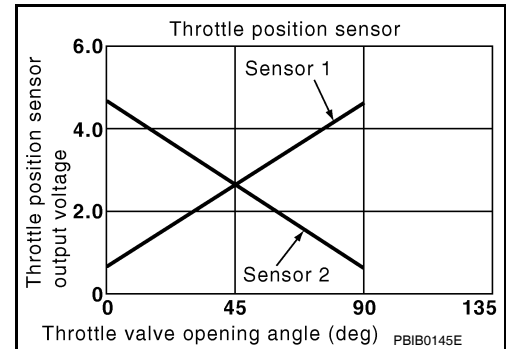
DTC P1226 TP SENSOR

Component Description

INFOID:000000006580144

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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.



On Board Diagnosis Logic

INFOID:000000006580145

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance	Closed throttle position learning is not performed successfully, repeatedly.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

INFOID:000000006580146

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Repeat steps 1 and 2 for 32 times.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-447, "Diagnosis Procedure"](#).

Diagnosis Procedure

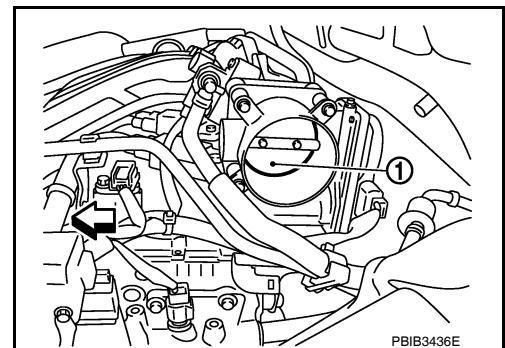
INFOID:000000006580147

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - ⇐: Vehicle front
 - Illustration shows the view with intake air duct removed.

OK or NG

- OK >> GO TO 2.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EM-18, "Component"](#).



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18, "Component"](#).

>> INSPECTION END

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

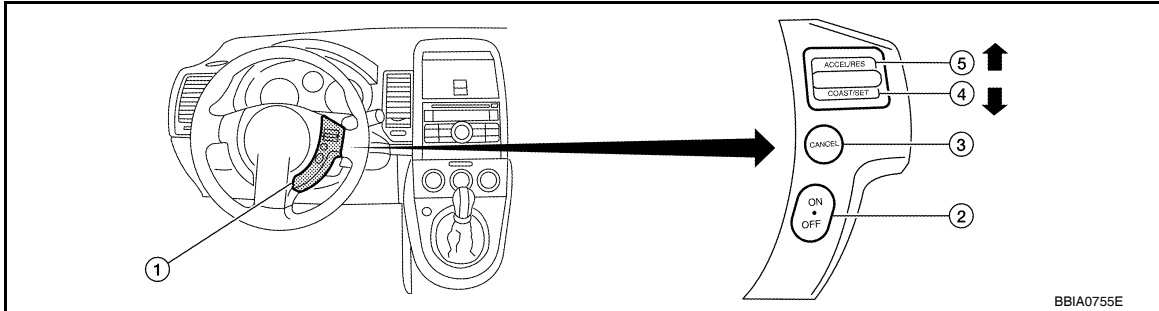
[MR20DE (FOR CALIFORNIA)]

DTC P1564 ASCD STEERING SWITCH

Component Description

INFOID:000000006580153

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



1. ASCD steering switch
2. MAIN switch
3. CANCEL switch
4. SET/COAST switch
5. RESUME/ACCELERATE switch

Refer to [EC-40](#) for the ASCD function.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580154

Specification data are reference values.

Monitor item	Condition	Specification	
MAIN SW	• Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	• Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	• Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF

On Board Diagnosis Logic

INFOID:000000006580155

- This self-diagnosis has the one trip detection logic.
- The MIL will not light up for this self-diagnosis.

NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605.

Refer to [EC-419](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1564 1564	ASCD steering switch	<ul style="list-style-type: none"> • An excessively high voltage signal from the ASCD steering switch is sent to ECM. • ECM detects that input signal from the ASCD steering switch is out of the specified range. • ECM detects that the ASCD steering switch is stuck ON. 	<ul style="list-style-type: none"> • Harness or connectors (ASCD switch circuit is open or shorted.) • ASCD steering switch • ECM

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC Confirmation Procedure

INFOID:000000006580156

NOTE:

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

1. Turn ignition switch ON.
2. Wait at least 10 seconds.
3. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
4. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Check DTC.
8. If DTC is detected, go to [EC-451, "Diagnosis Procedure"](#).

A

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DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

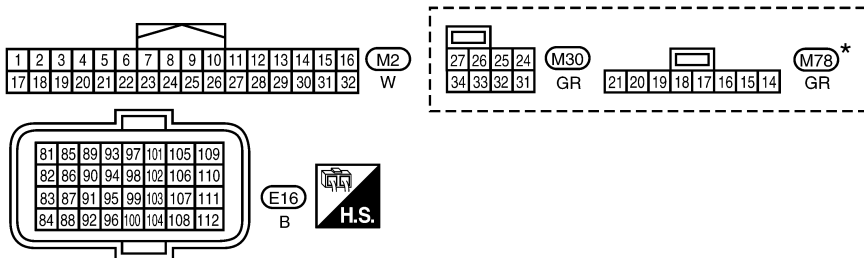
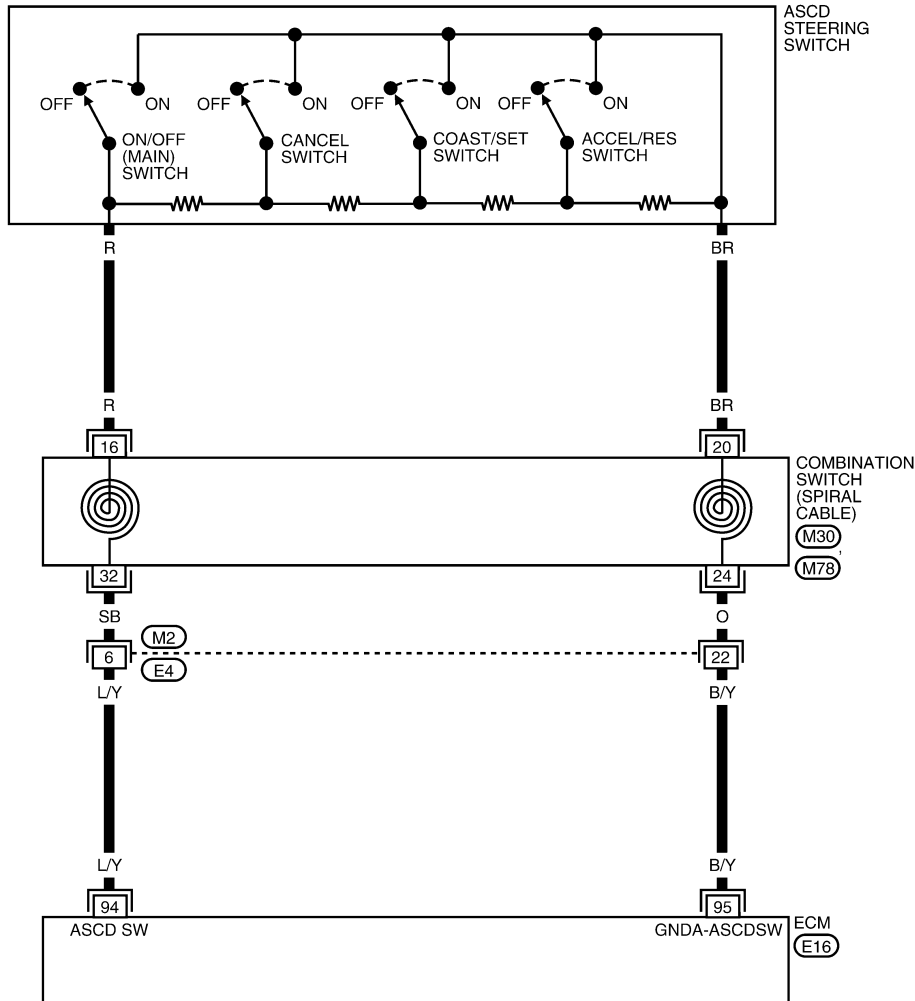
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580157

EC-ASC/SW-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

ABBWA0657GB

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

CAUTION:

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

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
94	L/Y	ASCD steering switch	[Ignition switch: ON] • ASCD steering switch: OFF	Approximately 4 V
			[Ignition switch: ON] • MAIN switch: Pressed	Approximately 0 V
			[Ignition switch: ON] • CANCEL switch: Pressed	Approximately 1 V
			[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	Approximately 3 V
			[Ignition switch: ON] • SET/COAST switch: Pressed	Approximately 2 V
95	B/Y	Sensor ground	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

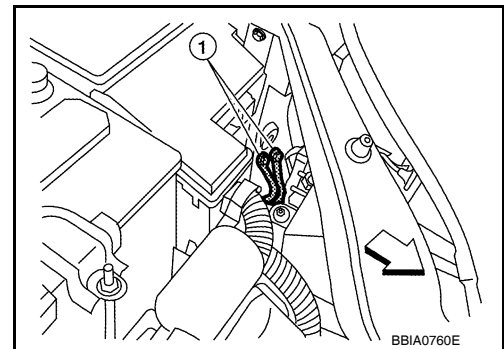
INFOID:000000006580158

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.



2. CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT-III

- Turn ignition switch ON.
- Select "MAIN SW", "RESUME/ACC SW", "SET SW and "CANCEL SW" in "DATA MONITOR" mode with CONSULT-III.
- Check each item indication under the following conditions.

Switch	Monitor item	Condition	Indication
MAIN switch	MAIN SW	Pressed	ON
		Released	OFF
CANCEL switch	CANCEL SW	Pressed	ON
		Released	OFF
RESUME/AC- CELERATE switch	RESUME/ACC SW	Pressed	ON
		Released	OFF
SET/COAST switch	SET SW	Pressed	ON
		Released	OFF

Without CONSULT-III

- Turn ignition switch ON.

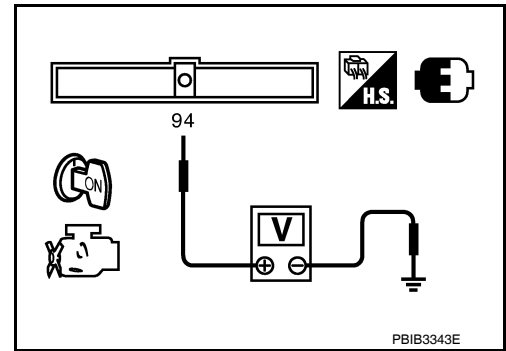
DTC P1564 ASCD STEERING SWITCH

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Check voltage between ECM terminal 94 and ground with pressing each button.

Switch	Condition	Voltage (V)
MAIN switch	Pressed	Approx. 0
	Released	Approx. 4.0
CANCEL switch	Pressed	Approx. 1.0
	Released	Approx. 4.0
RESUME/ACCELERATE switch	Pressed	Approx. 3.0
	Released	Approx. 4.0
SET/COAST switch	Pressed	Approx. 2.0
	Released	Approx. 4.0



OK or NG

- OK >> GO TO 8.
- NG >> GO TO 3.

3. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect combination switch harness connector M78.
3. Disconnect ECM harness connector.
4. Check harness continuity between combination switch terminal 20 (unit side) and ECM terminal 95. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M2, E4
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

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

5. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 94 and combination switch terminal 16. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M2, E4
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

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

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

7. CHECK ASCD STEERING SWITCH

Refer to [EC-453](#). "Component Inspection".

OK or NG

OK >> GO TO 8.

NG >> Replace ASCD steering switch. Refer to [PS-6](#). "On-Vehicle Inspection and Service".

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

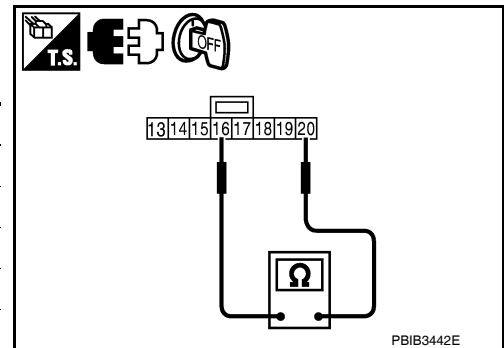
Component Inspection

INFOID:000000006580159

ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector M78.
2. Check continuity between combination switch (spiral cable) terminals 16 and 20 with pushing each switch.

Switch	Condition	Resistance (Ω)
MAIN switch	Pressed	Approx. 0
	Released	Approx. 4,000
CANCEL switch	Pressed	Approx. 250
	Released	Approx. 4,000
RESUME/ACCELERATE switch	Pressed	Approx. 1,480
	Released	Approx. 4,000
SET/COAST switch	Pressed	Approx. 660
	Released	Approx. 4,000



If NG, replace ASCD steering switch. Refer to [PS-6](#). "On-Vehicle Inspection and Service".

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

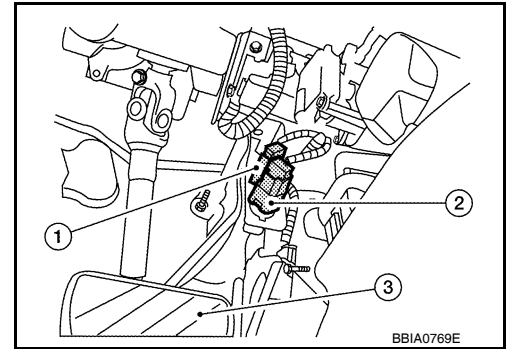
[MR20DE (FOR CALIFORNIA)]

DTC P1572 ASCD BRAKE SWITCH

Component Description

INFOID:000000006580160

When the brake pedal is depressed, ASCD brake switch (1) is turned OFF and stop lamp switch (2) is turned ON. ECM detects the state of the brake pedal (3) by this input of two kinds (ON/OFF signal). Refer to [EC-40](#) for the ASCD function.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580161

Specification data are reference values.

Monitor item	Condition	Specification	
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	• Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	ON
		• Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	OFF
BRAKE SW2 (Stop lamp switch)	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

INFOID:000000006580162

- This self-diagnosis has the one trip detection logic.
- The MIL will not light up for this self-diagnosis.

NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-419](#).
- 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
P1572 1572	ASCD brake switch	A) When the vehicle speed is above 30km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to ECM at the same time.	<ul style="list-style-type: none"> • Harness or connectors (Stop lamp switch circuit is shorted.) • Harness or connectors (ASCD brake switch circuit is shorted.) • Harness or connectors (ASCD clutch switch circuit is shorted.) (M/T)
		B) ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving	<ul style="list-style-type: none"> • Stop lamp switch • ASCD brake switch • ASCD clutch switch (M/T) • Incorrect stop lamp switch installation • Incorrect ASCD brake switch installation • Incorrect ASCD clutch switch installation (M/T) • ECM

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC Confirmation Procedure

INFOID:000000006580163

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

Steps 3 and 5 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.

1. Start engine.
2. Press MAIN switch and make sure that CRUISE indicator lights up.
3. Drive the vehicle for at least 5 consecutive seconds under the following condition.

Vehicle speed	More than 30 km/h (19 MPH)
Shift lever	Suitable position

4. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-457, "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to the following step.
5. Drive the vehicle for at least 5 consecutive seconds under the following condition.

Vehicle speed	More than 30 km/h (19 MPH)
Shift lever	Suitable position
Driving location	Depress the brake pedal for more than 5 seconds so as not to come off from the above-mentioned vehicle speed.

6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-457, "Diagnosis Procedure"](#).

DTC P1572 ASCD BRAKE SWITCH

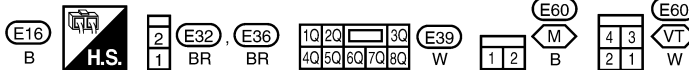
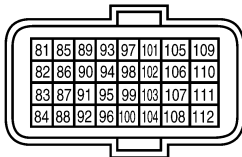
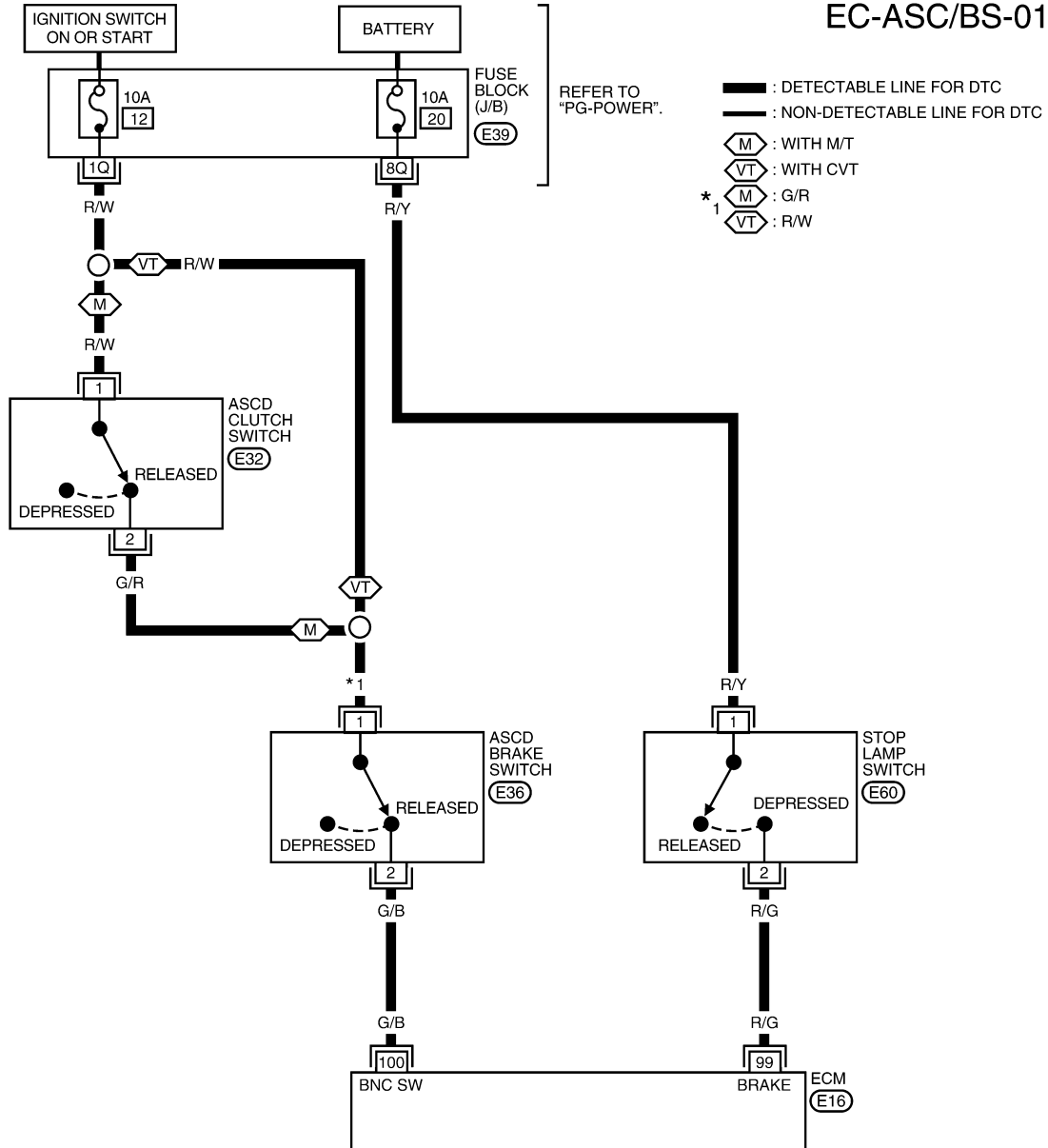
< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

INFOID:000000006580164

Wiring Diagram

EC-ASC/BS-01



AABWA0299GB

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

CAUTION:

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

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
99	R/G	Stop lamp switch	[Ignition switch: ON] • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)
100	G/B	ASCD brake switch	• Brake pedal: Slightly depressed (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14 V)
			• Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0 V

Diagnosis Procedure

INFOID:000000006580165

1. CHECK OVERALL FUNCTION-I

④ With CONSULT-III

- Turn ignition switch ON.
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-III.
- Check "BRAKE SW1" indication under the following conditions.

M/T models

Condition	Indication
Clutch pedal and/or brake pedal: Slightly depressed	OFF
Clutch pedal and brake pedal: Fully released	ON

CVT models

Condition	Indication
Brake pedal: Slightly depressed	OFF
Brake pedal: Fully released	ON

⊗ Without CONSULT-III

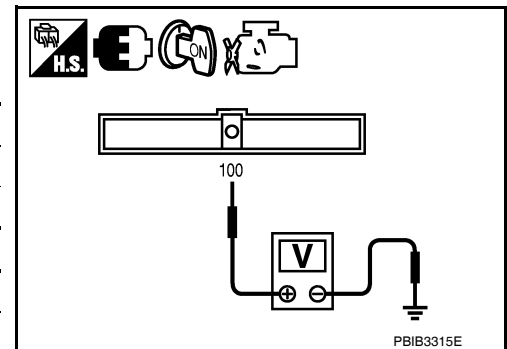
- Turn ignition switch ON.
- Check voltage between ECM terminal 100 and ground under the following conditions.

M/T models

Condition	Indication
Clutch pedal and/or brake pedal: Slightly depressed	Approximately 0 V
Clutch pedal and brake pedal: Fully released	Battery voltage

CVT models

Condition	Indication
Brake pedal: Slightly depressed	Approximately 0 V
Brake pedal: Fully released	Battery voltage



OK or NG

- OK >> GO TO 2.
- NG >> GO TO 3.

2. CHECK OVERALL FUNCTION-II

④ With CONSULT-III

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

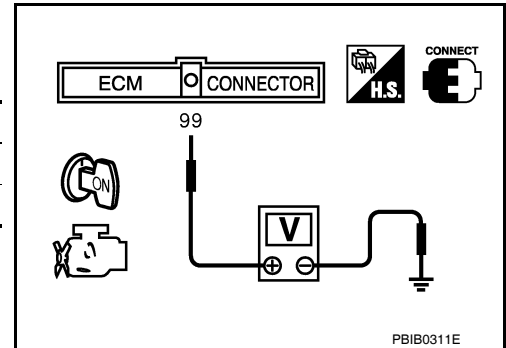
[MR20DE (FOR CALIFORNIA)]

Condition	Indication
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON

⊗ Without CONSULT-III

Check voltage between ECM terminal 99 and ground under the following conditions.

Condition	Indication
Brake pedal: Fully released	Approximately 0 V
Brake pedal: Slightly depressed	Battery voltage

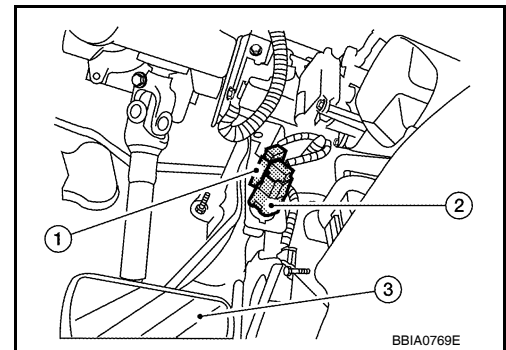


OK or NG

- OK >> GO TO 15.
- NG >> GO TO 11.

3. CHECK ASCD BRAKE SWITCH POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch (1) harness connector.
 - Stop lamp switch (2)
 - Brake pedal (3)
3. Turn ignition switch ON.

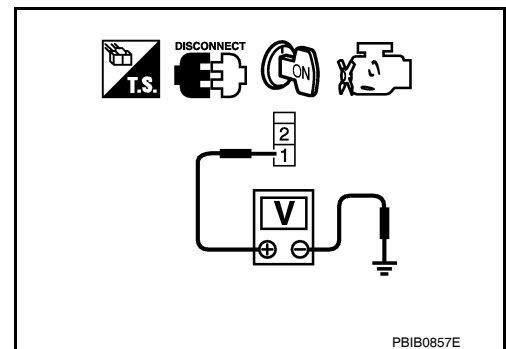


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 8.
- NG (M/T models)>>GO TO 4.
- NG (CVT models)>>GO TO 6.



4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

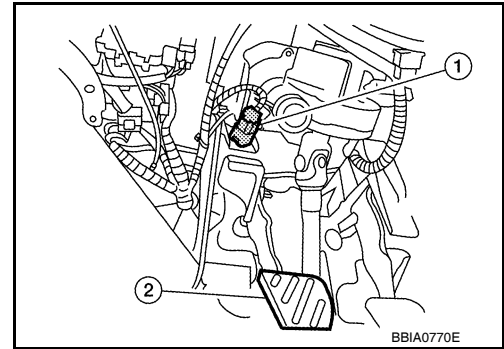
1. Turn ignition switch OFF.

DTC P1572 ASCD BRAKE SWITCH

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Disconnect ASCD clutch switch (1) harness connector.
 - Clutch pedal (2)
3. Turn ignition switch ON.

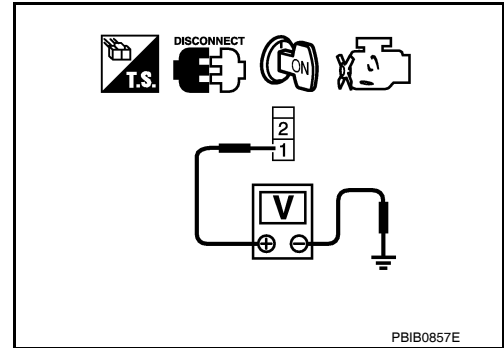


4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between ASCD clutch switch and fuse

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

6. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between ASCD brake switch and fuse

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

7. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 1 and ASCD clutch switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 10.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 100 and ASCD brake switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

A
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DTC P1572 ASCD BRAKE SWITCH

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 9.

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

9. CHECK ASCD BRAKE SWITCH

Refer to [EC-461, "Component Inspection"](#).

OK or NG

OK >> GO TO 15.

NG >> Replace ASCD brake switch. Refer to [BR-8, "Removal and Installation"](#).

10. CHECK ASCD CLUTCH SWITCH

Refer to [EC-461, "Component Inspection"](#)

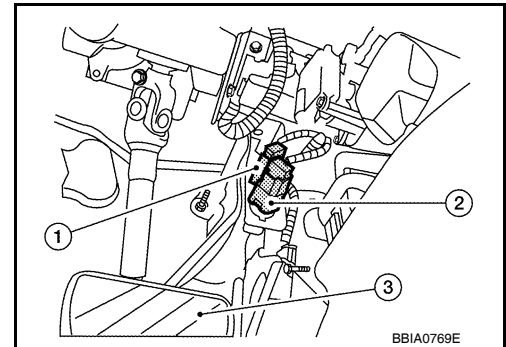
OK or NG

OK >> GO TO 15.

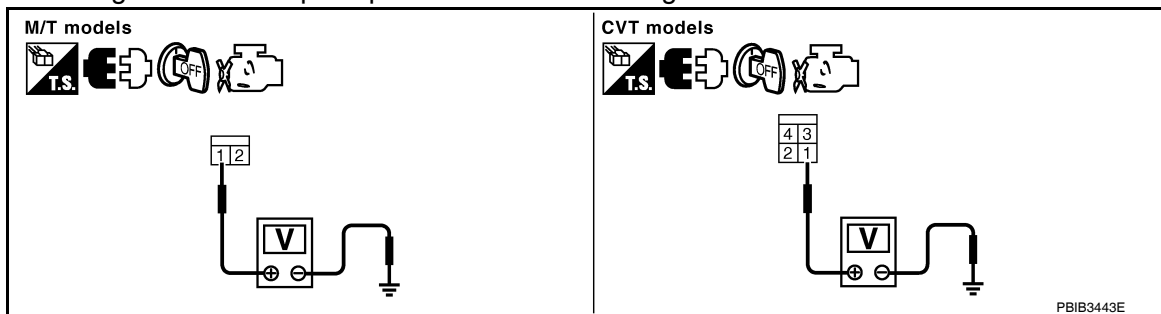
NG >> Replace ASCD clutch switch. Refer to [CL-7, "Removal and Installation"](#).

11. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch (2) harness connector.
 - ASCD brake switch (1)
 - Brake pedal (3)



3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -III or tester.



Voltage : Battery voltage

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between stop lamp switch and battery

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

13. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 99 and stop lamp switch terminal 2.
Refer to Wiring Diagram.

DTC P1572 ASCD BRAKE SWITCH

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Continuity should exist.

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

OK or NG

OK >> GO TO 14.

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

14. CHECK STOP LAMP SWITCH

Refer to [EC-461, "Component Inspection"](#)

OK or NG

OK >> GO TO 15.

NG >> Replace stop lamp switch.

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

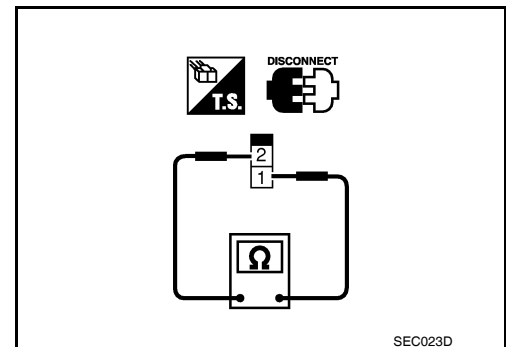
INFOID:000000006580166

ASCD BRAKE SWITCH

- Turn ignition switch OFF.
- Disconnect ASCD brake switch harness connector.
- Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Brake pedal: Fully released.	Should exist.
Brake pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-7](#), and perform step 3 again.

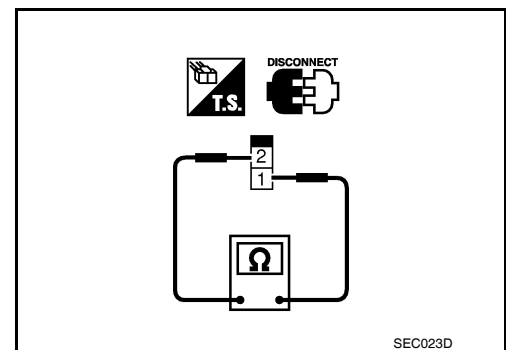


ASCD CLUTCH SWITCH

- Turn ignition switch OFF.
- Disconnect ASCD clutch switch harness connector.
- Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Clutch pedal: Fully released.	Should exist.
Clutch pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-6](#), and perform step 3 again.



STOP LAMP SWITCH

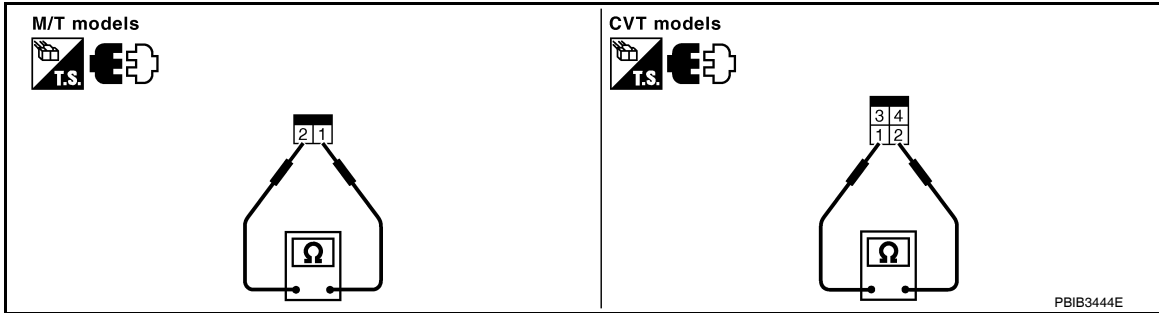
- Turn ignition switch OFF.
- Disconnect stop lamp switch harness connector.

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-7](#), and perform step 3 again.

DTC P1574 ASCD VEHICLE SPEED SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P1574 ASCD VEHICLE SPEED SENSOR

Component Description

INFOID:000000006580167

The ECM receives two vehicle speed signals via CAN communication line. One is sent from “ABS actuator and electric unit (control unit)” or combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to [EC-40](#) for ASCD functions.

On Board Diagnosis Logic

INFOID:000000006580168

- This self-diagnosis has the one trip detection logic.
- The MIL will not light up for this self-diagnosis.

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 [EC-408](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-419](#).
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-421](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1574 1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted.)• TCM (CVT models)• ABS actuator and electric unit (control unit)• Combination meter• ECM

DTC Confirmation Procedure

INFOID:000000006580169

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

Step 3 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 WITH CONSULT-III

1. Start engine.
2. Select “DATA MONITOR” mode with CONSULT-III.
3. Drive the vehicle at more than 40 km/h (25MPH).
4. Check DTC.
5. If DTC is detected, go to [EC-463, "Diagnosis Procedure"](#).

④ WITH GST

Follow the procedure “WITH CONSULT-III” above.

Diagnosis Procedure

INFOID:000000006580170

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to [CVT-29, "How to Perform Trouble Diagnosis for Quick and Accurate Repair"](#).

OK or NG

OK >> GO TO 2.

NG >> Perform trouble shooting relevant to DTC indicated. Refer to [CVT-5, "DTC No. Index"](#).

2.CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT”

DTC P1574 ASCD VEHICLE SPEED SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Refer to [BRC-45. "How to Perform Trouble Diagnosis for Quick and Accurate Repair"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3.CHECK COMBINATION METER

Check combination meter function.

Refer to [DI-6. "Component Parts and Harness Connector Location"](#).

>> **INSPECTION END**

DTC P1715 INPUT SPEED SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P1715 INPUT SPEED SENSOR

Description

INFOID:000000006580171

ECM receives input speed sensor signal from TCM through CAN communication line. ECM uses this signal for engine control.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580172

Specification data are reference values.

Monitor item	Condition	Specification
I/P PULLY SPD	• Vehicle speed: More than 20 km/h (12MPH)	Almost the same speed as the tachometer indication

On Board Diagnosis Logic

INFOID:000000006580173

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 [EC-314](#).
- If DTC P1715 is displayed with DTC P0340 first perform the trouble diagnosis for DTC P0340. Refer to [EC-321](#).
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-419](#).
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-421](#).

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1715 1715	Input speed sensor (TCM output)	Input speed sensor signal is different from the theoretical value calculated by ECM from output speed sensor signal and engine rpm signal.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Input speed sensor circuit is open or shorted)• TCM

DTC Confirmation Procedure

INFOID:000000006580174

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

Ⓟ WITH CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Start engine.
4. Drive vehicle at a speed of more than 50 km/h (31 MPH) for at least 5 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-465, "Diagnosis Procedure"](#).

Ⓟ WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

INFOID:000000006580175

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [CVT-29, "How to Perform Trouble Diagnosis for Quick and Accurate Repair"](#).

OK or NG

DTC P1715 INPUT SPEED SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK >> GO TO 2.

NG >> Perform trouble shooting relevant to DTC indicated. Refer to [CVT-5, "DTC No. Index"](#).

2.REPLACE TCM

Replace TCM. Refer to [CVT-162, "Removal and Installation"](#).

>> **INSPECTION END**

DTC P1805 BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P1805 BRAKE SWITCH

Description

INFOID:000000006580176

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580177

Specification data are reference values.

Monitor item	Condition	Specification	
BRAKE SW	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

INFOID:000000006580178

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	<ul style="list-style-type: none">• Harness or connectors (Stop lamp switch circuit is open or shorted.)• Stop lamp switch

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters in fail-safe mode.

Engine operation condition in fail-safe mode	
ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.	
Vehicle condition	Driving condition
Engine: Idling	Normal
Accelerating	Poor acceleration

DTC Confirmation Procedure

INFOID:000000006580179

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-III.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-469. "Diagnosis Procedure"](#).

DTC P1805 BRAKE SWITCH





[MR20DE (FOR CALIFORNIA)]

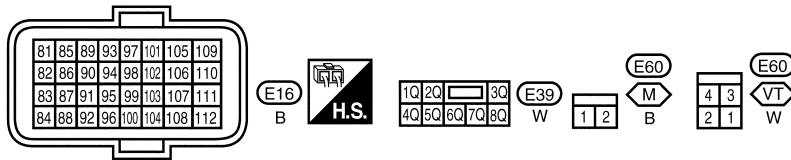
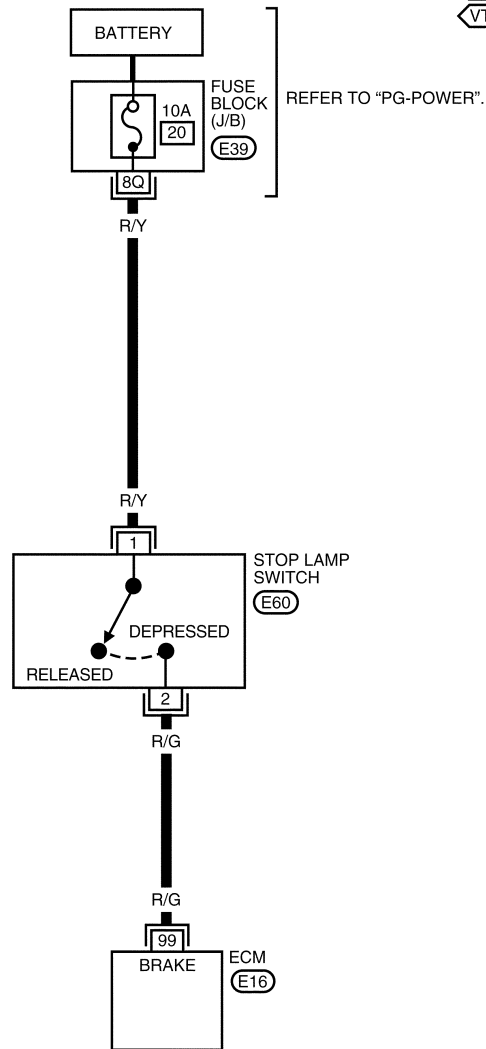
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006580180

EC-BRK/SW-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH M/T
-  : WITH CVT



BBWA2896E

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

CAUTION:

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

DTC P1805 BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
99	R/G	Stop lamp switch	[Ignition switch: OFF] • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580181

1. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

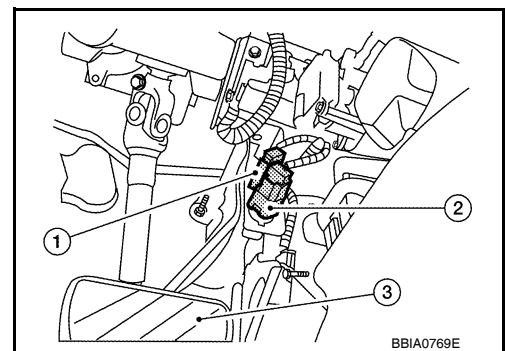
Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

OK or NG

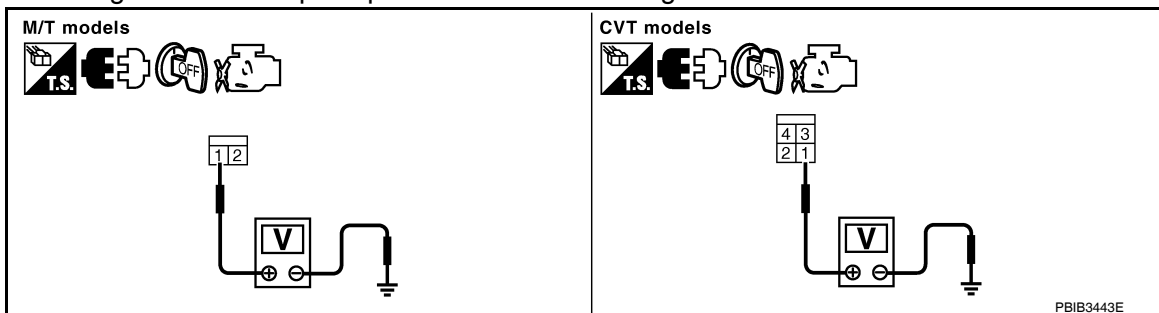
- OK >> GO TO 4.
- NG >> GO TO 2.

2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch (2) harness connector.
 - ASCD brake switch (1)
 - Brake pedal (3)



2. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-III or tester.



Voltage : Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open and short between stop lamp switch and battery

DTC P1805 BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect stop lamp switch harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between stop lamp switch terminal 2 and ECM terminal 99.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 5.

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

5. CHECK STOP LAMP SWITCH

Refer to [EC-470, "Component Inspection"](#).

OK or NG

OK >> GO TO 6.

NG >> Replace stop lamp switch. Refer to [BR-8, "Removal and Installation"](#).

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

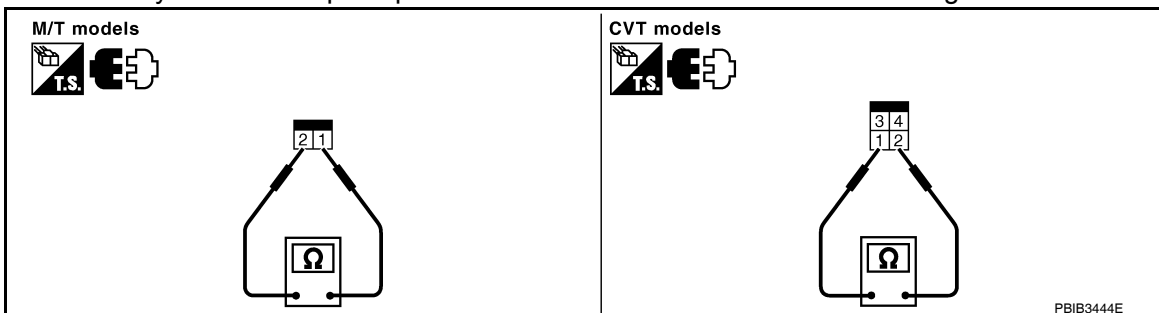
>> **INSPECTION END**

Component Inspection

INFOID:000000006580182

STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-7](#), and perform step 3 again.

DTC P2004 TUMBLE CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P2004 TUMBLE CONTROL VALVE

Description

INFOID:000000006580183

SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*	Tumble control valve control	Tumble control valve motor
Camshaft position sensor (PHASE)			
Battery	Battery voltage*		
Engine coolant temperature sensor	Engine coolant temperature		
Accelerator pedal position sensor	Accelerator pedal position		
Tumble control valve position sensor	Tumble control valve position		

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

Tumble control valve has a valve portion in the intake passage of each cylinder.

While idling and during low engine coolant temperature, the tumble control valve closes. Thus the velocity of the air in the intake passage increases, promoting the vaporization of the fuel and producing a tumble in the combustion chamber.

Because of this operation, this system tends to increase the burning speed of the gas mixture, improve fuel consumption, and increase the stability in running conditions.

Also, except when idling and during low engine coolant temperature, this system opens the tumble control valve.

In this condition, this system tends to increase power by improving intake efficiency via reduction of intake flow resistance.

The tumble control valve is operated by the ECM.

COMPONENT DESCRIPTION

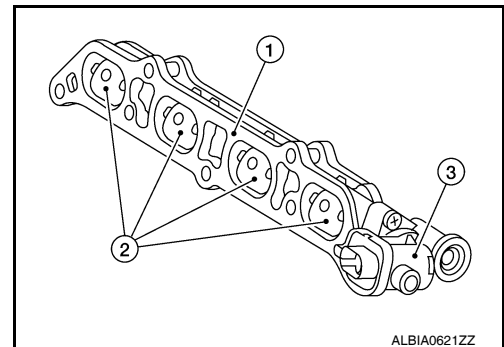
Tumble control valve (2) is installed in the intake manifold adapter (1).

Tumble control valve actuator (3) is connected to the front end of the valve shaft.

Tumble control valve actuator consists of motor and position sensor, etc.

The motor opens or closes the valve by the output signal of the ECM.

The sensor consists of a permanent magnet and Hall IC. It senses the valve shaft movement and feeds the voltage signals to the ECM.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580184

Specification data are reference values.

Monitor item	Condition		Specification
SWRL CONT S/V	<ul style="list-style-type: none"> Engine coolant temperature: Between 5°C (41°F) and 45°C (113°F) Engine speed: Less than 3,200 rpm 	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

DTC P2004 TUMBLE CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

On Board Diagnosis Logic

INFOID:000000006580185

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2004	Tumble control valve stuck	The target angle of tumble control valve controlled by ECM and the input signal from tumble control valve position sensor is not in the normal range.	<ul style="list-style-type: none">• Harness or connectors (Tumble control valve motor circuit is open or shorted.) (Tumble control valve position sensor circuit is open or shorted.) (Accelerator pedal position sensor 2 circuit is shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (EVAP control system pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.)• Tumble control valve actuator (Tumble control valve motor) (Tumble control valve position sensor)• Accelerator pedal position sensor• Crankshaft position sensor (POS)• EVAP control system pressure sensor• Refrigerant pressure sensor

DTC Confirmation Procedure

INFOID:000000006580186

NOTE:

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

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.
- Always perform the test at a temperature above 0°C (32°F)

④ WITH CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Make sure that "COOLAN TEMP/S" indicates between 5°C (41°F) to 45°C (113°F).
If not, cool engine down or warm engine up until "COOLAN TEMP/S" indicates between 5°C (41°F) to 45°C (113°F). Then go to the following steps.
4. Fully release accelerator pedal and wait at least 5 seconds.
5. Depress accelerator pedal and wait at least 5 seconds.
6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-474. "Diagnosis Procedure"](#).

④ WITH GST

Following the procedure "WITH CONSULT-III" above.

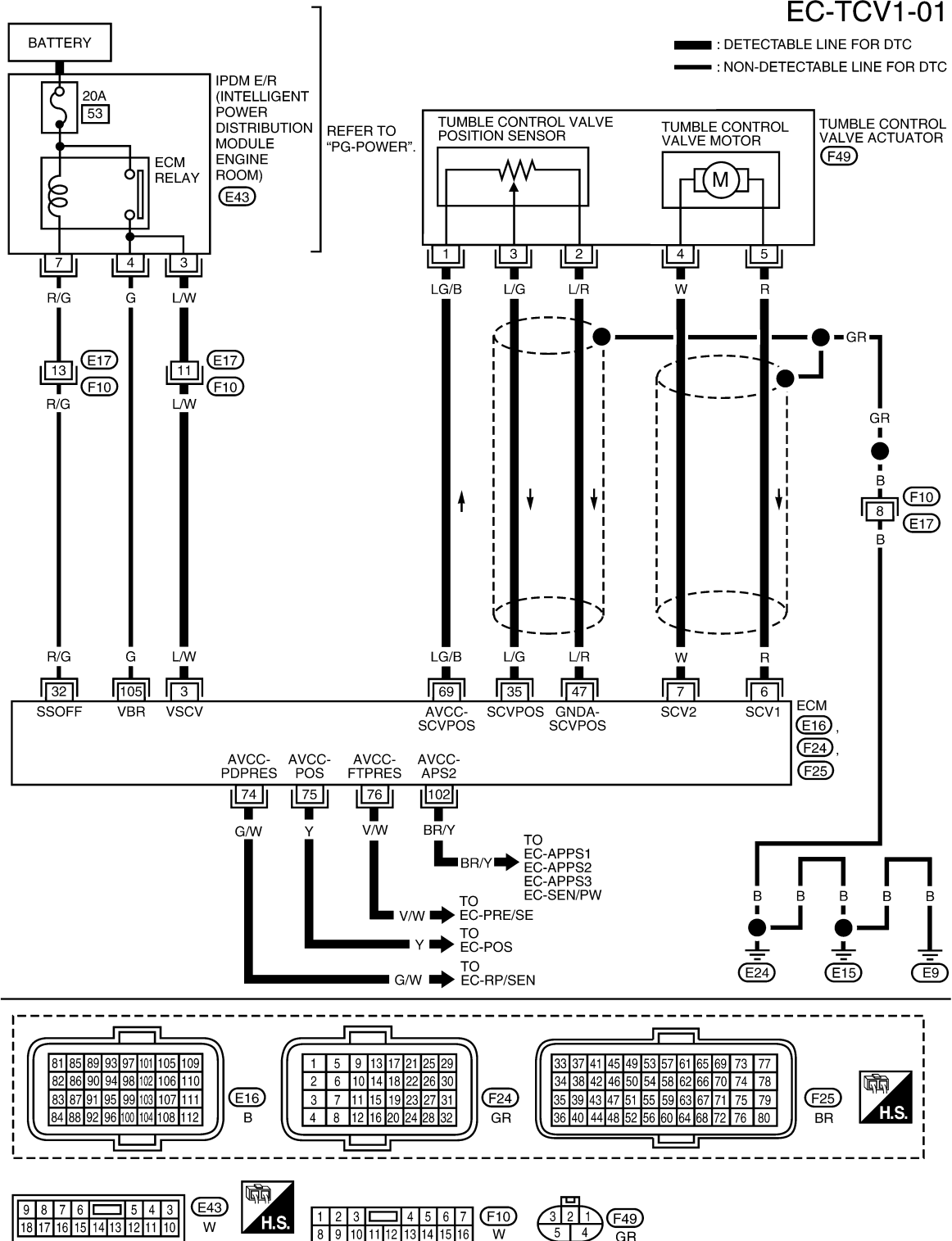
DTC P2004 TUMBLE CONTROL VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

INFOID:000000006580187

Wiring Diagram



Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

DTC P2004 TUMBLE CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	L/W	Tumble control vale motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
6	R	Tumble control valve motor (Open)	[Ignition switch: ON → OFF] • For a few seconds after turning ignition switch ON	0 V ↓ BATTERY VOLTAGE (11 - 14 V) ↓ 0 V
7	W	Tumble control valve motor (Close)	[Ignition switch: OFF → ON] • For a few seconds after turning ignition switch ON	0 V ↓ BATTERY VOLTAGE (11 - 14 V) ↓ 0 V
35	L/G	Tumble control valve position sensor	[Engine is running] • Engine coolant temperature: Between 5°C (41°F) and 45°C (113°F) • Engine speed: Less than 3,200 rpm • Accelerator pedal: Fully released	Less than 1.2 V
			[Engine is running] • Engine coolant temperature: Between 5°C (41°F) and 45°C (113°F) • Accelerator pedal: Slightly depressed	More than 2.9 V
47	L/R	Sensor ground (Tumble control valve position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
69	LG/B	Sensor power supply (Tumble control valve position sensor)	[Ignition switch: ON]	Approximately 5 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	[Ignition switch: ON]	Approximately 5 V

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

Diagnosis Procedure

INFOID:000000006580188

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P2004 TUMBLE CONTROL VALVE

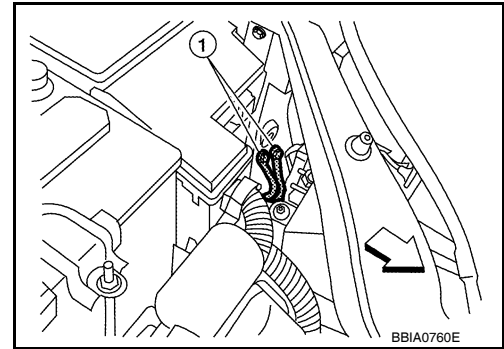
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ⇐: Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



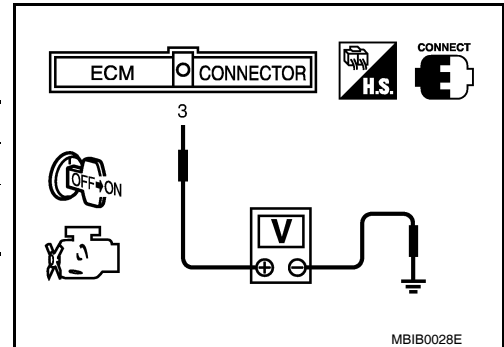
2.CHECK TUMBLE CONTROL VALVE MOTOR POWER SUPPLY CIRCUIT-I

Check the voltage between ECM terminal 3 and ground under the following conditions with CONSULT-III or tester.

Ignition switch	Voltage
OFF	Approximately 0 V
ON	Battery voltage (11 - 14 V)

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 3.



3.CHECK TUMBLE CONTROL VALVE MOTOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector.
4. Check harness continuity between ECM terminal 3 and IPDM E/R terminal 3. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> Refer to [EC-155, "Diagnosis Procedure"](#).
- NG >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between ECM and IPDM E/R

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

5.CHECK TUMBLE CONTROL VALVE MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect tumble control valve actuator harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

Tumble control valve actuator terminal	ECM terminal	Continuity
4	6	Should not exist
	7	Should exist
5	6	Should exist
	7	Should not exist

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

DTC P2004 TUMBLE CONTROL VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

- OK >> GO TO 6.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

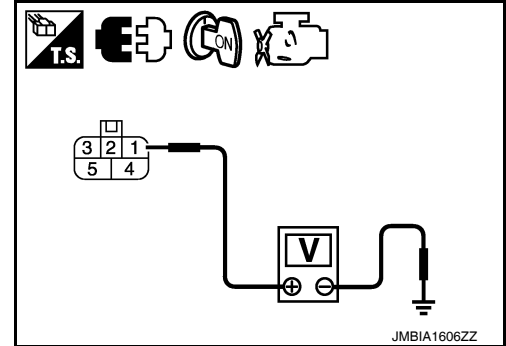
6. CHECK TUMBLE CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Reconnect ECM harness connector disconnected.
2. Turn ignition switch ON.
3. Check voltage between tumble control valve actuator terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- YES >> GO TO 14.
- NO >> GO TO 7.



7. CHECK TUMBLE CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between tumble control valve actuator terminal 1 and ECM terminal 69. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 8.
- NG >> Repair open circuit.

8. CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
69	Tumble control valve actuator terminal 1	EC-473. "Wiring Diagram"
74	Refrigerant pressure sensor terminal 3	EC-564. "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-316. "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-374. "Wiring Diagram"
102	APP sensor terminal 5	EC-507. "Wiring Diagram"

OK or NG

- OK >> GO TO 9.
- NG >> Repair short to ground or short to power in harness or connectors.

9. CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28](#).

OK or NG

- OK >> GO TO 10.
- NG >> Replace refrigerant pressure sensor. Refer to [MTC-92](#).

10. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-320. "Component Inspection"](#).

OK or NG

- OK >> GO TO 11.
- NG >> Replace crankshaft position sensor (POS). Refer to [EM-80](#).

11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

DTC P2004 TUMBLE CONTROL VALVE

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Refer to [EC-378, "Component Inspection"](#).

OK or NG

OK >> GO TO 12.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

12. CHECK APP SENSOR

Refer to [EC-510, "Component Inspection"](#).

OK or NG

OK >> GO TO 17.

NG >> GO TO 13.

13. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> **INSPECTION END**

14. CHECK TUMBLE CONTROL VALVE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between tumble control valve actuator terminal 2 and ECM terminal 47.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 15.

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

15. CHECK TUMBLE CONTROL VALVE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between tumble control valve actuator terminal 3 and ECM terminal 35.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 16.

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

16. CHECK TUMBLE CONTROL VALVE

Refer to [EC-477, "Component Inspection"](#).

OK or NG

OK >> GO TO 17.

NG >> Replace intake manifold adapter. Refer to [EM-18](#).

17. CHECK INTERMITTENT INCIDENT

Refer to [EC-153, "Description"](#).

OK or NG

OK >> Replace intake manifold adapter. Refer to [EM-18](#).

NG >> Repair or replace harness or connectors.

Component Inspection

INFOID:0000000006580189

TUMBLE CONTROL VALVE

Ⓢ WITH CONSULT-III

DTC P2004 TUMBLE CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

1. Turn ignition switch OFF.
2. Remove intake manifold adapter.
3. Visually check the valve for damage and check if foreign matter is caught between the valve and the housing.
4. Connect tumble control valve actuator harness connector.
5. Turn ignition switch ON.
6. Perform "TUMBLE CONTROL VALVE" in "ACTIVE TEST" mode with CONSULT-III.
7. Touch "ON/OFF" and check that the valve opens and closes.

⊗ WITHOUT CONSULT-III

1. Turn ignition switch OFF.
2. Remove intake manifold adapter.
3. Visually check the valve for damage and check if foreign matter is caught between the valve and the housing.
4. Supply tumble control valve actuator terminals with battery voltage within 2 seconds and check operation.

Tumble control valve	Terminal	
	(+)	(-)
Close	4	5
Open	5	4

CAUTION:

Do not apply 12 V DC continuously for 30 seconds or more. Doing so may result in damage to the coil in tumble control valve motor.

DTC P2014 TUMBLE CONTROL VALVE POSITION SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P2014 TUMBLE CONTROL VALVE POSITION SENSOR

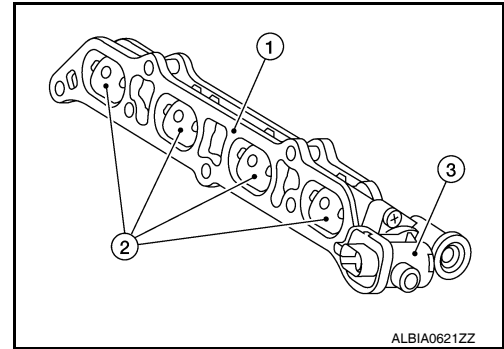
Component Description

INFOID:000000006580191

Tumble control valve position sensor is built into the tumble control valve actuator (3).

- 1 : Intake manifold adapter
- 2 : Tumble control valve

The sensor consists of a permanent magnet and Hall IC. It senses the valve shaft movement and feeds the voltage signals to the ECM.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580192

Specification data are reference values.

Monitor item	Condition		Specification
TUMBLE POS SEN	<ul style="list-style-type: none"> • Engine coolant temperature: Between 5°C (41°F) and 45°C (113°F) • Engine speed: Less than 3,200 rpm 	Accelerator pedal: Fully released	Less than 1.2 V
		Accelerator pedal: Slightly depressed	More than 2.9 V

On Board Diagnosis Logic

INFOID:000000006580193

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2014	Tumble control valve position sensor circuit	An excessively low or high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Tumble control valve position sensor circuit is open or shorted.) (Accelerator pedal position sensor 2 circuit is shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (EVAP control system pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • Tumble control valve actuator (Tumble control valve position sensor) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • EVAP control system pressure sensor • Refrigerant pressure sensor

DTC Confirmation Procedure

INFOID:000000006580194

NOTE:

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

TESTING CONDITION:

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

1. Start engine and let it idle for 5 second.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-481. "Diagnosis Procedure"](#).

DTC P2014 TUMBLE CONTROL VALVE POSITION SENSOR

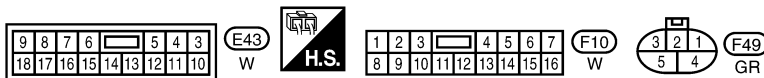
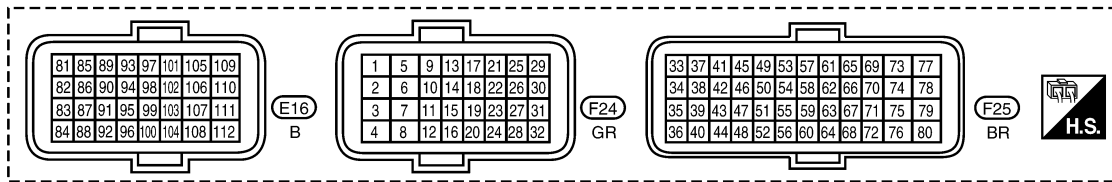
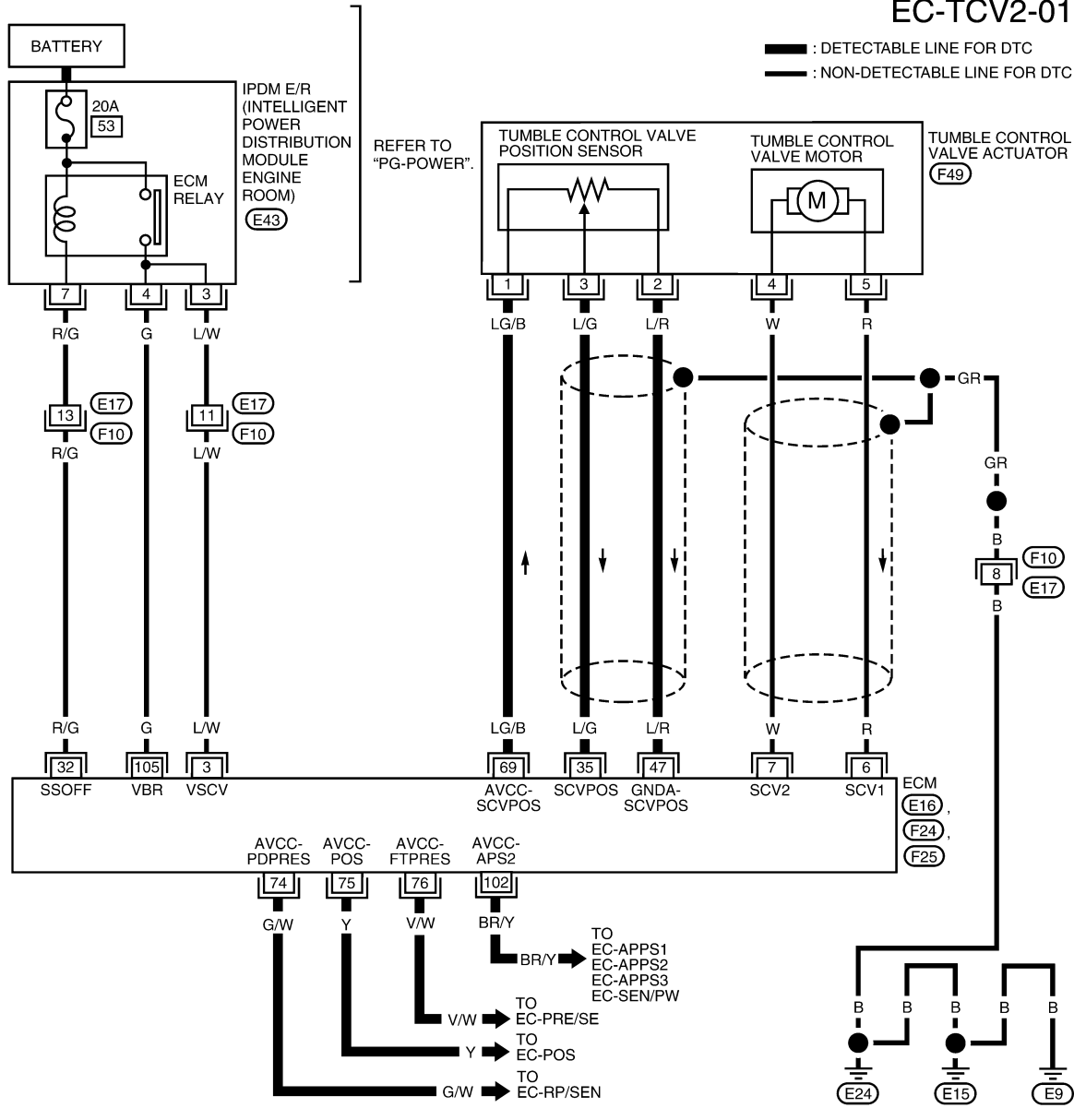
< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

INFOID:000000006580195

Wiring Diagram

EC-TCV2-01



ABBWA0659GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

DTC P2014 TUMBLE CONTROL VALVE POSITION SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	L/W	Tumble control vale motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
6	R	Tumble control valve motor (Open)	[Ignition switch: ON → OFF] • For a few seconds after turning ignition switch ON	0 V ↓ BATTERY VOLTAGE (11 - 14 V) ↓ 0 V
7	W	Tumble control valve motor (Close)	[Ignition switch: OFF → ON] • For a few seconds after turning ignition switch ON	0 V ↓ BATTERY VOLTAGE (11 - 14 V) ↓ 0 V
35	L/G	Tumble control valve position sensor	[Engine is running] • Engine coolant temperature: Between 5°C (41°F) and 45°C (113°F) • Engine speed: Less than 3,200 rpm • Accelerator pedal: Fully released	Less than 1.2 V
			[Engine is running] • Engine coolant temperature: Between 5°C (41°F) and 45°C (113°F) • Accelerator pedal: Slightly depressed	More than 2.9 V
47	L/R	Sensor ground (Tumble control valve position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
69	LG/B	Sensor power supply (Tumble control valve position sensor)	[Ignition switch: ON]	Approximately 5 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	[Ignition switch: ON]	Approximately 5 V

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

Diagnosis Procedure

INFOID:000000006580196

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P2014 TUMBLE CONTROL VALVE POSITION SENSOR

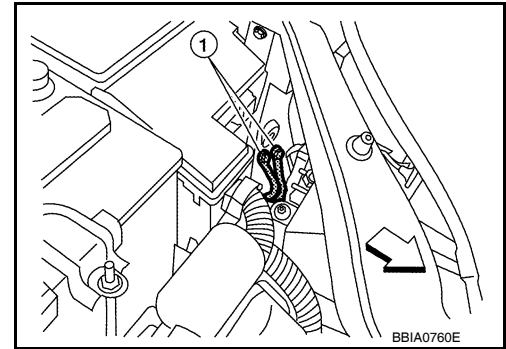
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔: Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.



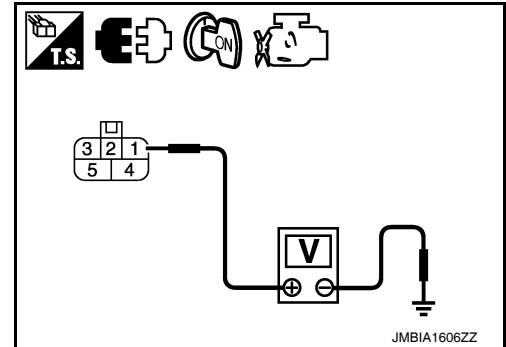
2. CHECK TUMBLE CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT-I

- Reconnect ECM harness connector disconnected.
- Turn ignition switch ON.
- Check voltage between tumble control valve actuator terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- YES >> GO TO 10.
NO >> GO TO 3.



3. CHECK TUMBLE CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT-II

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check harness continuity between tumble control valve actuator terminal 1 and ECM terminal 69.
Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit.

4. CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
69	Tumble control valve actuator terminal 1	EC-480, "Wiring Diagram"
74	Refrigerant pressure sensor terminal 3	EC-564, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-316, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-374, "Wiring Diagram"
102	APP sensor terminal 5	EC-507, "Wiring Diagram"

OK or NG

- OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-320, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
NG >> Replace crankshaft position sensor (POS). Refer to [EM-80](#).

DTC P2014 TUMBLE CONTROL VALVE POSITION SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

6. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-378](#), "Component Inspection".

OK or NG

OK >> GO TO 7.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

7. CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28](#).

OK or NG

OK >> GO TO 8.

NG >> Replace refrigerant pressure sensor. Refer to [MTC-92](#).

8. CHECK APP SENSOR

Refer to [EC-510](#), "Component Inspection".

OK or NG

OK >> GO TO 12.

NG >> GO TO 9.

9. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4](#), "Removal and Installation".

>> **INSPECTION END**

10. CHECK TUMBLE CONTROL VALVE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between tumble control valve actuator terminal 2 and ECM terminal 47.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 11.

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

11. CHECK TUMBLE CONTROL VALVE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between tumble control valve actuator terminal 3 and ECM terminal 35.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 12.

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

12. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#), "Description".

OK or NG

OK >> Replace intake manifold adapter. Refer to [EM-18](#).

NG >> Repair or replace harness or connectors.

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

Component Description

INFOID:000000006580198

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580199

Specification data are reference values.

Monitor item	Condition	Specification
THRTL RELAY	• Ignition switch: ON	ON

On Board Diagnosis Logic

INFOID:000000006580200

These self-diagnoses have one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2100 2100	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is open)• Throttle control motor relay
P2103 2103	Throttle control motor relay circuit short	ECM detects the throttle control motor relay is stuck ON.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is shorted)• Throttle control motor relay

FAIL-SAFE MODE

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

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006580201

NOTE:

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

PROCEDURE FOR DTC P2100

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.
4. If DTC is detected, go to [EC-486, "Diagnosis Procedure"](#).

PROCEDURE FOR DTC P2103

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-486, "Diagnosis Procedure"](#).

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

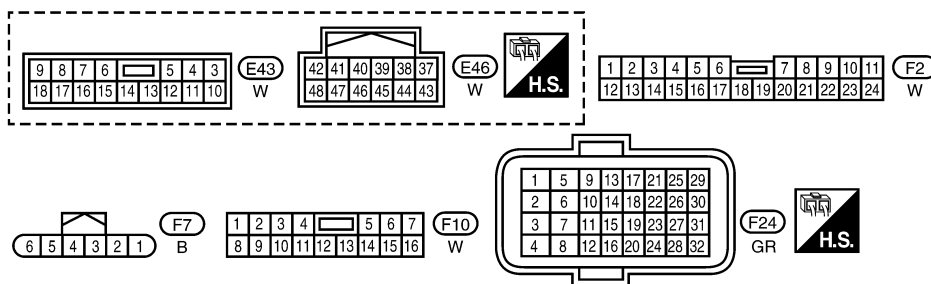
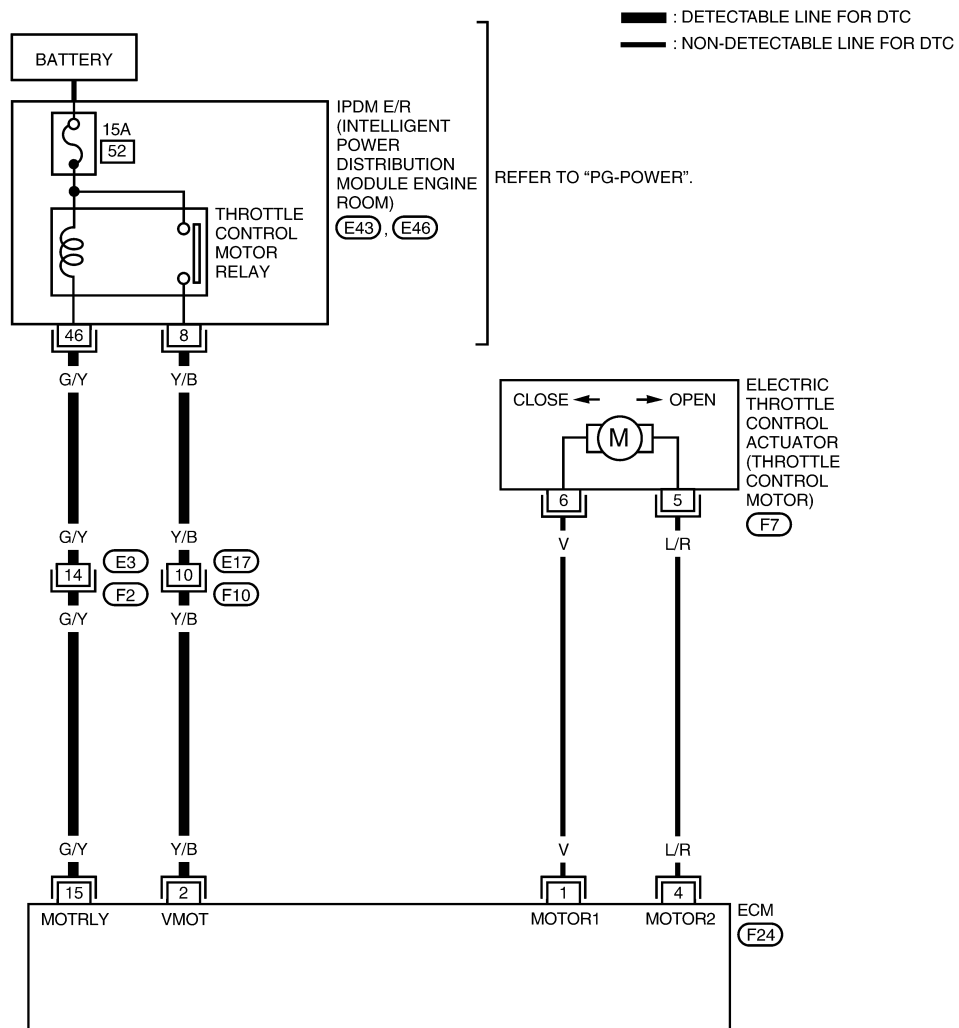
< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580202

EC-ETC2-01



AABWA0289GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

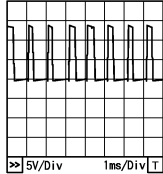
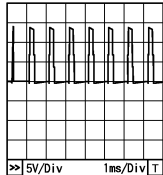
CAUTION:

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	V	Throttle control motor (Open)	[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed 	Approximately 3.2 V★  PBIAB150J
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
4	L/R	Throttle control motor (Close)	[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released 	Approximately 1.8 V★  PBIAB149J
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

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

Diagnosis Procedure

INFOID:000000006580203

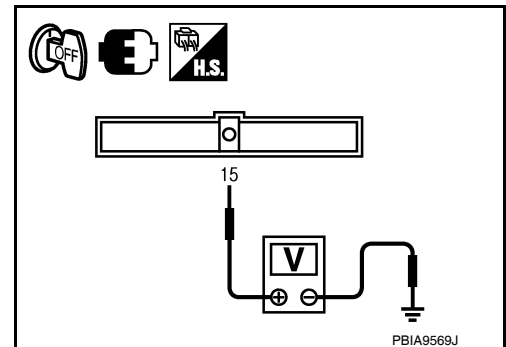
1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal 15 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 2.



2. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E46.
3. Check continuity between ECM terminal 15 and IPDM E/R terminal 46. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
 NG >> GO TO 3.

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between ECM and IPDM E/R

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

4. CHECK FUSE

1. Disconnect 15 A fuse.
2. Check 15 A fuse for blown.

OK or NG

- OK >> GO TO 8.
- NG >> Replace 15 A fuse.

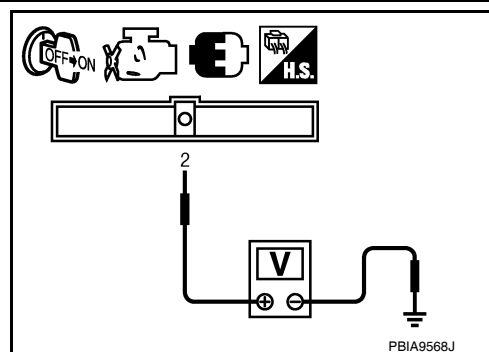
5. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

Check voltage between ECM terminal 2 and ground under the following conditions with CONSULT-III or tester.

Ignition switch	Voltage
OFF	Approximately 0 V
ON	Battery voltage (11 - 14 V)

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 6.



6. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E43.
4. Check continuity between ECM terminal 2 and IPDM E/R terminal 8.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between ECM and IPDM E/R

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

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-28, "Removal and Installation of IPDM E/R"](#).
- NG >> Repair or replace harness or connectors.

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:000000006580204

NOTE:

If DTC P2101 is displayed with DTC P2100 or P2119, first perform the trouble diagnosis for DTC P2100 or P2119. Refer to [EC-484](#) or [EC-498](#).

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.

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.

On Board Diagnosis Logic

INFOID:000000006580205

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2101 2101	Electric throttle control performance	Electric throttle control function does not operate properly.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor circuit is open or shorted)• Electric throttle control actuator

FAIL-SAFE MODE

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

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006580206

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V when engine is running.

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.
4. If DTC is detected, go to [EC-490, "Diagnosis Procedure"](#).

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580207

EC-ETC1-01

A

EC

C

D

E

F

G

H

I

J

K

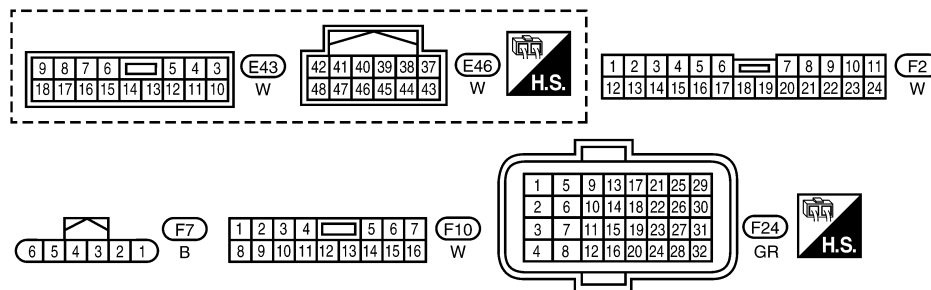
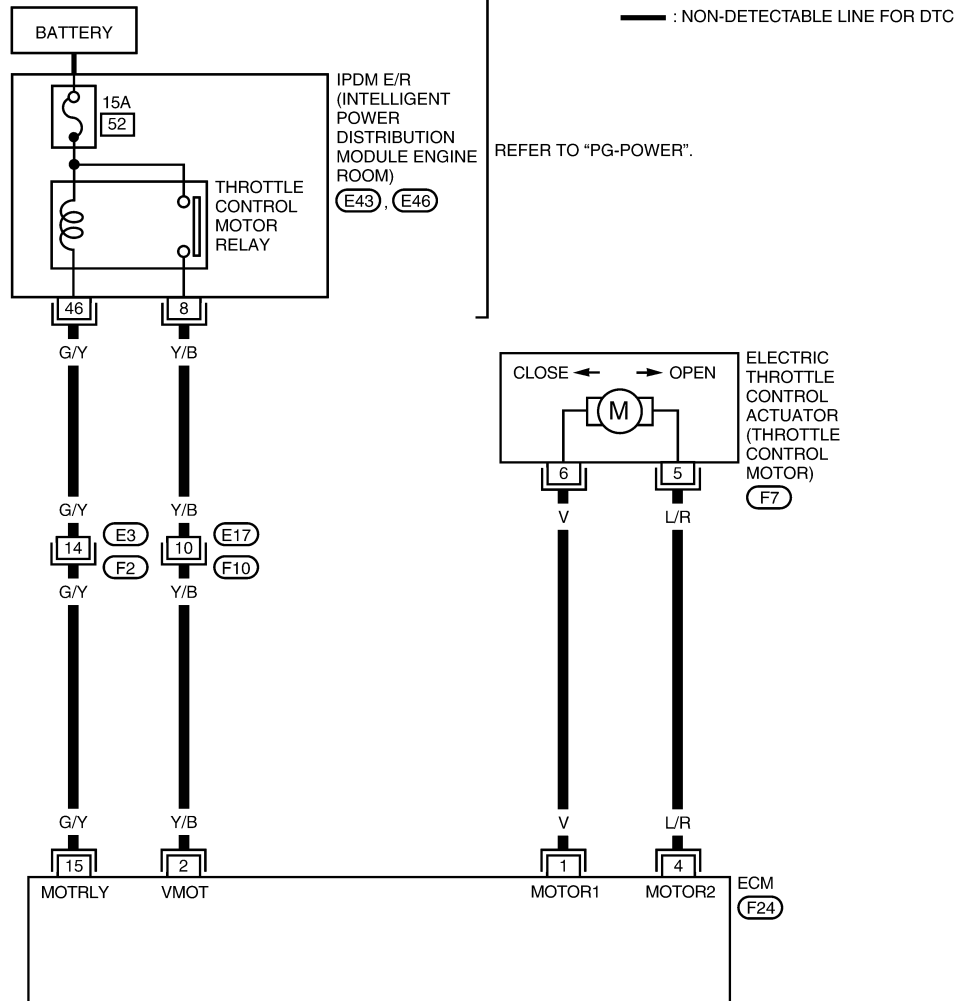
L

M

N

O

P



AABWA0288GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

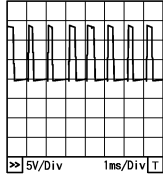
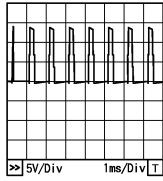
CAUTION:

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	V	Throttle control motor (Open)	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Approximately 3.2 V★  PBIAB150J
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
4	L/R	Throttle control motor (Close)	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Approximately 1.8 V★  PBIAB149J
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

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

Diagnosis Procedure

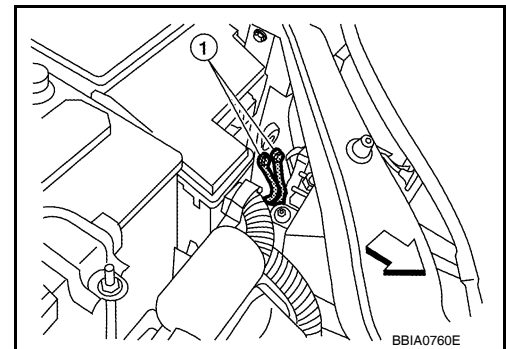
INFOID:000000006580208

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



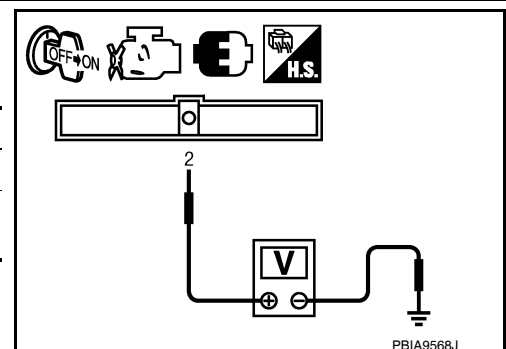
2. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

Check voltage between ECM terminal 2 and ground under the following conditions with CONSULT-III or tester.

Ignition switch	Voltage
OFF	Approximately 0 V
ON	Battery voltage (11 - 14 V)

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 3.



DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E43.
4. Check continuity between ECM terminal 2 and IPDM E/R terminal 8.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between ECM and IPDM E/R

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

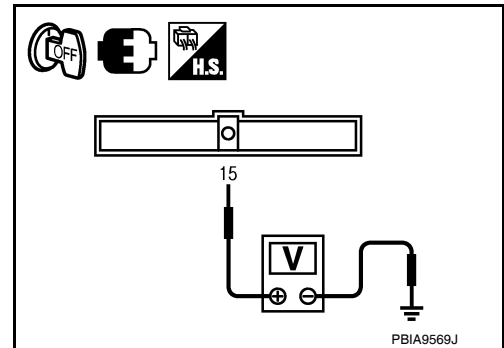
5. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Reconnect all harness connectors disconnected.
2. Check voltage between ECM terminal 15 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 6.



6. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E46.
3. Check harness continuity between ECM terminal 15 and IPDM E/R terminal 46.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between ECM and IPDM E/R

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

8. CHECK FUSE

1. Disconnect 15 A fuse.
2. Check 15 A fuse for blown.

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

- OK >> GO TO 9.
- NG >> Replace 15A fuse.

9. CHECK INTERMITTENT INCIDENT

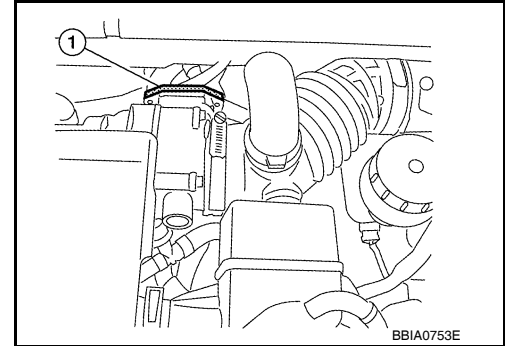
Refer to [EC-153](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-28, "Removal and Installation of IPDM E/R"](#).
- NG >> Repair or replace harness or connectors.

10. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator (1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.



Electric throttle control actuator terminal	ECM terminal	Continuity
5	1	Should not exist.
	4	Should exist.
6	1	Should exist.
	4	Should not exist.

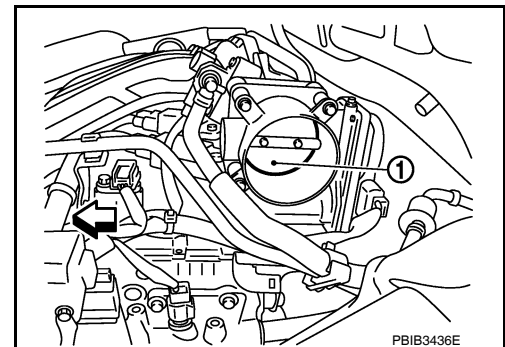
5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 11.
- NG >> Repair or replace.

11. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - ↶ : Vehicle front
 - Illustration shows the view with intake air duct removed.



OK or NG

- OK >> GO TO 12.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EM-18, "Component"](#).

12. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-493, "Component Inspection"](#).

OK or NG

- OK >> GO TO 13.
- NG >> GO TO 14.

13. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

OK or NG

- OK >> GO TO 14.
- NG >> Repair or replace harness or connectors.

14. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Replace the electric throttle control actuator. Refer to [EM-18. "Component"](#).

>> INSPECTION END

Component Inspection

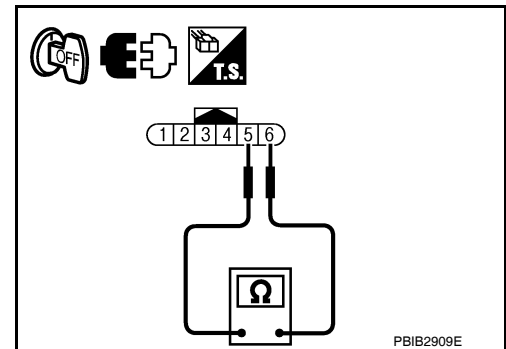
INFOID:000000006580209

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 5 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]

3. If NG, replace electric throttle control actuator and go to next step. Refer to [EM-18. "Component"](#).



DTC P2118 THROTTLE CONTROL MOTOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P2118 THROTTLE CONTROL MOTOR

Component Description

INFOID:000000006580211

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.

On Board Diagnosis Logic

INFOID:000000006580212

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2118 2118	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor circuit is shorted.)• Electric throttle control actuator (Throttle control motor)

FAIL-SAFE MODE

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

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006580213

NOTE:

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

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.
4. If DTC is detected, go to [EC-496, "Diagnosis Procedure"](#).

DTC P2118 THROTTLE CONTROL MOTOR

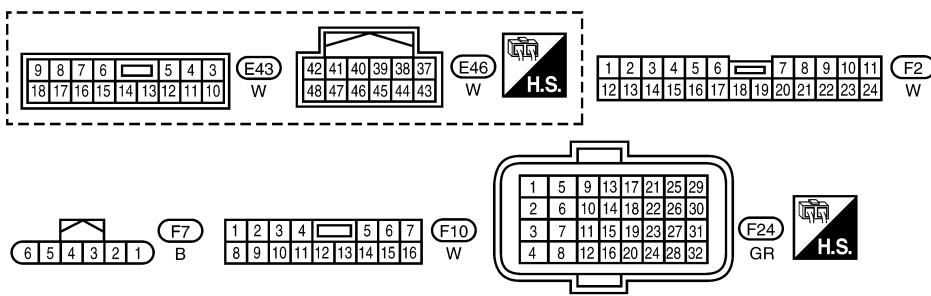
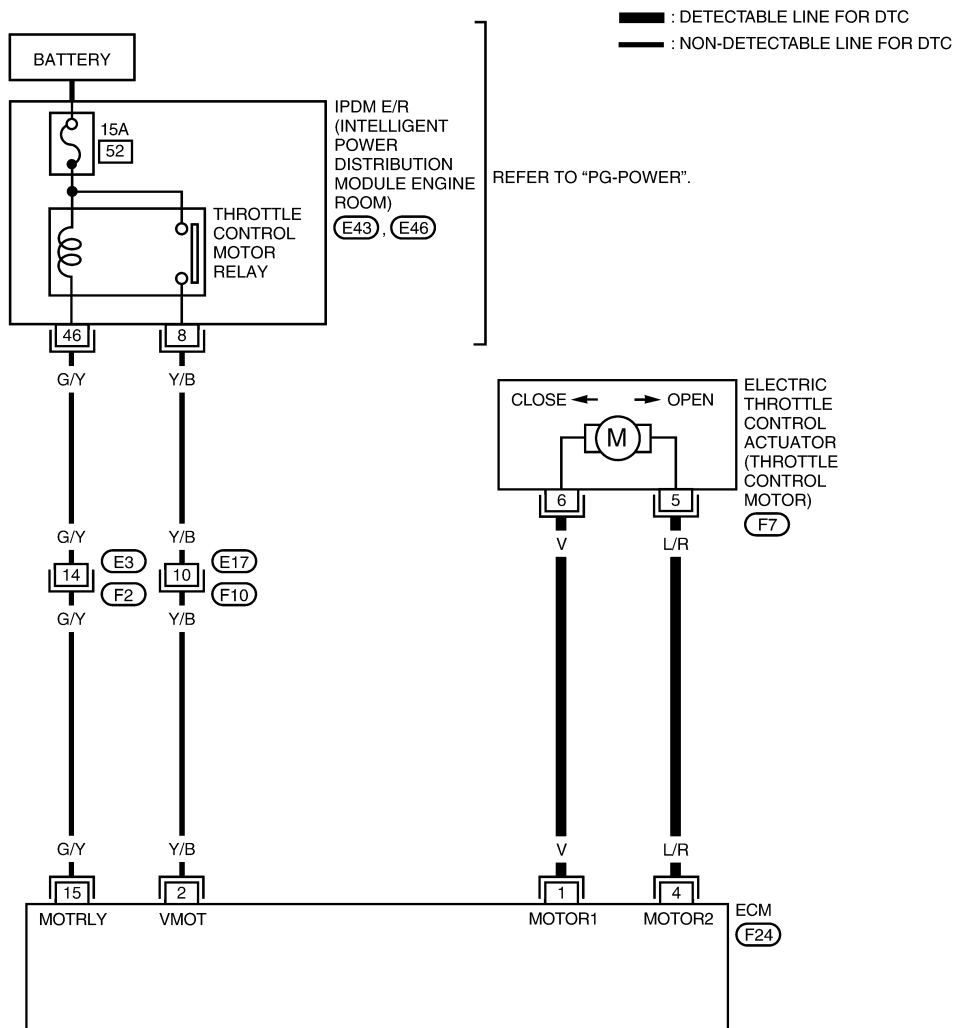
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

INFOID:000000006580214

Wiring Diagram

EC-ETC3-01



AABWA0290GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

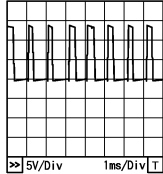
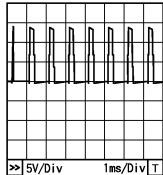
CAUTION:

DTC P2118 THROTTLE CONTROL MOTOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	V	Throttle control motor (Open)	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Approximately 3.2 V★  PBIAB150J
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
4	L/R	Throttle control motor (Close)	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Approximately 1.8 V★  PBIAB149J
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

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

Diagnosis Procedure

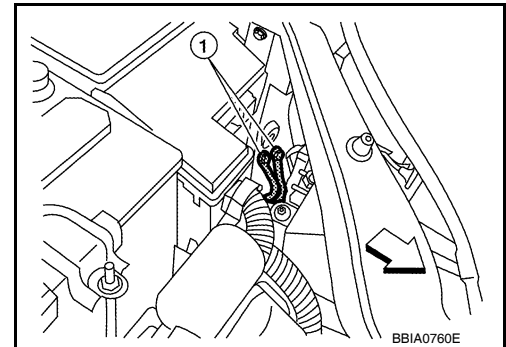
INFOID:000000006580215

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten engine screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

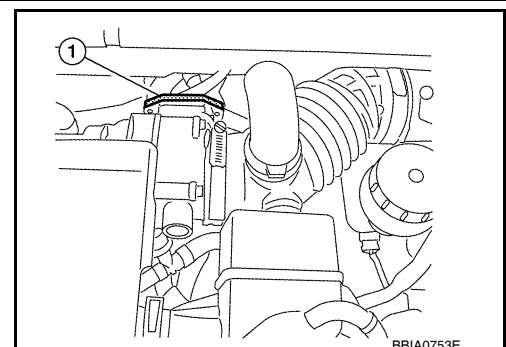
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

- Disconnect electric throttle control actuator (1) harness connector.
- Disconnect ECM harness connector.
- Check harness continuity between the following terminals.
Refer to Wiring Diagram.



Electric throttle control actuator terminal	ECM terminal	Continuity
5	1	Should not exist.
	4	Should exist.

DTC P2118 THROTTLE CONTROL MOTOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Electric throttle control actuator terminal	ECM terminal	Continuity
6	1	Should exist.
	4	Should not exist.

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

OK or NG

OK >> GO TO 3.

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

3. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-497, "Component Inspection"](#).

OK or NG

OK >> GO TO 4.

NG >> GO TO 5.

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

OK or NG

OK >> GO TO 5.

NG >> Repair or replace harness or connectors.

5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18, "Component"](#).

>> **INSPECTION END**

Component Inspection

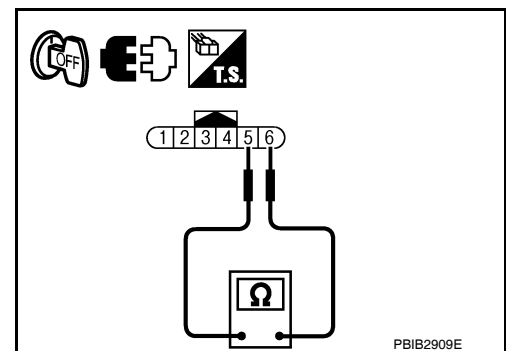
INFOID:000000006580216

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 5 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]

3. If NG, replace electric throttle control actuator and go to next step. Refer to [EM-18, "Component"](#).



DTC P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

Component Description

INFOID:000000006580218

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds 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.

On Board Diagnosis Logic

INFOID:000000006580219

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P2119 2119	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	• Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detects the throttle valve is stuck open.	

FAIL-SAFE MODE

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

Detected items	Engine operating condition in fail-safe mode
Malfunction A	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.
Malfunction B	ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
Malfunction C	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P position (CVT), neutral (M/T), and engine speed will not exceed 1,000 rpm or more.

DTC Confirmation Procedure

INFOID:000000006580220

NOTE:

- Perform **PROCEDURE FOR MALFUNCTION A AND B** first. If the DTC cannot be confirmed, perform **PROCEDURE FOR MALFUNCTION C**.
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A AND B

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D position (CVT) or 1st position (M/T), and wait at least 3 seconds.
3. Set shift lever to P position (CVT) or Neutral position (M/T).
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition switch ON and wait at least 1 second.
6. Set shift lever to D position (CVT) or 1st position (M/T), and wait at least 3 seconds.
7. Set shift lever to P position (CVT) or Neutral position (M/T).
8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
9. Check DTC.
10. If DTC is detected, go to [EC-499, "Diagnosis Procedure"](#).

PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D position (CVT) or 1st position (M/T) and wait at least 3 seconds.

DTC P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Set shift lever to N, P position (CVT) or Neutral (M/T) position.
4. Start engine and let it idle for 3 seconds.
5. Check DTC.
6. If DTC is detected, go to [EC-499. "Diagnosis Procedure"](#).

Diagnosis Procedure

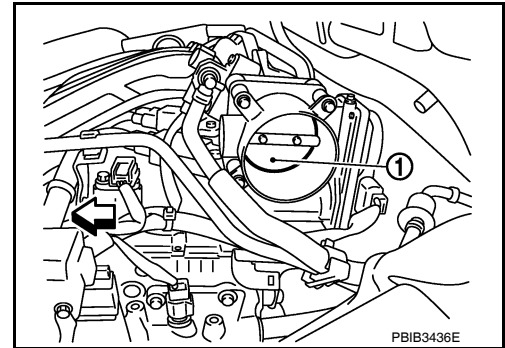
INFOID:000000006580221

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if a foreign matter is caught between the throttle valve (1) and the housing.
 - ↖ : Vehicle front
 - This illumination is shows the view with intake air duct removed.

OK or NG

- OK >> GO TO 2.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EM-18. "Component"](#).



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18. "Component"](#).

>> **INSPECTION END**

DTC P2122, P2123 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P2122, P2123 APP SENSOR

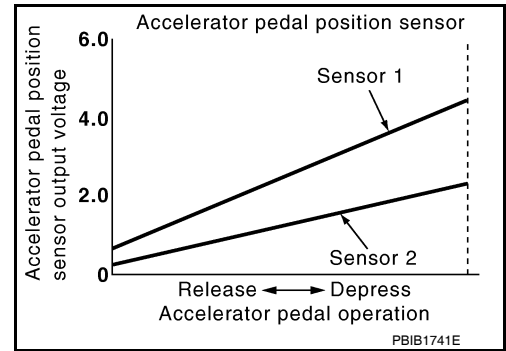
Component Description

INFOID:000000006580222

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580223

Specification data are reference values.

Monitor item	Condition	Specification
ACCEL SEN 1	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	ON
	Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:000000006580224

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-422](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122 2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (APP sensor 1 circuit is open or shorted.) • Accelerator pedal position sensor (APP sensor 1)
P2123 2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

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

Engine operating condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006580225

NOTE:

DTC P2122, P2123 APP SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

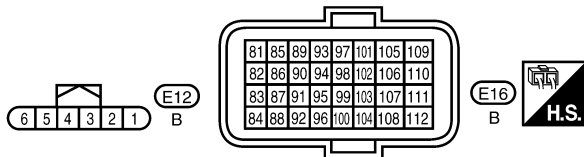
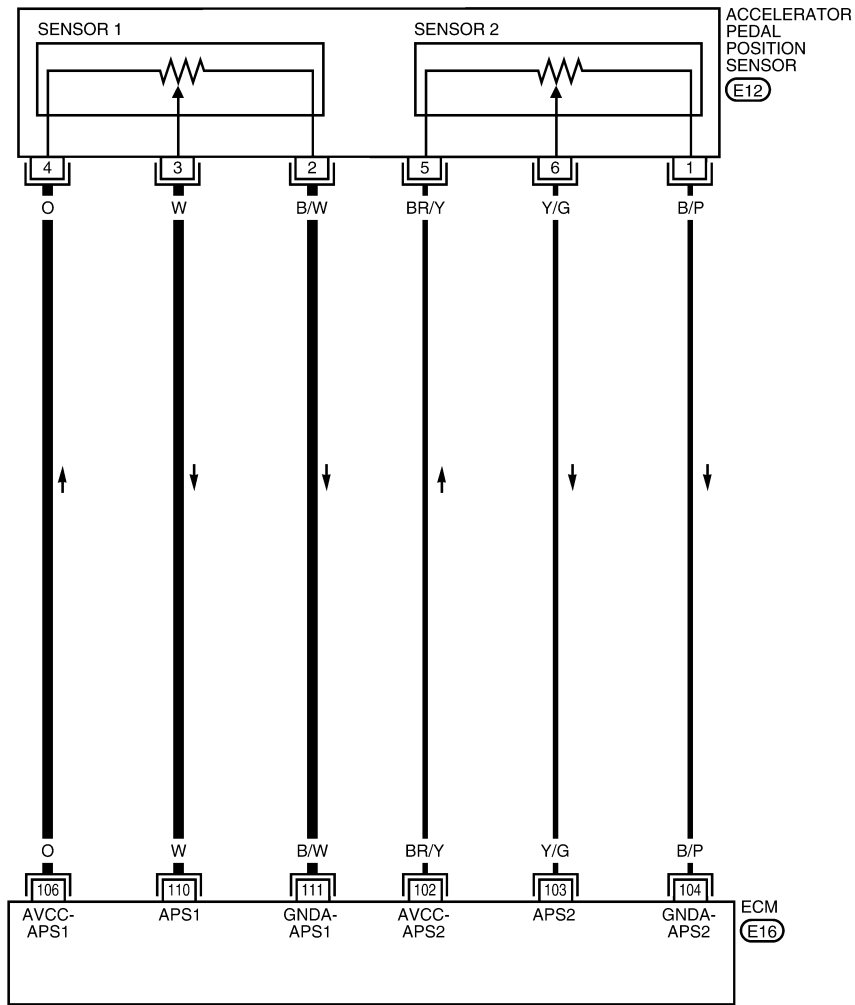
1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-502. "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006580226

EC-APPS1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



DTC P2122, P2123 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

CAUTION:

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

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
103	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	B/P	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
106	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
110	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006580227

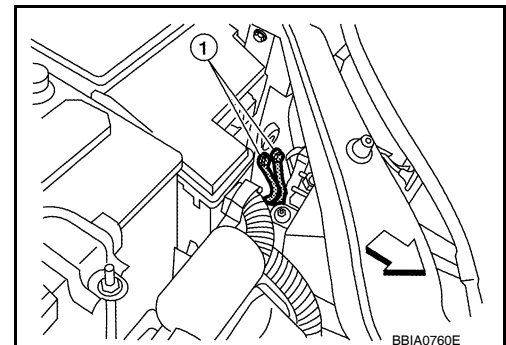
1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).

- ⇐ : Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



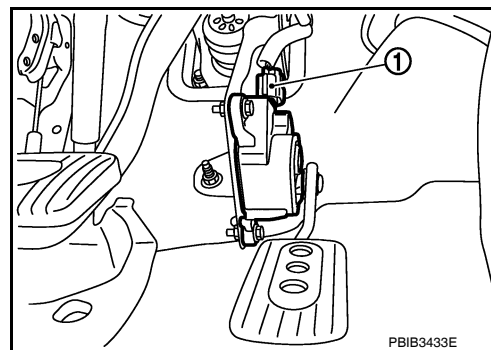
2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

DTC P2122, P2123 APP SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

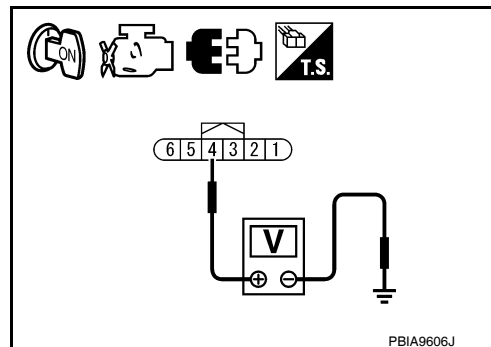


3. Check voltage between APP sensor terminal 4 and ground with CONSULT-III or tester.

Voltage : Approximately 5 V

OK or NG

- OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3.CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 111 and APP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 110 and APP sensor terminal 3. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK APP SENSOR

Refer to [EC-504. "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4. "Removal and Installation"](#).

>> INSPECTION END

DTC P2122, P2123 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

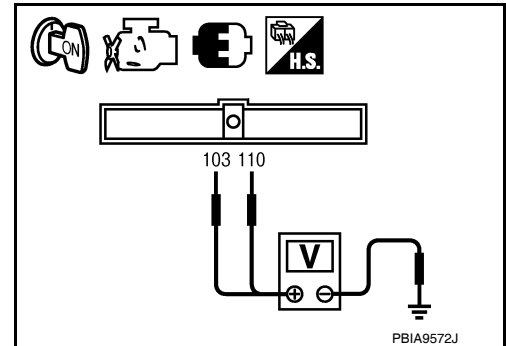
Component Inspection

INFOID:000000006580228

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 110 (APP sensor 1 signal), 103 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
110 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
103 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V



4. If NG, replace accelerator pedal assembly and go to next step. Refer to [ACC-4, "Removal and Installation"](#).
5. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).
6. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).
7. Perform [EC-99, "Idle Air Volume Learning"](#).

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

DTC P2127, P2128 APP SENSOR

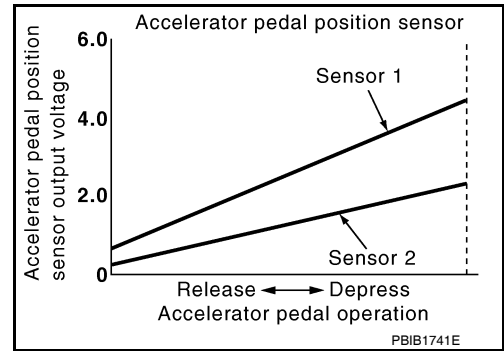
Component Description

INFOID:000000006580230

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580231

Specification data are reference values.

Monitor item	Condition	Specification
ACCEL SEN 1	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	ON
	Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:000000006580232

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127 2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (APP sensor 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • EVAP control system pressure sensor • Tumble control valve position sensor
P2128 2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

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

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Engine operating condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006580233

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-508, "Diagnosis Procedure"](#).

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

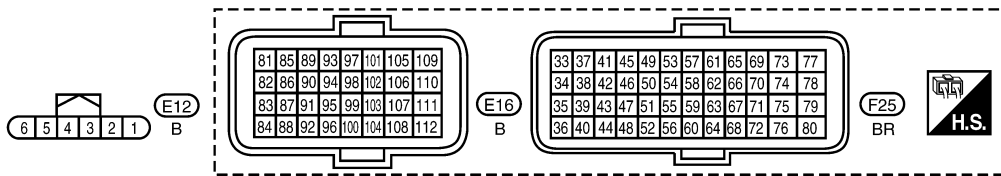
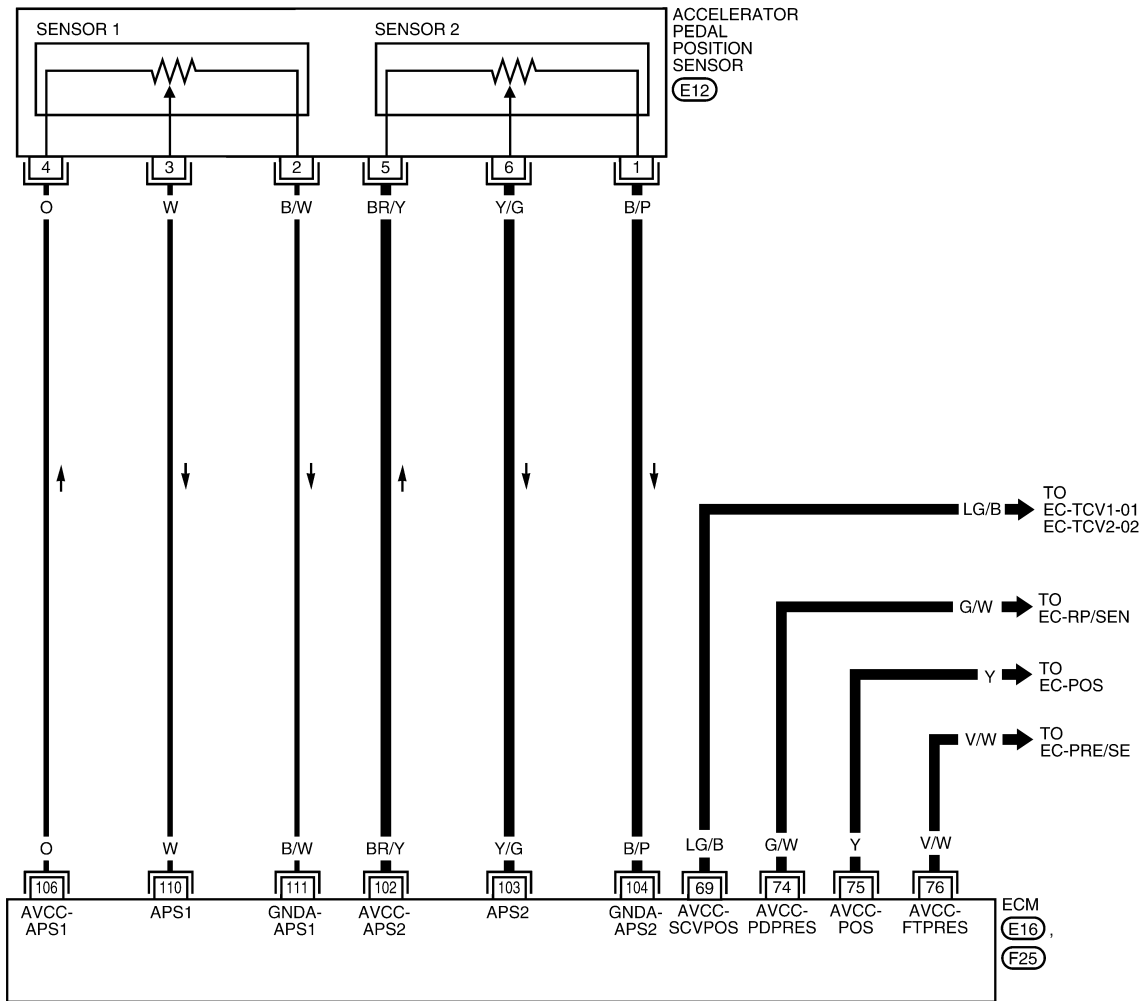
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580234

EC-APPS2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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

CAUTION:

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

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
69	LG/B	Sensor power supply (Tumble control valve position sensor)	[Ignition switch: ON]	Approximately 5 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
103	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	B/P	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
106	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
110	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

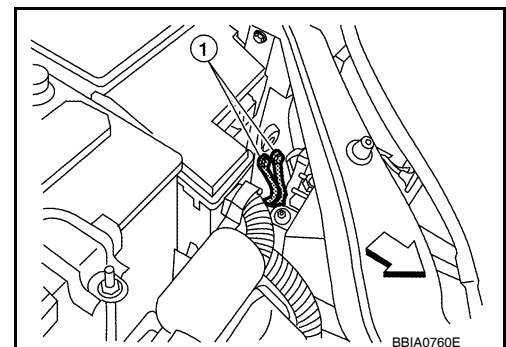
INFOID:000000006580235

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ⇐ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



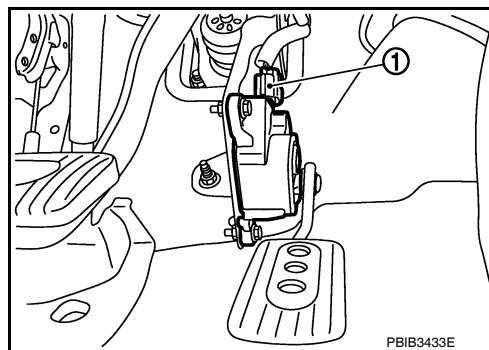
2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

DTC P2127, P2128 APP SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

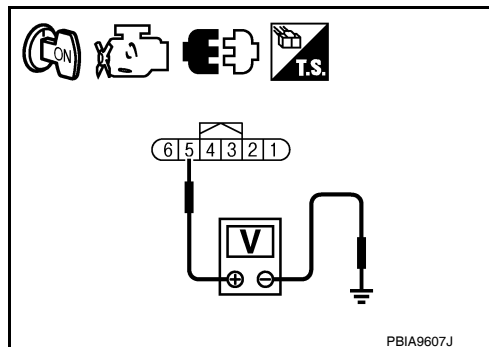


3. Check voltage between APP sensor terminal 5 and ground with CONSULT-III or tester.

Voltage : Approximately 5 V

OK or NG

- OK >> GO TO 6.
 NG >> GO TO 3.



3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 5 and ECM terminal 102. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
 NG >> Repair open circuit.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
69	Tumble control valve position sensor terminal 1	EC-480. "Wiring Diagram"
74	Refrigerant pressure sensor terminal 3	EC-564. "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-316. "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-374. "Wiring Diagram"
102	APP sensor terminal 5	EC-507. "Wiring Diagram"

OK or NG

- OK >> GO TO 5.
 NG >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-320. "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [MTC-28.](#))
- EVAP control system pressure (Refer to [EC-378. "Component Inspection"](#).)
- Tumble control valve position sensor (Refer to [EC-481. "Diagnosis Procedure"](#).)

OK or NG

- OK >> GO TO 10.

DTC P2127, P2128 APP SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

NG >> Replace malfunctioning component.

6. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 104 and APP sensor terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 7.

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

7. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 103 and APP sensor terminal 6.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 8.

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

8. CHECK APP SENSOR

Refer to [EC-510, "Component Inspection"](#).

OK or NG

OK >> GO TO 10.

NG >> GO TO 9.

9. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

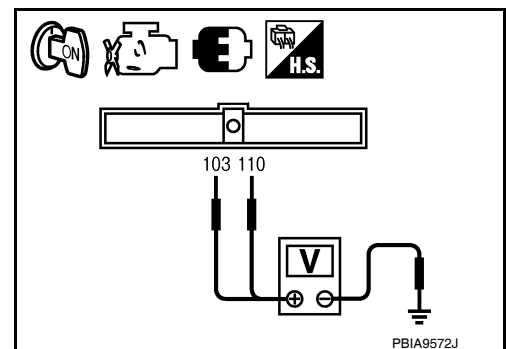
Component Inspection

INFOID:000000006580236

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 110 (APP sensor 1 signal), 103 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
110 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
103 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V



DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

4. If NG, replace accelerator pedal assembly and go to next step. Refer to [ACC-4. "Removal and Installation"](#).
5. Perform [EC-98. "Accelerator Pedal Released Position Learning"](#).
6. Perform [EC-98. "Throttle Valve Closed Position Learning"](#).
7. Perform [EC-99. "Idle Air Volume Learning"](#).

A

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DTC P2135 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

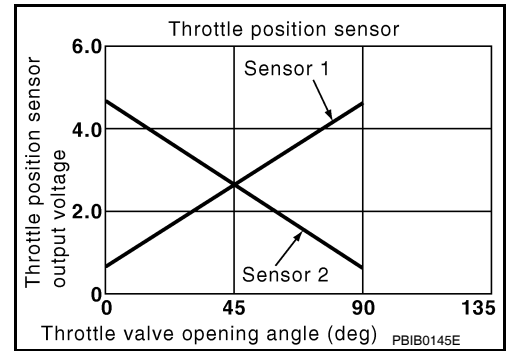
DTC P2135 TP SENSOR

Component Description

INFOID:000000006580238

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580239

Specification data are reference values.

Monitor item	Condition	Specification
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	More than 0.36 V
	• Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully depressed	Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:000000006580240

This self-diagnosis has the one trip detection logic.

NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.

Refer to [EC-422](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135 2135	Throttle position sensor circuit range/performance	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	<ul style="list-style-type: none"> • Harness or connector (TP sensor 1 and 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 1 and 2)

FAIL-SAFE MODE

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

Engine operation condition in fail-safe mode

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. So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006580241

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-514, "Diagnosis Procedure"](#).

DTC P2135 TP SENSOR

< SERVICE INFORMATION >

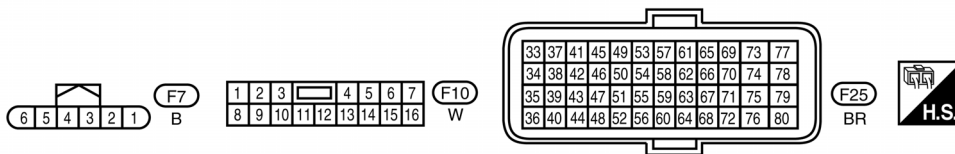
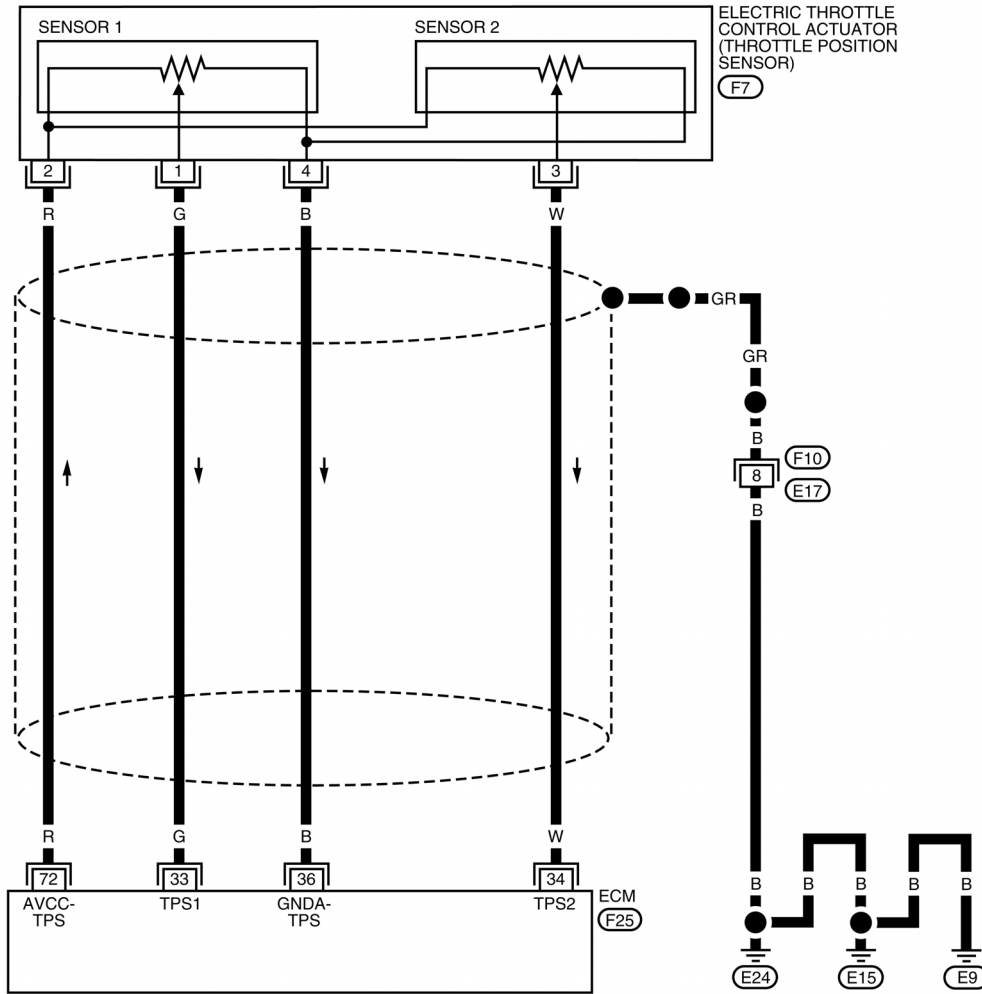
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006580242

Wiring Diagram

EC-TPS3-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0154GB

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

CAUTION:

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

DTC P2135 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
33	G	Throttle position sensor 1	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34	W	Throttle position sensor 2	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
36	B	Sensor ground (Throttle position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
72	R	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

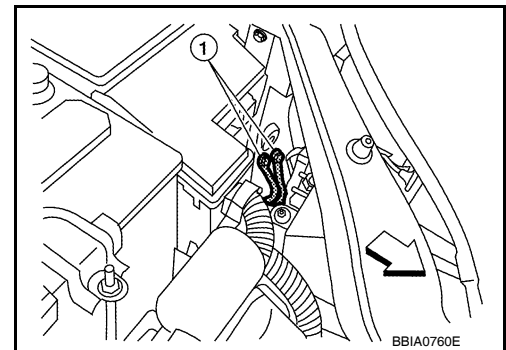
INFOID:000000006580243

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).
- ⇐ : Vehicle front
 - Body ground (1)

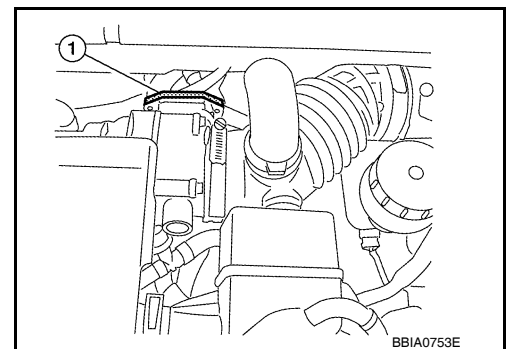
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator (1) harness connector.
2. Turn ignition switch ON.



DTC P2135 TP SENSOR

[MR20DE (FOR CALIFORNIA)]

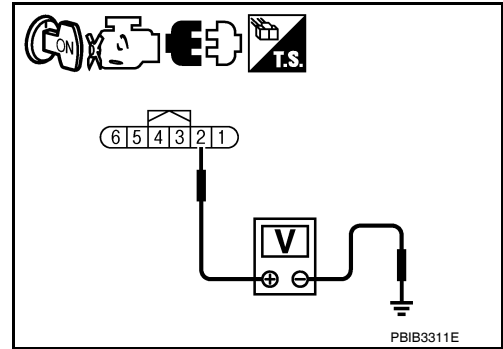
< SERVICE INFORMATION >

3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT-III or tester.

Voltage : Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 4 and ECM terminal 36. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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

1. Check harness continuity between the following;
electric throttle control actuator terminal 1 and ECM terminal 33,
electric throttle control actuator terminal 3 and ECM terminal 34.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-515, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18, "Component"](#).

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

Component Inspection

INFOID:000000006580244

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.

DTC P2135 TP SENSOR

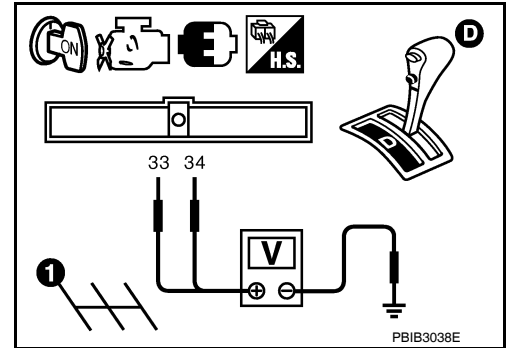
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Perform [EC-98. "Throttle Valve Closed Position Learning"](#).
3. Turn ignition switch ON.
4. Set shift lever to D position (CVT) or 1st position (M/T).
5. Check voltage between ECM terminals 33 (TP sensor 1 signal), 34 (TP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
33 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
34 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V

6. If NG, replace electric throttle control actuator and go to the next step. Refer to [EM-18. "Component"](#).



DTC P2138 APP SENSOR

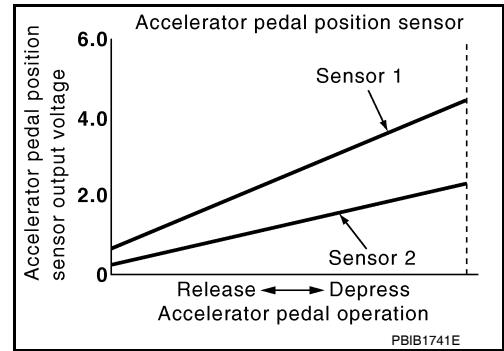
Component Description

INFOID:000000006580246

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580247

Specification data are reference values.

Monitor item	Condition	Specification
ACCEL SEN 1	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	ON
	Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:000000006580248

This self-diagnosis has the one trip detection logic.

NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.

Refer to [EC-422](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138 2138	Accelerator pedal position sensor circuit range/performance	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	<ul style="list-style-type: none"> • Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) (Tumble control valve position sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 1 and 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • EVAP control system pressure sensor • Tumble control valve position sensor

FAIL-SAFE MODE

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

DTC P2138 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Engine operating condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006580249

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-520, "Diagnosis Procedure"](#).

DTC P2138 APP SENSOR

[MR20DE (FOR CALIFORNIA)]

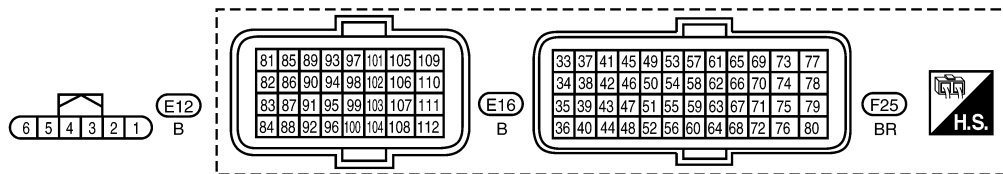
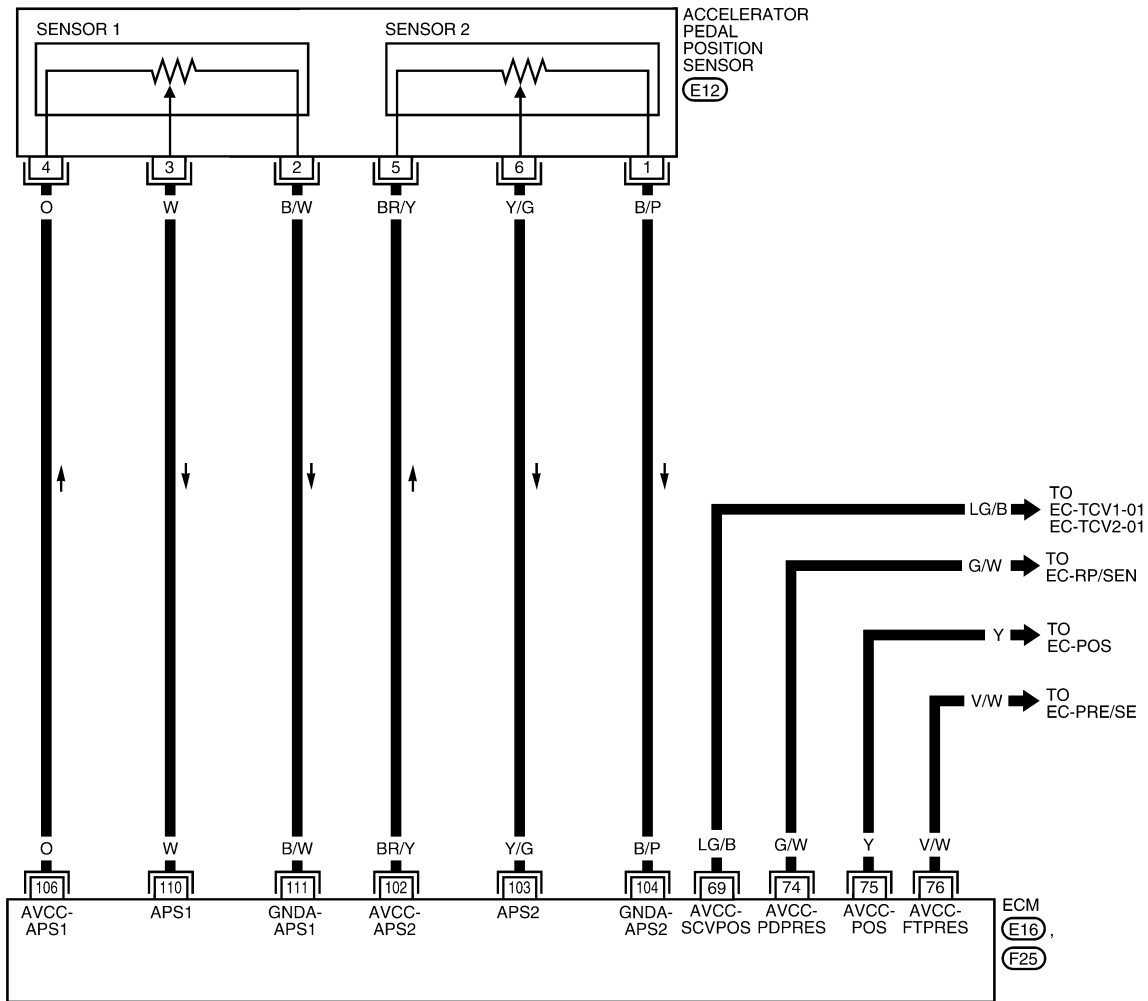
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006580250

EC-APPS3-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



AABWA0294GB

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

CAUTION:

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

DTC P2138 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
69	LG/B	Sensor power supply (Tumble control valve position sensor)	[Ignition switch: ON]	Approximately 5 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
103	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	B/P	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
106	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
110	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

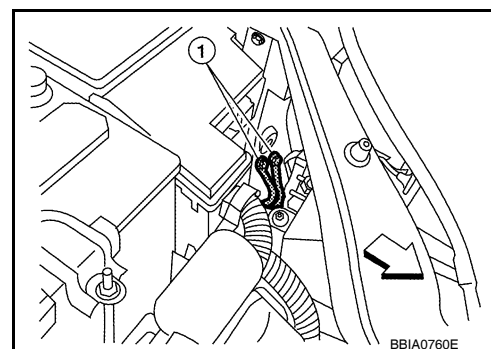
INFOID:000000006580251

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔ : Vehicle front
 - ① : Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



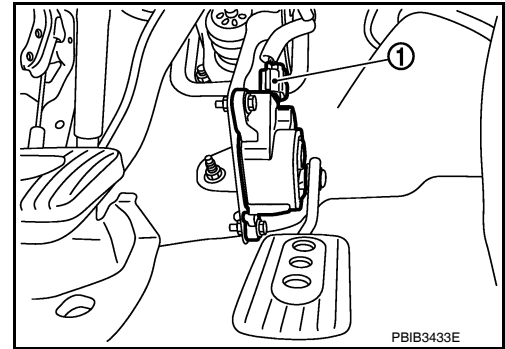
2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

DTC P2138 APP SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

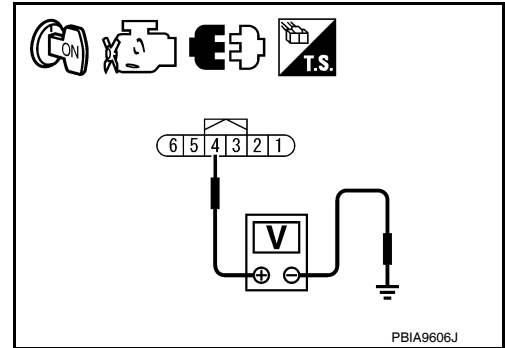


3. Check voltage between APP sensor terminal 4 and ground with CONSULT-III or tester.

Voltage : Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



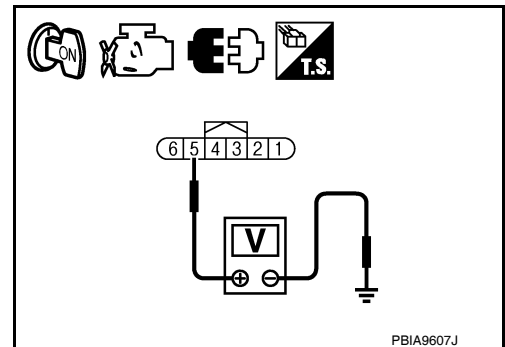
3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between APP sensor terminal 5 and ground with CONSULT-III or tester.

Voltage : Approximately 5 V

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 4.



4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 5 and ECM terminal 102. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit.

5.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
69	Tumble control valve position sensor terminal 1	EC-480, "Wiring Diagram"
74	Refrigerant pressure sensor terminal 3	EC-564, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-316, "Wiring Diagram"

DTC P2138 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

ECM terminal	Sensor terminal	Reference Wiring Diagram
76	EVAP control system pressure sensor terminal 3	EC-374, "Wiring Diagram"
102	APP sensor terminal 5	EC-507, "Wiring Diagram"

OK or NG

- OK >> GO TO 6.
NG >> Repair short to ground or short to power in harness or connectors.

6. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-320, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [MTC-28](#).)
- EVAP control system pressure (Refer to [EC-378, "Component Inspection"](#).)
- Tumble control valve position sensor (Refer to [EC-481, "Diagnosis Procedure"](#).)

OK or NG

- OK >> GO TO 11.
NG >> Replace malfunctioning component.

7. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following;
ECM terminal 111 and APP sensor terminal 2,
ECM terminal 104 and APP sensor terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following;
ECM terminal 110 and APP sensor terminal 3,
ECM terminal 103 and APP sensor terminal 6.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 9.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK APP SENSOR

Refer to [EC-523, "Component Inspection"](#).

OK or NG

- OK >> GO TO 11.
NG >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> **INSPECTION END**

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

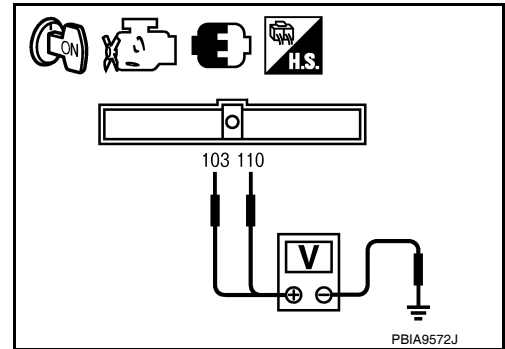
Component Inspection

INFOID:000000006580252

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 110 (APP sensor 1 signal), 103 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
110 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
103 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V



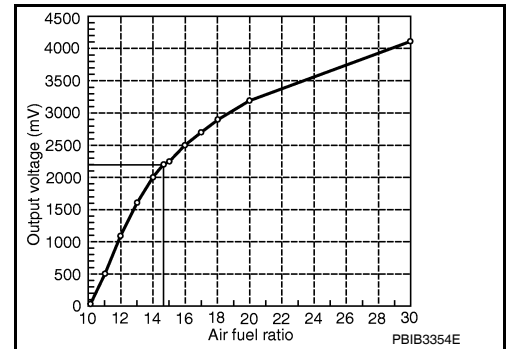
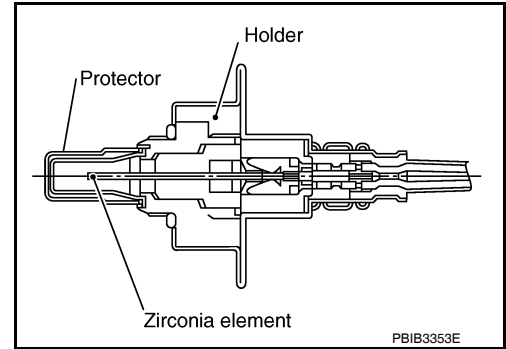
4. If NG, replace accelerator pedal assembly and go to next step. Refer to [ACC-4. "Removal and Installation"](#).
5. Perform [EC-98. "Accelerator Pedal Released Position Learning"](#).
6. Perform [EC-98. "Throttle Valve Closed Position Learning"](#).
7. Perform [EC-99. "Idle Air Volume Learning"](#).

DTC P2A00 A/F SENSOR 1

Component Description

INFOID:000000006580254

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 λ 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 about 800°C (1,472°F).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580255

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1)	<ul style="list-style-type: none"> Engine: After warming up Maintaining engine speed at 2,000 rpm 	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006580256

To judge the malfunction, the A/F signal computed by ECM from the A/F sensor 1 signal is monitored not to be shifted to LEAN side or RICH side.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P2A00 2A00	Air fuel ratio (A/F) sensor 1 circuit range/performance	<ul style="list-style-type: none"> The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period. The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period. 	<ul style="list-style-type: none"> Air fuel ratio (A/F) sensor 1 Air fuel ratio (A/F) sensor 1 heater Fuel pressure Fuel injector Intake air leaks

DTC Confirmation Procedure

INFOID:000000006580257

NOTE:

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

TESTING CONDITION:

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

WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.

DTC P2A00 A/F SENSOR 1

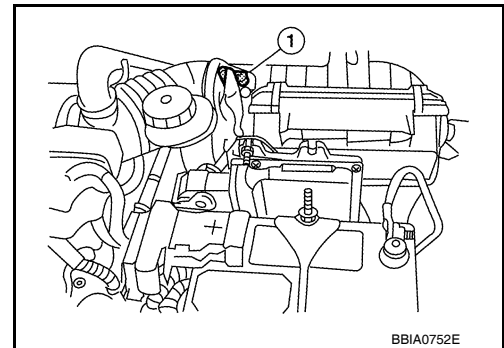
[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Turn ignition switch ON and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
4. Clear the self-learning coefficient by touching "CLEAR".
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 1 minute under no load.
7. Let engine idle for 1 minute.
8. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
9. Check 1st trip DTC.
10. If 1st trip DTC is detected, go to [EC-527. "Diagnosis Procedure"](#).

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. Disconnect mass air flow sensor (1) harness connector.
4. Start engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select Service \$03 with GST and make sure that DTC P0102 is detected.
7. Select Service \$04 with GST and erase the DTC P0102.
8. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
9. Let engine idle for 1 minute.
10. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
11. Select Service \$07 with GST.
If 1st trip DTC is detected, go to [EC-527. "Diagnosis Procedure"](#).



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DTC P2A00 A/F SENSOR 1

< SERVICE INFORMATION >

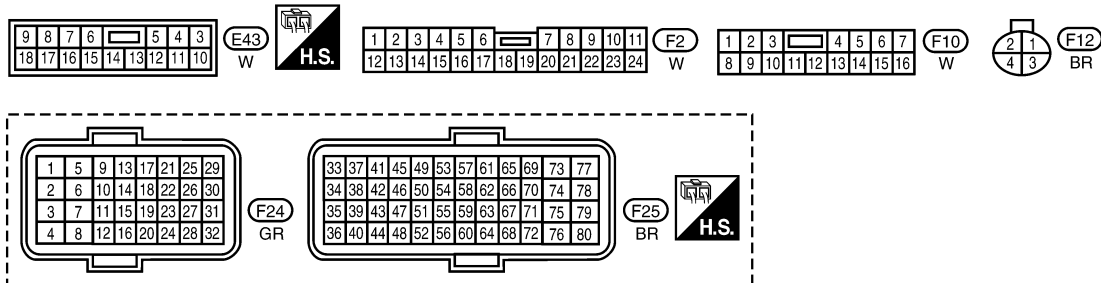
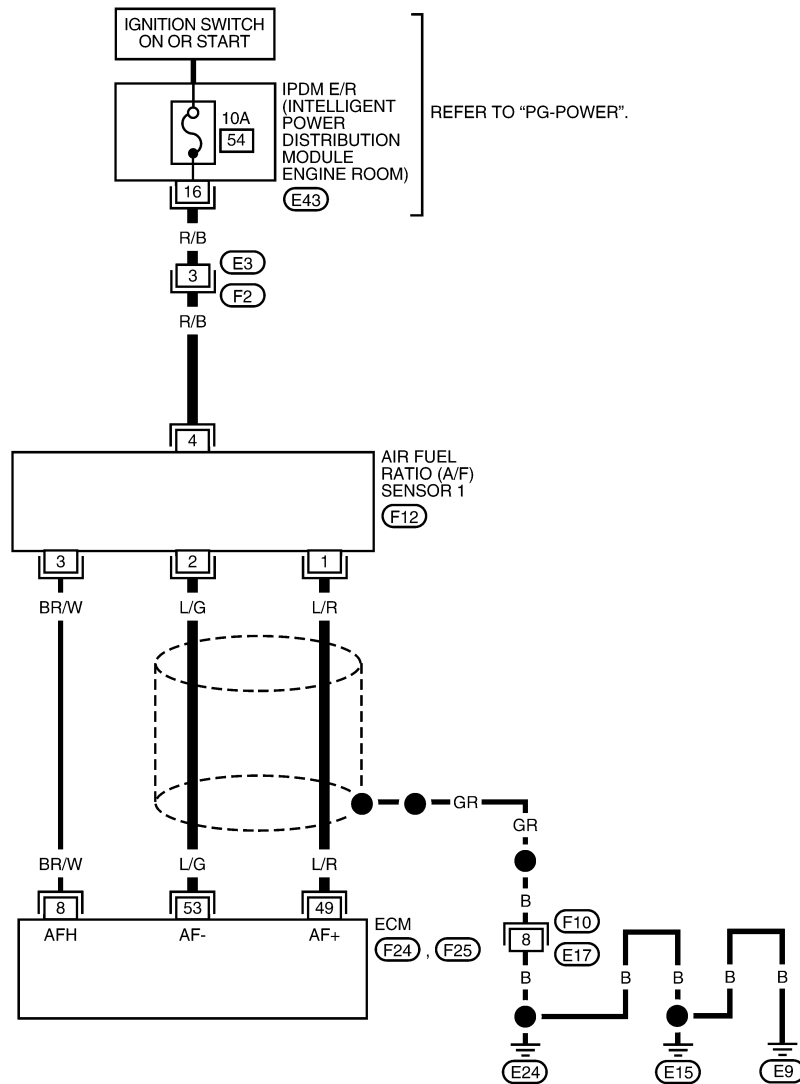
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006580258

Wiring Diagram

EC-A/F-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

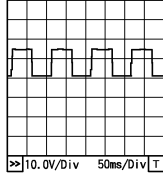
CAUTION:

DTC P2A00 A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  P8IA8148J
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

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

Diagnosis Procedure

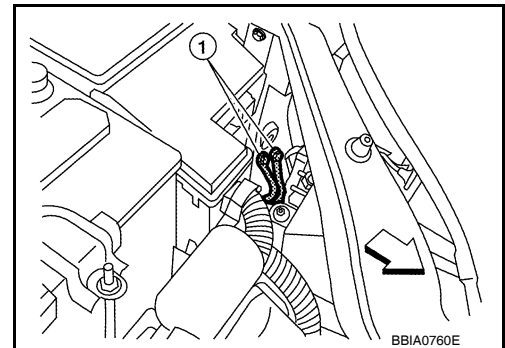
INFOID:000000006580259

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1

Loosen and retighten the air fuel ratio (A/F) sensor 1.
Refer to [EM-24, "Removal and Installation"](#).

>> GO TO 3.

3. CHECK FOR INTAKE AIR LEAK

- Start engine and run it at idle.
- Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace.

4. CLEAR THE SELF-LEARNING DATA.

With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
- Clear the self-learning control coefficient by touching "CLEAR".
- Run engine for at least 10 minutes at idle speed.
- Check 1st trip DTC.

Is the 1st trip DTC P0171 and P0172 detected?

DTC P2A00 A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Is it difficult to start engine?

⊗ Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Make sure DTC P0102 is displayed.
7. Erase the DTC memory. Refer to [EC-59. "Emission-related Diagnostic Information"](#).
8. Make sure DTC P0000 is displayed.
9. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 and P0172 detected? Is it difficult to start engine?

Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-272](#) or [EC-278](#).
No >> GO TO 5.

5. CHECK HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector (1).
 - Air fuel ratio (A/F) sensor (2)
3. Check harness connector for water.

Water should no exist.

OK or NG

- OK >> GO TO 6.
NG >> Repair or replace harness connector.

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

1. Turn ignition switch ON.
2. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

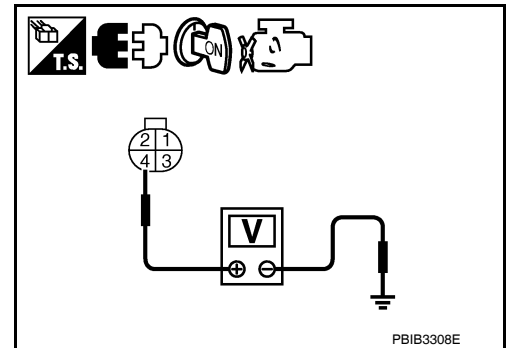
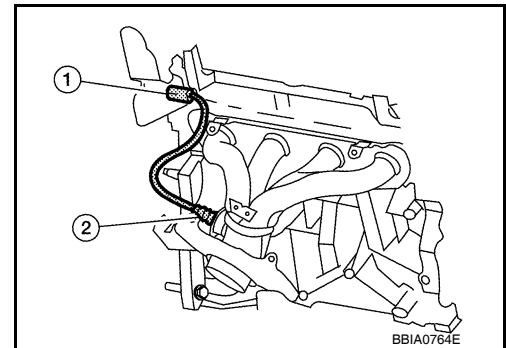
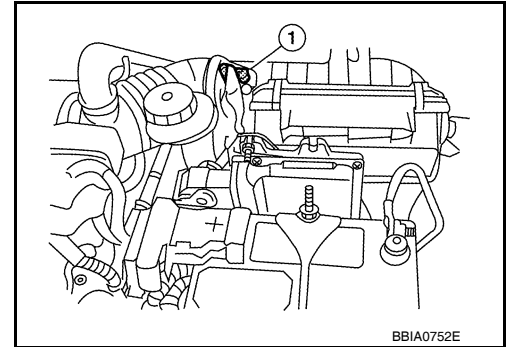
Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.



DTC P2A00 A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 9.

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

9. CHECK A/F SENSOR 1 HEATER

Refer to [EC-173, "Component Inspection"](#).

OK or NG

OK >> GO TO 10.

NG >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Perform [EC-153](#).

OK or NG

OK >> GO TO 11.

NG >> Repair or replace.

11. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23, "Component"](#).

CAUTION:

- Discard any air fuel ratio (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 air fuel ratio (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> GO TO 12.

12. CONFIRM A/F ADJUSTMENT DATA

1. Turn ignition switch ON.
2. Select "A/F ADJ-B1" in "DATA MONITOR" mode with CONSULT-III.
3. Make sure that "0.000" is displayed on CONSULT-III screen.

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 13.

13. CLEAR THE SELF-LEARNING DATA

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear the self-learning control coefficient by touching "CLEAR".

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.

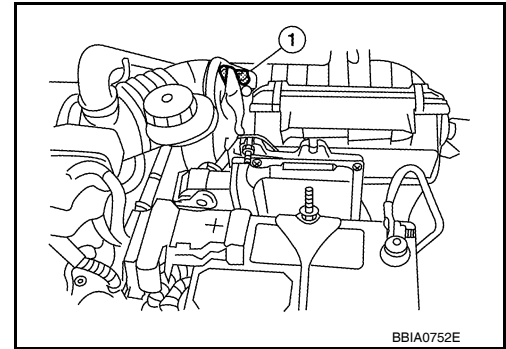
DTC P2A00 A/F SENSOR 1

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Disconnect mass air flow sensor harness (1) connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Make sure DTC P0102 is displayed.
7. Erase the DTC memory. Refer to [EC-59, "Emission-related Diagnostic Information"](#).
8. Make sure DTC P0000 is displayed.

>> GO TO 14.



14. CONFIRM A/F ADJUSTMENT DATA

1. Turn ignition switch OFF and then ON.
2. Select "A/F ADJ-B1" in "DATA MONITOR" mode with CONSULT-III.
3. Make sure that "0.000" is displayed on CONSULT-III screen.

>> INSPECTION END

ASCD BRAKE SWITCH

< SERVICE INFORMATION >

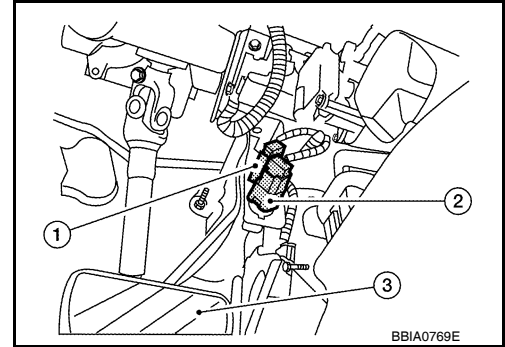
[MR20DE (FOR CALIFORNIA)]

ASCD BRAKE SWITCH

Component Description

INFOID:000000006580261

When depress on the brake pedal, ASCD brake switch (1) is turned OFF and stop lamp switch (2) is turned ON. ECM detects the state of the brake pedal (3) by this input of two kinds (ON/OFF signal)
Refer to [EC-40](#) for the ASCD function.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580262

Specification data are reference values.

Monitor item	Condition	Specification
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	ON
	• Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	OFF
BRAKE SW2 (Stop lamp switch)	• Ignition switch: ON	OFF
	• Brake pedal: Fully released • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	ON

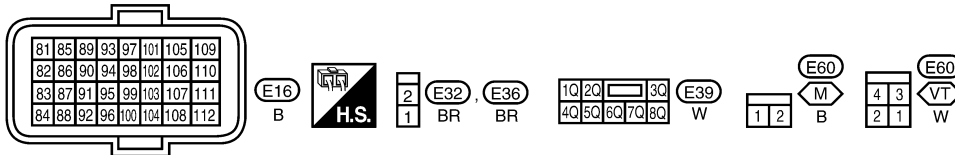
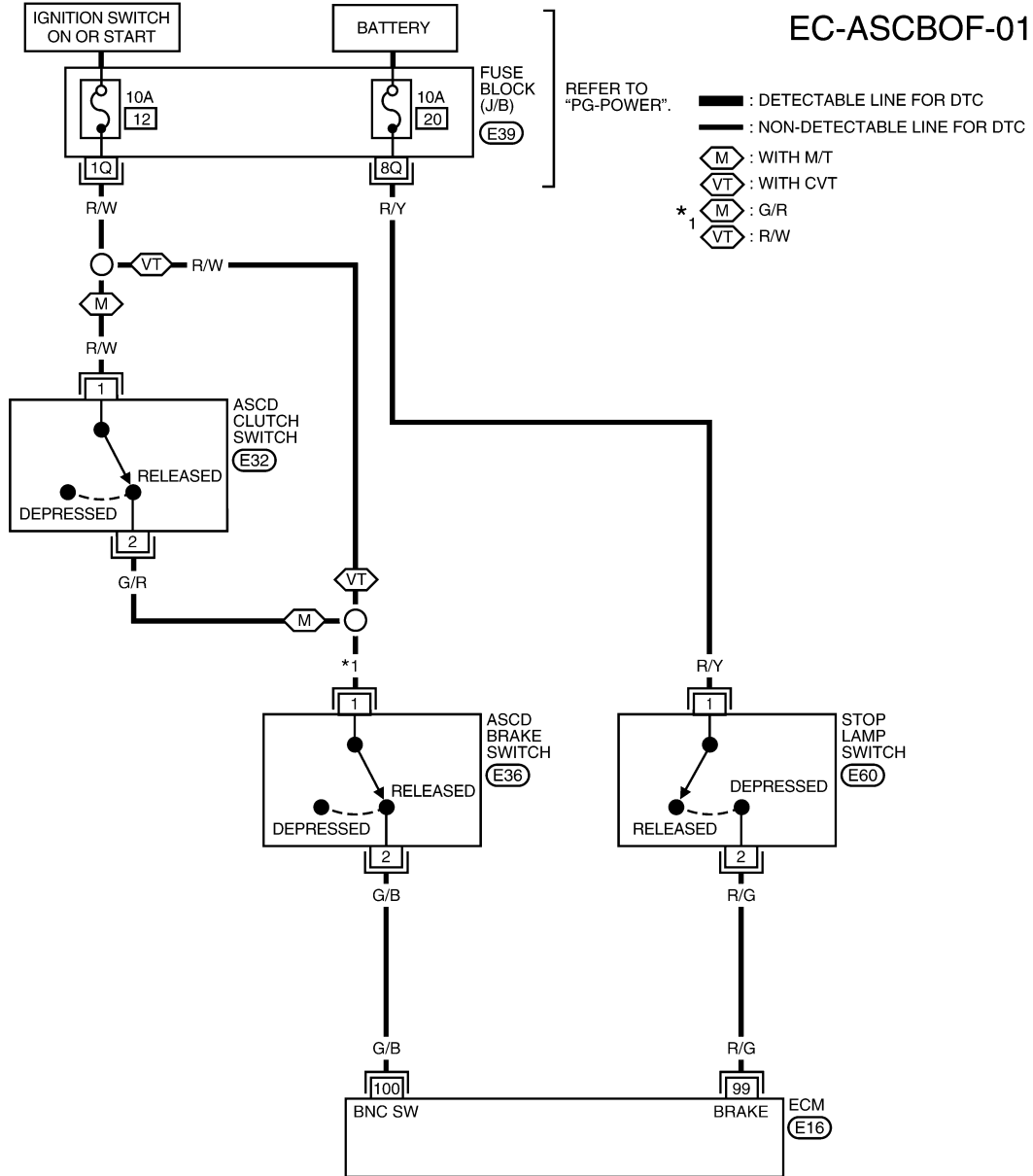
ASC D BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

INFOID:000000006580263

Wiring Diagram



ABBWA0660GB

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

CAUTION:

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

ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
99	R/G	Stop lamp switch	[Ignition switch: ON] • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)
100	G/B	ASCD brake switch	[Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580264

1. CHECK OVERALL FUNCTION-I

With CONSULT-III

- Turn ignition switch ON.
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-III.
- Check "BRAKE SW1" indication under the following conditions.

M/T models

Condition	Indication
Clutch pedal and/or brake pedal: Slightly depressed	OFF
Clutch pedal and brake pedal: Fully released	ON

CVT models

Condition	Indication
Brake pedal: Slightly depressed	OFF
Brake pedal: Fully released	ON

Without CONSULT-III

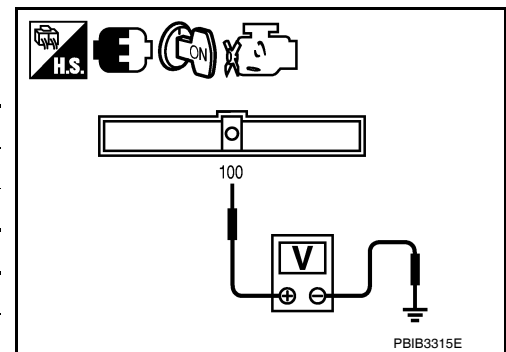
- Turn ignition switch ON.
- Check voltage between ECM terminal 100 and ground under the following conditions.

M/T models

Condition	Voltage
Clutch pedal and/or brake pedal: Slightly depressed	Approximately 0 V
Clutch pedal and brake pedal: Fully released	Battery voltage

CVT models

Condition	Voltage
Brake pedal: Slightly depressed	Approximately 0 V
Brake pedal: Fully released	Battery voltage



OK or NG

- OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK OVERALL FUNCTION-II

With CONSULT-III

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

ASCD BRAKE SWITCH

< SERVICE INFORMATION >

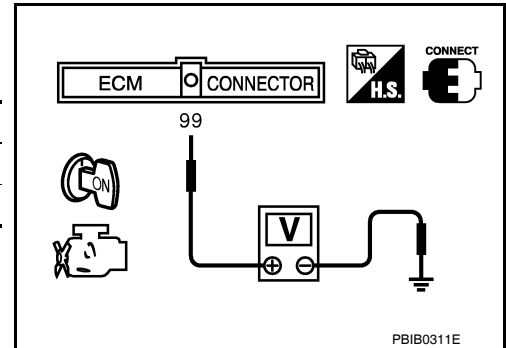
[MR20DE (FOR CALIFORNIA)]

Condition	Indication
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON

⊗ Without CONSULT-III

Check voltage between ECM terminal 99 and ground under the following conditions.

Condition	Voltage
Brake pedal: Fully released	Approximately 0 V
Brake pedal: Slightly depressed	Battery voltage

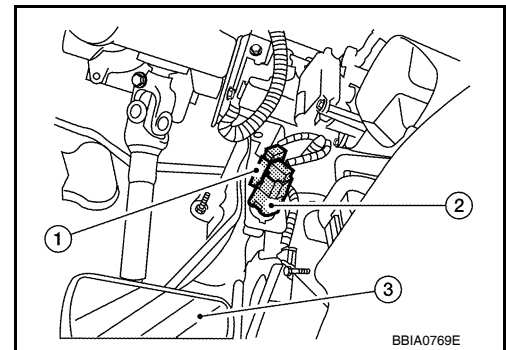


OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 11.

3. CHECK ASCD BRAKE SWITCH POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch (1) harness connector.
 - Stop lamp switch (2)
 - Brake pedal (3)
3. Turn ignition switch ON.

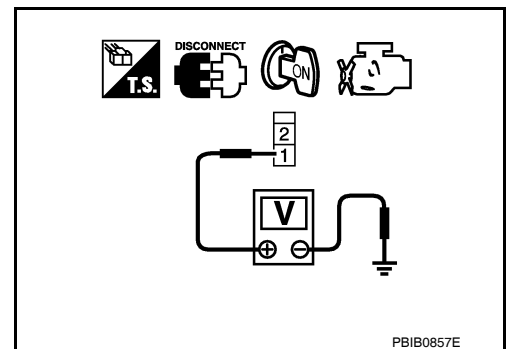


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 8.
- NG (M/T models) >>GO TO 4.
- NG (CVT models)>>GO TO 6.



4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

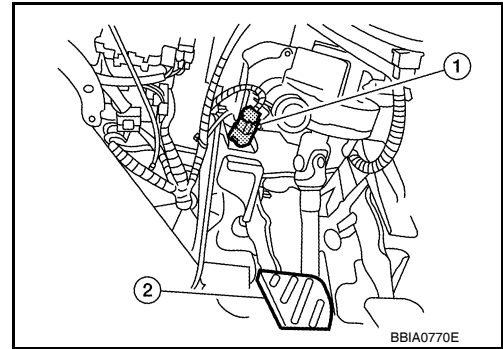
1. Turn ignition switch OFF.

ASCD BRAKE SWITCH

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Disconnect ASCD clutch switch (1) harness connector.
 - Clutch pedal (2)
3. Turn ignition switch ON.

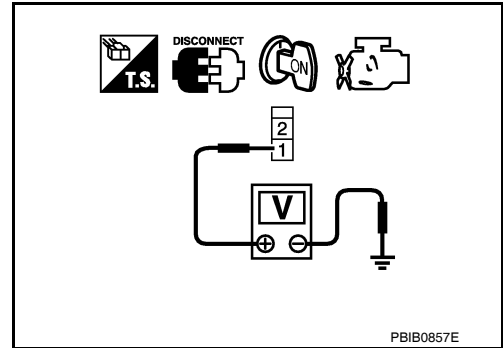


4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between ASCD clutch switch and fuse

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

6. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between ASCD brake switch and fuse

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

7. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 1 and ASCD clutch switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 10.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 100 and ASCD brake switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

ASCD BRAKE SWITCH

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 9.

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

9. CHECK ASCD BRAKE SWITCH

Refer to [EC-461, "Component Inspection"](#).

OK or NG

OK >> GO TO 15.

NG >> Replace ASCD brake switch. Refer to [BR-8, "Removal and Installation"](#).

10. CHECK ASCD CLUTCH SWITCH

Refer to [EC-461, "Component Inspection"](#)

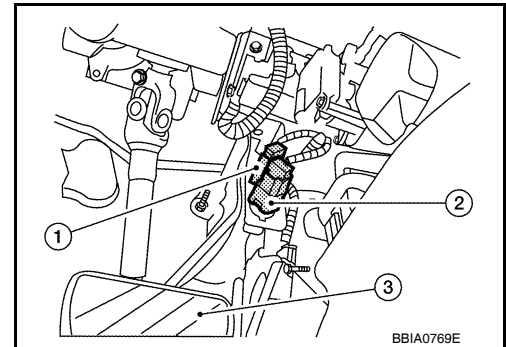
OK or NG

OK >> GO TO 15.

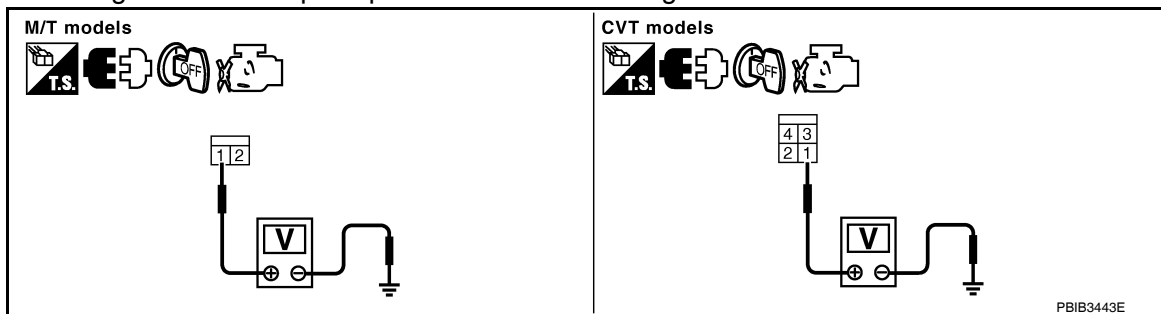
NG >> Replace ASCD clutch switch. Refer to [CL-7, "Removal and Installation"](#).

11. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch (2) harness connector.
 - ASCD brake switch (1)
 - Brake pedal (3)



3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -III or tester.



Voltage : Battery voltage

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between stop lamp switch and battery

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

13. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 99 and stop lamp switch terminal 2.
Refer to Wiring Diagram.

ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Continuity should exist.

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

OK or NG

OK >> GO TO 14.

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

14. CHECK STOP LAMP SWITCH

Refer to [EC-461, "Component Inspection"](#)

OK or NG

OK >> GO TO 15.

NG >> Replace stop lamp switch. Refer to [BR-8, "Removal and Installation"](#).

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> INSPECTION END

Component Inspection

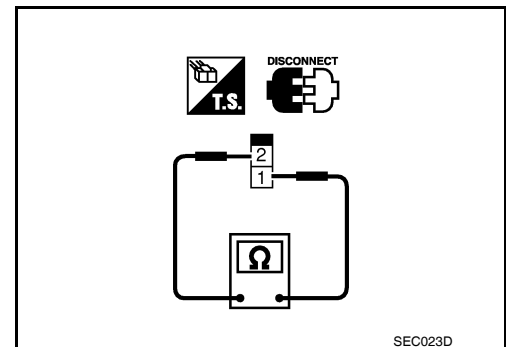
INFOID:000000006580265

ASCD BRAKE SWITCH

- Turn ignition switch OFF.
- Disconnect ASCD brake switch harness connector.
- Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Brake pedal: Fully released.	Should exist.
Brake pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-7](#), and perform step 3 again.

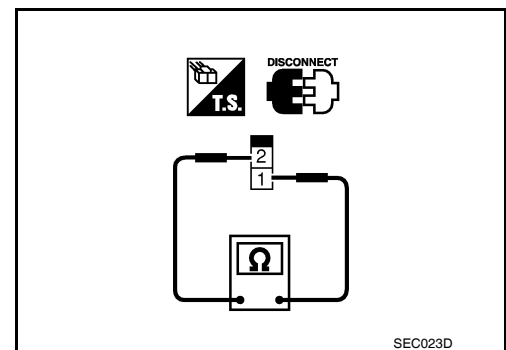


ASCD CLUTCH SWITCH

- Turn ignition switch OFF.
- Disconnect ASCD clutch switch harness connector.
- Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Clutch pedal: Fully released.	Should exist.
Clutch pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-6](#), and perform step 3 again.



STOP LAMP SWITCH

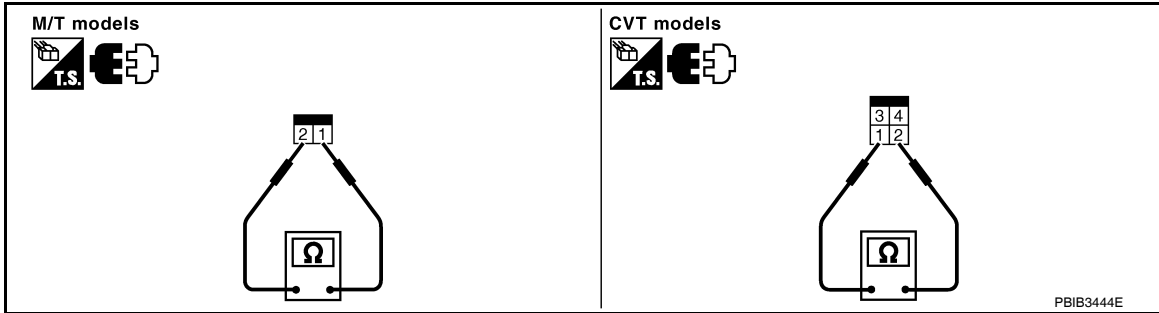
- Turn ignition switch OFF.
- Disconnect stop lamp switch harness connector.

ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-7](#), and perform step 3 again.

ASC D INDICATOR

Component Description

INFOID:000000006580266

ASC D indicator lamp illuminates to indicate ASC D operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE indicator illuminates when MAIN switch on ASC D steering switch is turned ON to indicate that ASC D system is ready for operation.

SET indicator illuminates when following conditions are met.

- CRUISE indicator is illuminated.
- SET/COAST switch on ASC D steering switch is turned ON while vehicle speed is within the range of ASC D setting.

SET indicator remains lit during ASC D control.

Refer to [EC-40](#) for the ASC D function.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580267

Specification data are reference value.

Monitor item	Condition		Specification
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at 1st time → 2nd	ON → OFF
SET LAMP	• MAIN switch: ON • Vehicle: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASC D: Operating	ON
		ASC D: Not operating	OFF

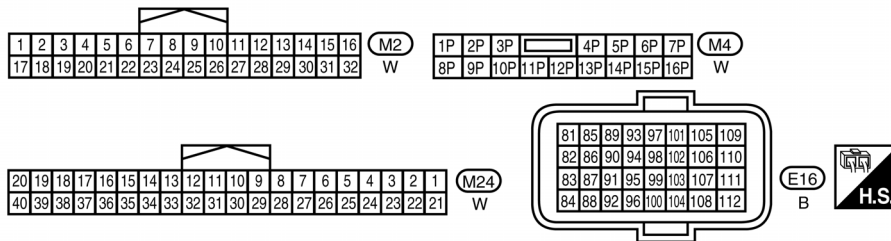
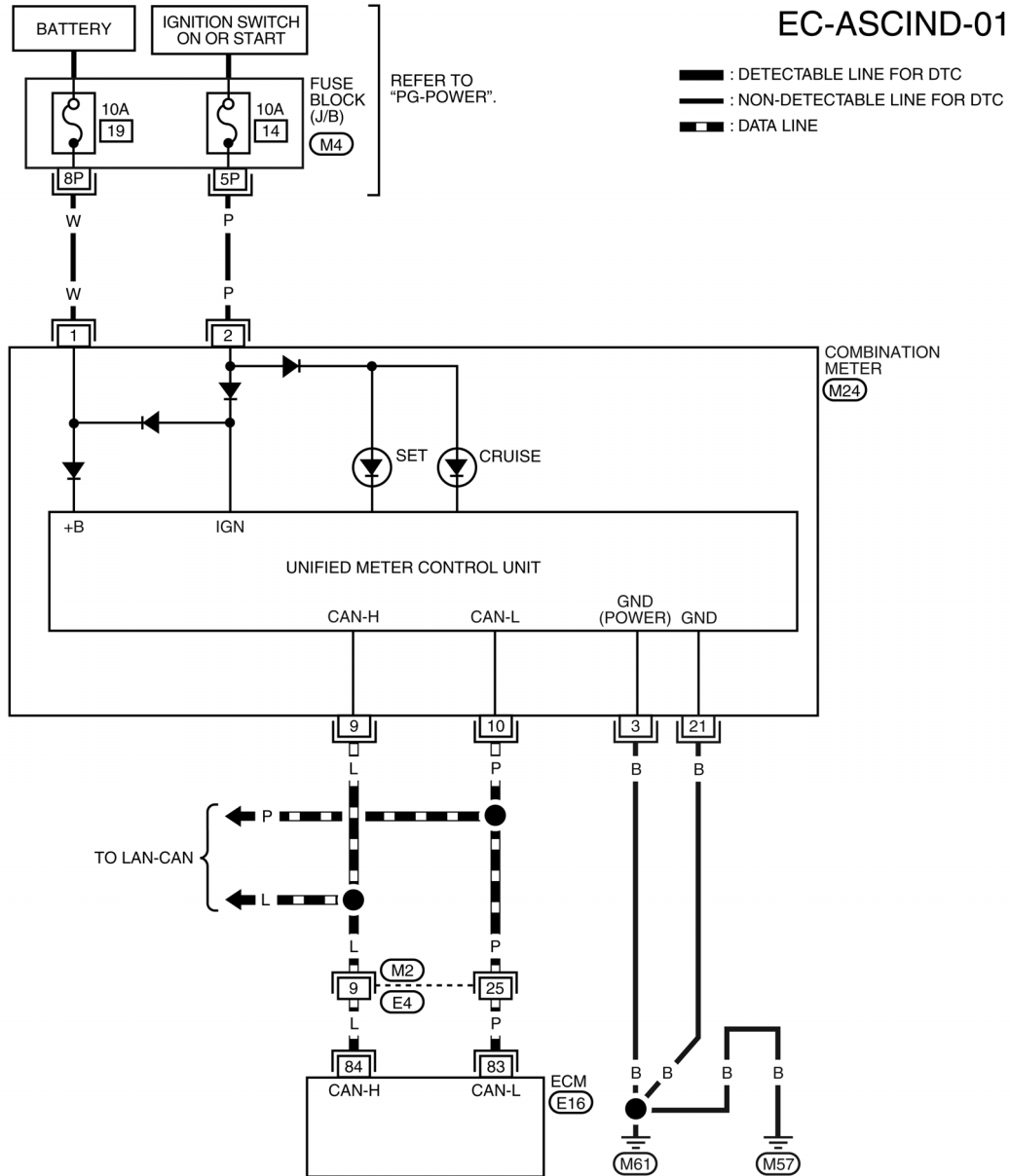
ASCD INDICATOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006580268



ABBWA0155GB

Diagnosis Procedure

INFOID:000000006580269

1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

ASCD indicator	Condition		Specification
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at 1st time → 2nd	ON → OFF
SET LAMP	• MAIN switch: ON • Vehicle: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 2.

2.CHECK DTC

Check that DTC UXXXX is not displayed.

Yes or No

Yes >> Perform trouble diagnoses for DTC UXXXX.

No >> GO TO 3.

3.CHECK COMBINATION METER OPERATION

Does combination meter operate normally?

Yes or No

Yes >> GO TO 4.

No >> Check combination meter circuit. Refer to [DI-6](#).

4.CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

ELECTRICAL LOAD SIGNAL

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

ELECTRICAL LOAD SIGNAL

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580270

Specification data are reference values.

Monitor item	Condition	Specification	
LOAD SIGNAL	• Ignition switch: ON	Rear window defogger switch is ON and/or lighting switch is in 2nd position.	ON
		Rear window defogger switch is OFF and lighting switch is OFF.	OFF
HEATER FAN SW	• Ignition switch: ON	Heater fan: Operating.	ON
		Heater fan: Not operating.	OFF

Diagnosis Procedure

INFOID:000000006580271

1. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

1. Turn ignition switch ON.
2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-III under the following conditions.

Condition	LOAD SIGNAL
Lighting switch: ON at 2nd position	ON
Lighting switch: OFF	OFF

OK or NG

- OK >> GO TO 2.
NG >> GO TO 4.

2. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-III under the following conditions.

Condition	LOAD SIGNAL
Rear window defogger switch: ON	ON
Rear window defogger switch: OFF	OFF

OK or NG

- OK >> GO TO 3.
NG >> GO TO 5.

3. CHECK HEATER FAN SIGNAL CIRCUIT OVERALL FUNCTION

Check "HEATER FAN SW" in "DATA MONITOR" mode with CONSULT-III under the following conditions.

Condition	HEATER FAN SW
Heater fan control switch: ON	ON
Heater fan control switch: OFF	OFF

OK or NG

- OK >> **INSPECTION END.**
NG >> GO TO 6.

4. CHECK HEADLAMP SYSTEM

Refer to [LT-5](#).

>> **INSPECTION END**

5. CHECK REAR WINDOW DEFOGGER SYSTEM

ELECTRICAL LOAD SIGNAL

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Refer to [GW-56](#).

A

>> INSPECTION END

6. CHECK HEATER FAN CONTROL SYSTEM

EC

Refer to [MTC-28](#).

>> INSPECTION END

C

D

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I

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FUEL INJECTOR

< SERVICE INFORMATION >

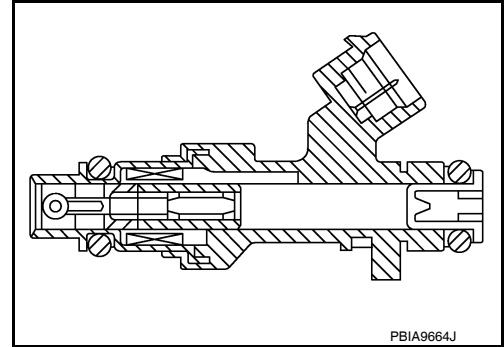
[MR20DE (FOR CALIFORNIA)]

FUEL INJECTOR

Component Description

INFOID:000000006580272

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580273

Specification data are reference values.

Monitor item	Condition	Specification
B/FUEL SCHDL	See EC-145 .	
INJ PULSE-B1	• Engine: After warming up • Air conditioner switch: OFF • Shift lever: P or N (CVT), Neutral (M/T) • No load	Idle
		2,000 rpm
		2.0 - 3.0 msec
		1.9 - 2.9 msec

FUEL INJECTOR

< SERVICE INFORMATION >

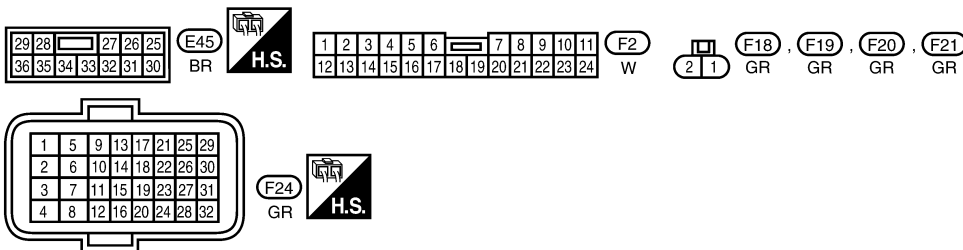
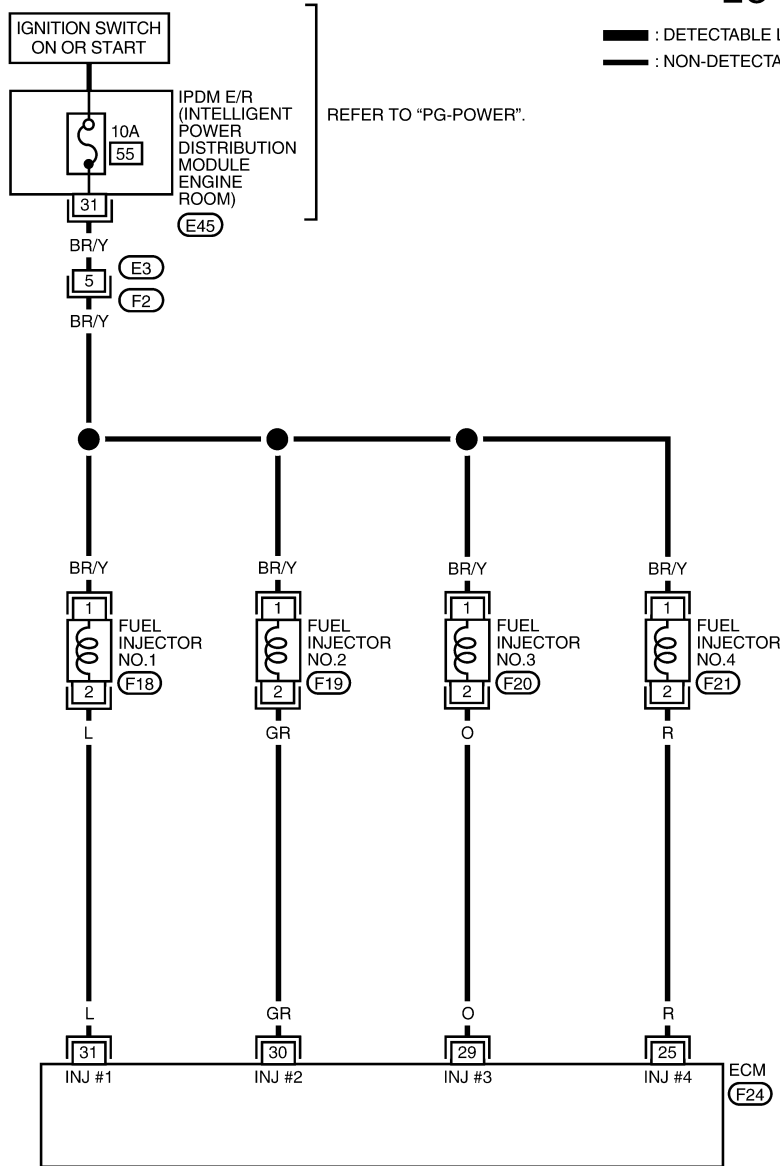
[MR20DE (FOR CALIFORNIA)]

INFOID:00000006580274

Wiring Diagram

EC-INJECT-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA2907E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

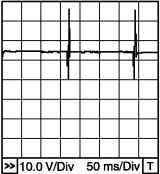
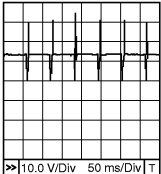
CAUTION:

FUEL INJECTOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25 29 30 31	R O GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle</p>	<p>BATTERY VOLTAGE (11 - 14 V)★</p>  <p>PBIB0529E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	<p>BATTERY VOLTAGE (11 - 14 V)★</p>  <p>PBIA4943J</p>

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

Diagnosis Procedure

INFOID:000000006580275

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

Yes or No

Yes >> GO TO 2.

No >> GO TO 3.

2. CHECK OVERALL FUNCTION

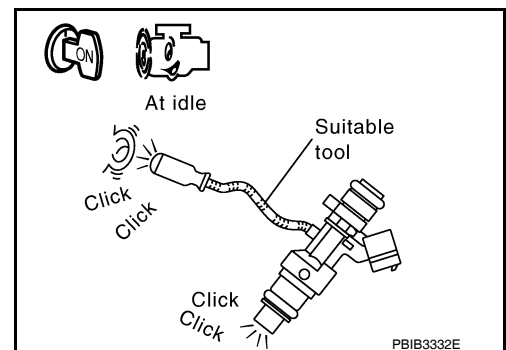
With CONSULT-III

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

1. Start engine.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



OK or NG

OK >> **INSPECTION END**

NG >> GO TO 3.

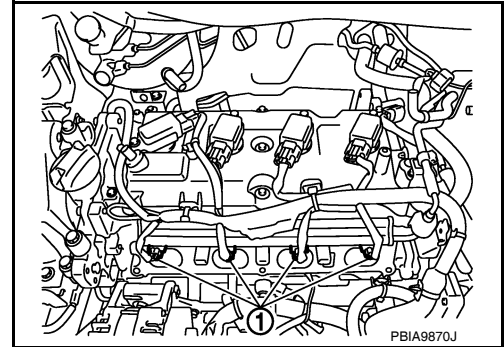
FUEL INJECTOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel injector (1) harness connector.
3. Turn ignition switch ON.

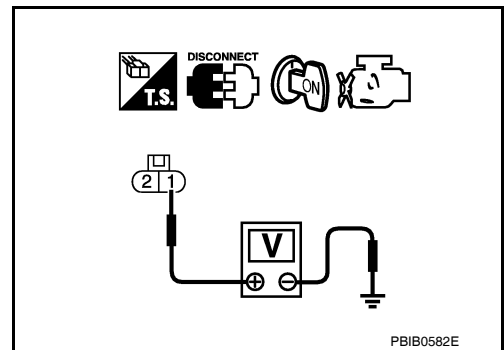


4. Check voltage between fuel injector terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- IPDM E/R harness connector E45
- 10 A fuse
- Harness for open or short between fuel injector and fuse

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

5. CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between fuel injector terminal 2 and ECM terminals 25, 29, 30, 31. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 6.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK FUEL INJECTOR

Refer to [EC-548. "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> Replace fuel injector. Refer to [EM-36. "Removal and Installation"](#).

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

FUEL INJECTOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

>> INSPECTION END

Component Inspection

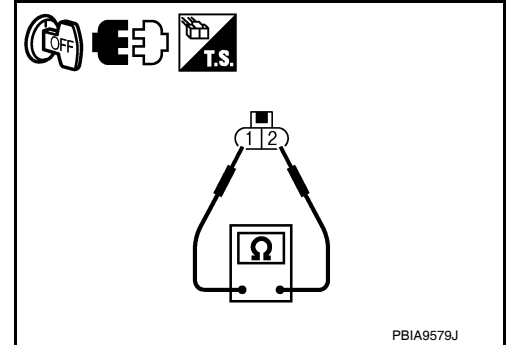
INFOID:000000006580276

FUEL INJECTOR

1. Disconnect fuel injector harness connector.
2. Check resistance between terminals as shown in the figure.

Resistance: 11.1 - 14.3 Ω [at 10 - 60°C (50 - 140°F)]

3. If NG, replace fuel injector. Refer to [EM-36. "Removal and Installation"](#).



FUEL PUMP

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

FUEL PUMP

Description

INFOID:000000006580278

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay
Battery	Battery voltage*		

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

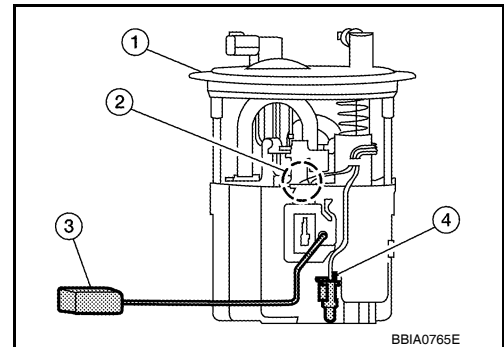
The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine start ability. If the ECM receives a engine speed signal from the crankshaft position sensor (POS) and camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump 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
Engine: Stopped	Stops in 1.5 seconds
Except as shown above	Stops

COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the fuel tank.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)
- Fuel tank temperature sensor (4)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580279

Specification data are reference values.

Monitor item	Condition	Specification
FUEL PUMP RLY	<ul style="list-style-type: none"> • For 1 second after turning ignition switch ON • Engine running or cranking 	ON
	<ul style="list-style-type: none"> • Except above conditions 	OFF

FUEL PUMP

< SERVICE INFORMATION >

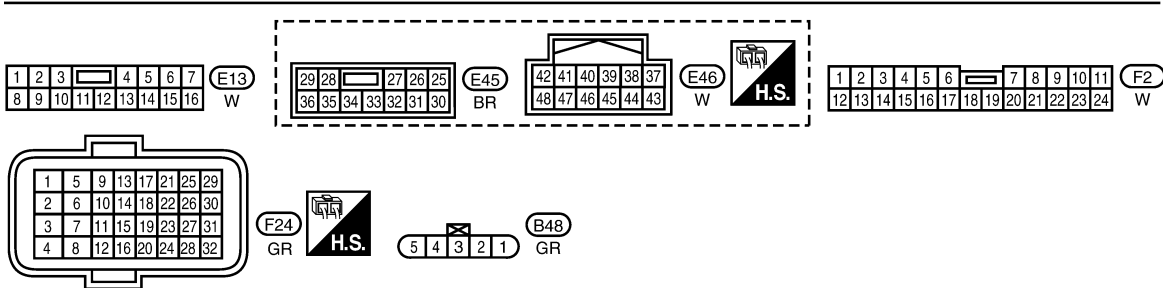
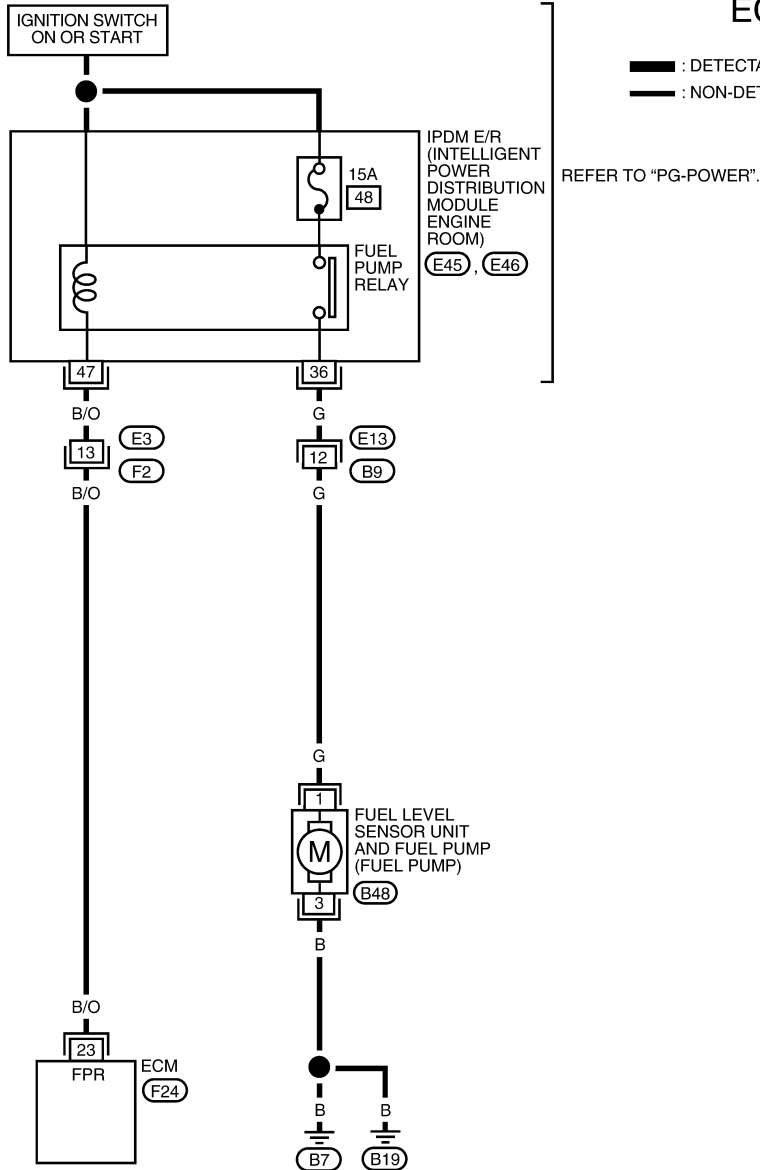
[MR20DE (FOR CALIFORNIA)]

INFOID:000000006580280

Wiring Diagram

EC-F/PUMP-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA2908E

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

CAUTION:

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

FUEL PUMP

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
23	B/O	Fuel pump relay	[Ignition switch: ON] • For 1 second after turning ignition switch ON [Engine is running]	0 - 1.0 V
			[Ignition switch: ON] • More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580281

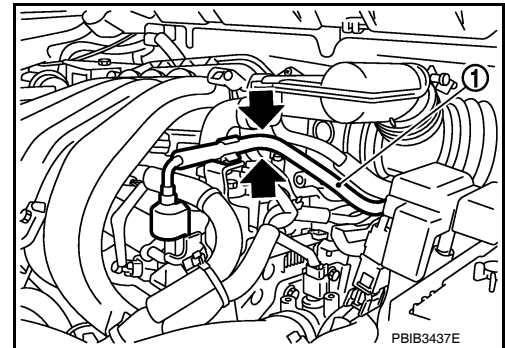
1. CHECK OVERALL FUNCTION

- Turn ignition switch ON.
- Pinch fuel feed hose (1) with two fingers.
- This illumination is shows the view with intake air duct removed.

Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 2.



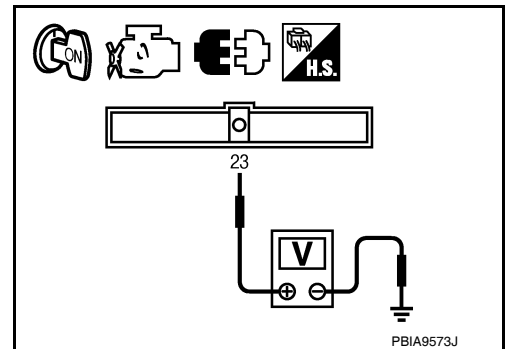
2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Turn ignition switch ON.
- Check voltage between ECM terminal 23 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 3.



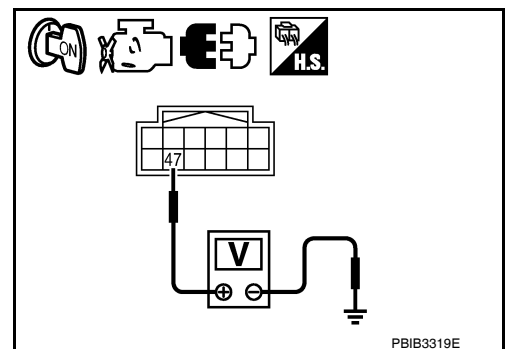
3. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

- Turn ignition switch OFF.
- Disconnect IPDM E/R harness connector E46.
- Turn ignition switch ON.
- Check voltage between IPDM E/R terminal 47 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 4.
 NG >> GO TO 11.



FUEL PUMP

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

4. DETECT MALFUNCTIONING PART

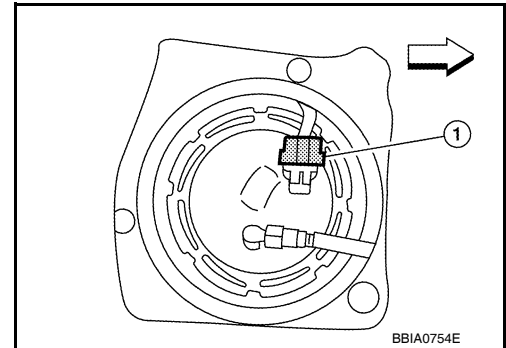
Check the following.

- Harness connectors E3, F2
- Harness for open or short between IPDM E/R and ECM

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

5. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect "fuel level sensor unit and fuel pump" harness connector (1).
 - This illumination is shows the view with inspection hole cover removed.
4. Turn ignition switch ON.

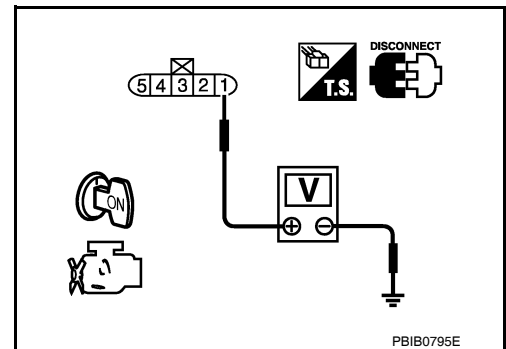


5. Check voltage between "fuel level sensor unit and fuel pump" terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage should exist for 1 second after ignition switch is turned ON.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 6.



6. CHECK 15A FUSE

1. Turn ignition switch OFF.
2. Disconnect 15 A fuse.
3. Check 15A fuse.

OK or NG

- OK >> GO TO 7.
- NG >> Replace fuse.

7. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-IV

1. Disconnect IPDM E/R harness connector E45.
2. Check harness continuity between IPDM E/R terminal 36 and "fuel level sensor unit and fuel pump" terminal 1. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 11.
- NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E13, B9
- Harness for open or short between IPDM E/R and "fuel level sensor unit and fuel pump"

FUEL PUMP

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

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

9. CHECK FUEL PUMP GROUND CIRCUIT

1. Check harness continuity between “fuel level sensor unit and fuel pump” terminal 3 and ground. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to power.

OK or NG

OK >> GO TO 10.

NG >> Repair or replace harness or connectors.

10. CHECK FUEL PUMP

Refer to [EC-553, "Component Inspection"](#).

OK or NG

OK >> GO TO 11.

NG >> Replace fuel pump. Refer to [FL-6, "Component"](#).

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

OK or NG

OK >> Replace IPDM E/R. Refer to [PG-28, "Removal and Installation of IPDM E/R"](#).

NG >> Repair or replace harness or connectors.

Component Inspection

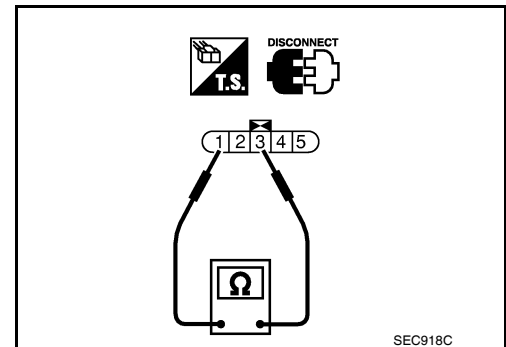
INFOID:000000006580282

FUEL PUMP

1. Disconnect “fuel level sensor unit and fuel pump” harness connector.
2. Check resistance between “fuel level sensor unit and fuel pump” terminals 1 and 3.

Resistance: Approximately 0.2 - 5.0 Ω [at 25°C (77°F)]

3. If NG, replace “fuel level sensor unit and fuel pump”. Refer to [FL-6, "Component"](#).



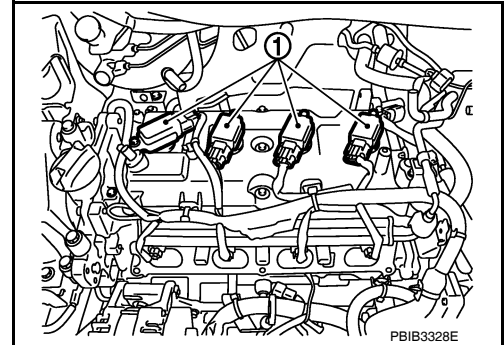
IGNITION SIGNAL

Component Description

INFOID:000000006580284

IGNITION COIL & 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 (1) primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.



IGNITION SIGNAL

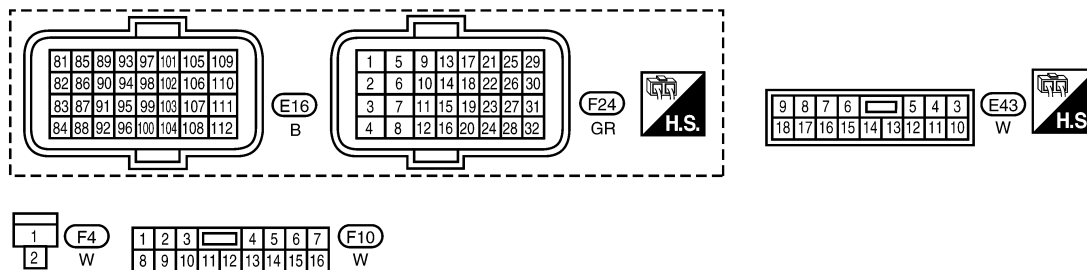
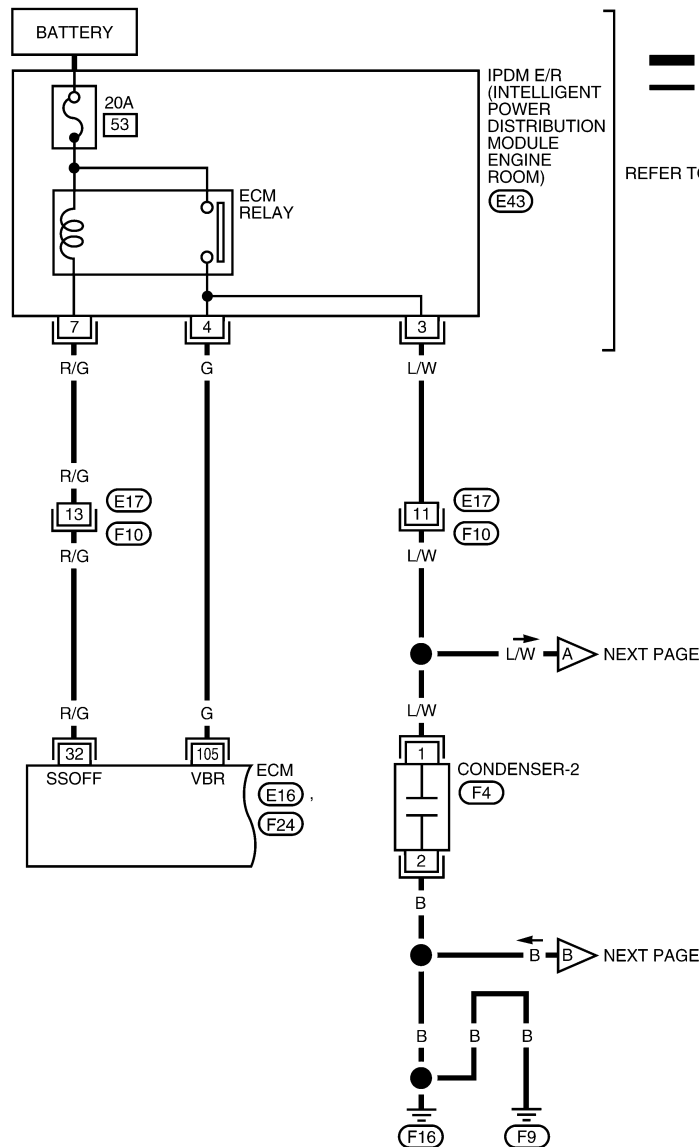
< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

INFOID:000000006580285

Wiring Diagram

EC-IGNSYS-01



AABWA0298GB

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

CAUTION:

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

IGNITION SIGNAL

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

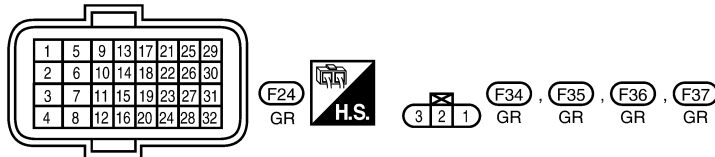
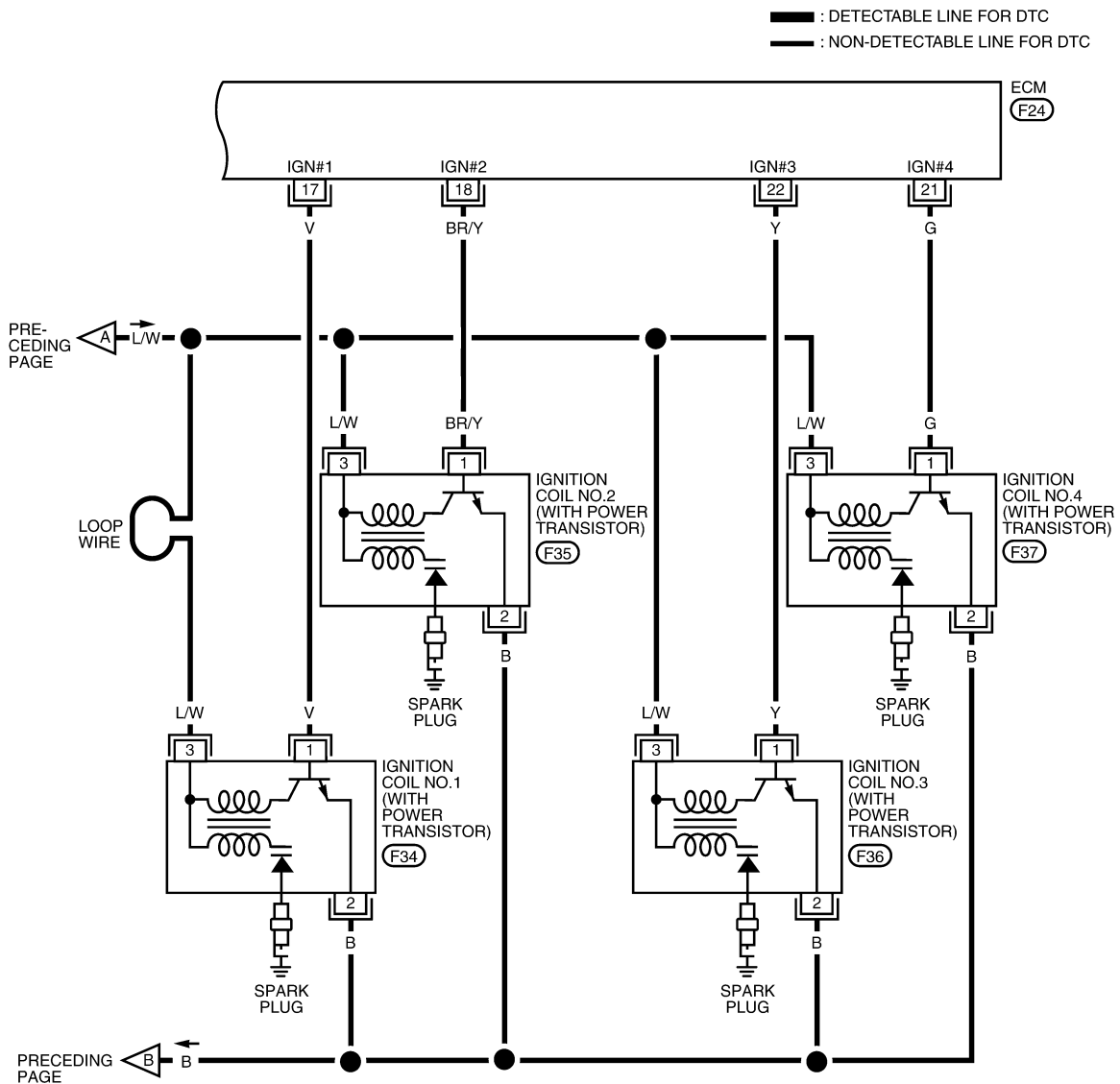
TER- MI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none"> • For a few seconds after turning ignition switch OFF 	0 - 1.0 V
			[Ignition switch: OFF] <ul style="list-style-type: none"> • More than a few seconds after turning ignition switch OFF 	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

IGNITION SIGNAL

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

EC-IGNSYS-02



BBWA2910E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

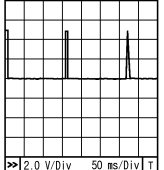
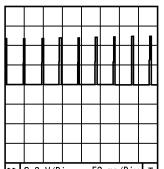
CAUTION:

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

IGNITION SIGNAL

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
17	V	Ignition signal No. 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle</p>	<p style="text-align: center;">0 - 0.3 V★</p>  <p style="text-align: right; font-size: small;">PBI A9265J</p>	
18	BR/Y	Ignition signal No. 2			
21	G	Ignition signal No. 4		<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,500 rpm 	<p style="text-align: center;">0.2 - 0.5 V★</p>  <p style="text-align: right; font-size: small;">PBI A9266J</p>
22	Y	Ignition signal No. 3			

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

Diagnosis Procedure

INFOID:000000006580286

1. CHECK ENGINE START

Turn ignition switch OFF, and restart engine.

Is engine running?

Yes or No

- Yes (With CONSULT-III)>>GO TO 2.
- Yes (Without CONSULT-III)>>GO TO 3.
- No >> GO TO 4.

2. CHECK OVERALL FUNCTION

With CONSULT-III

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
2. Make sure that each circuit produces a momentary engine speed drop.

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 10.

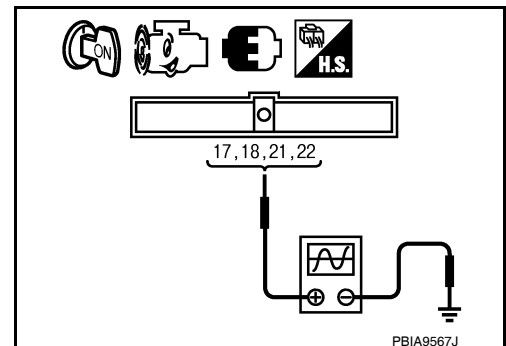
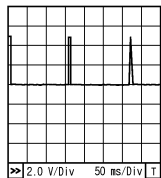
3. CHECK OVERALL FUNCTION

Without CONSULT-III

1. Let engine idle.
2. Read the voltage signal between ECM terminals 17, 18, 21, 22 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.

NOTE:

The pulse cycle changes depending on rpm at idle.



OK or NG

IGNITION SIGNAL

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- OK >> **INSPECTION END**
- NG >> GO TO 10.

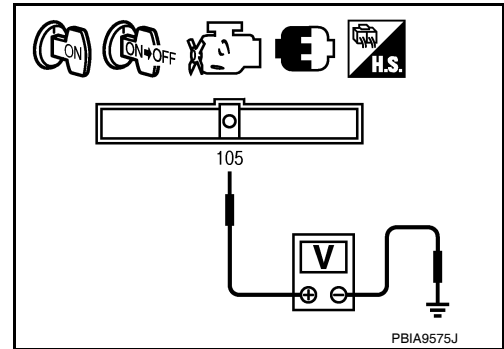
4.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check voltage between ECM terminal 105 and ground with CONSULT-III or tester.

Voltage : Battery voltage

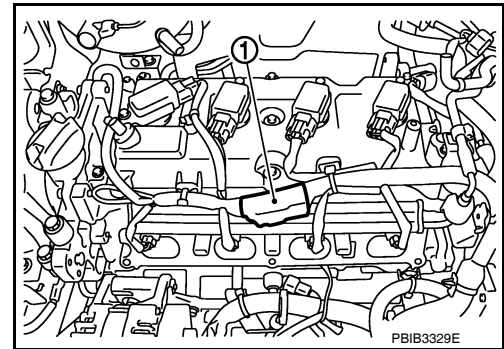
OK or NG

- OK >> GO TO 5.
- NG >> Go to [EC-154](#).



5.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser-2 (1) harness connector.
3. Turn ignition switch ON.

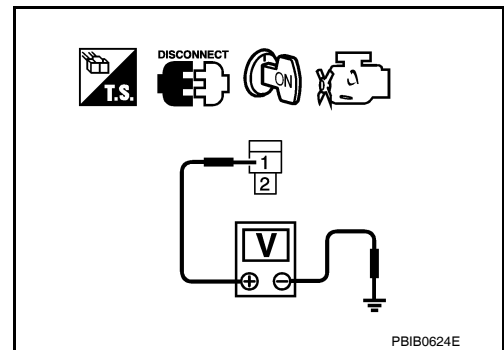


4. Check voltage between condenser-2 terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 6.



6.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between IPDM E/R terminal 3 and condenser-2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> Go to [EC-154](#).
- NG >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10

IGNITION SIGNAL

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Harness for open or short between IPDM E/R and condenser-2

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

8. CHECK CONDENSER-2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between condenser-2 terminal 2 and ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to power in harness or connectors.

9. CHECK CONDENSER-2

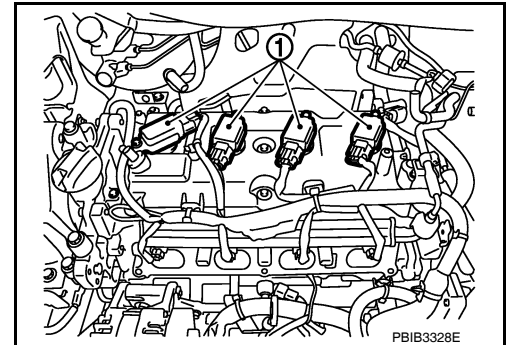
Refer to [EC-561, "Component Inspection"](#)

OK or NG

- OK >> GO TO 10.
- NG >> Replace condenser-2.

10. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil (1) harness connector.
4. Turn ignition switch ON.

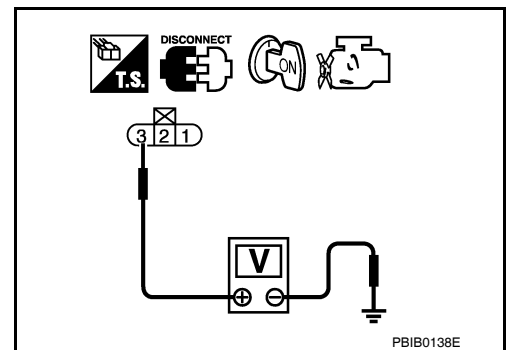


5. Check voltage between ignition coil terminal 3 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 12.
- NG >> GO TO 11.



11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector F10
- Harness for open or short between ignition coil and harness connector F10

>> Repair or replace harness or connectors.

12. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

IGNITION SIGNAL

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Check harness continuity between ignition coil terminal 2 and ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 13.

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

13. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 17, 18, 21, 22 and ignition coil terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 14.

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

14. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-561, "Component Inspection"](#).

OK or NG

OK >> GO TO 15.

NG >> Replace ignition coil with power transistor. Refer to [EM-33, "Component"](#).

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580287

IGNITION COIL WITH POWER TRANSISTOR

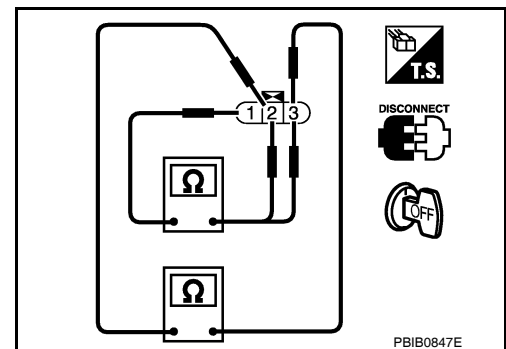
CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminal No. (Polarity)	Resistance [at 25°C (77°F)]
1 and 2	Except 0 or ∞ Ω
1 and 3	Except 0 Ω
2 and 3	

4. If NG, replace ignition coil with power transistor. Refer to [EM-33](#).
If OK, go to next step.
5. Turn ignition switch OFF.
6. Reconnect all harness connectors disconnected.



IGNITION SIGNAL

< SERVICE INFORMATION >

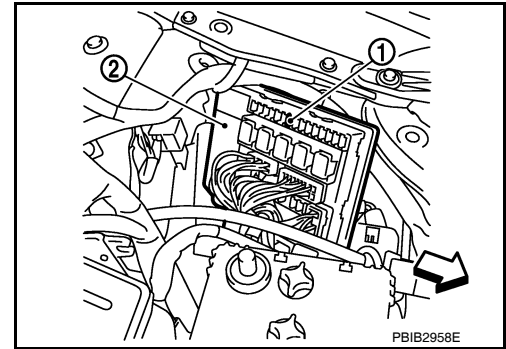
[MR20DE (FOR CALIFORNIA)]

7. Remove fuel pump fuse (1) in IPDM E/R (2) to release fuel pressure.

NOTE:

Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.

- ⇐ : Vehicle front
8. Start engine.
 9. After engine stalls, crank it two or three times to release all fuel pressure.
 10. Turn ignition switch OFF.
 11. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
 12. Remove ignition coil and spark plug of the cylinder to be checked.
 13. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
 14. Connect spark plug and harness connector to ignition coil.
 15. 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.
 16. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

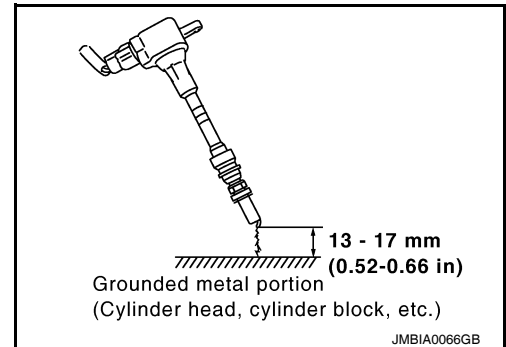
CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm. 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.

17. If NG, replace ignition coil with power transistor. Refer to [EM-33](#).

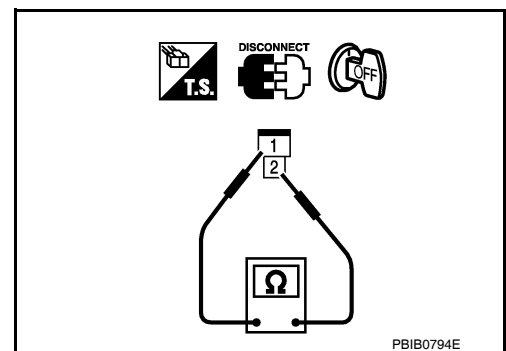


CONDENSER-2

1. Turn ignition switch OFF.
2. Disconnect condenser-2 harness connector.
3. Check resistance between condenser-2 terminals 1 and 2.

Resistance: Above 1 MΩ [at 25°C (77°F)]

4. If NG, replace condenser-2.



REFRIGERANT PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

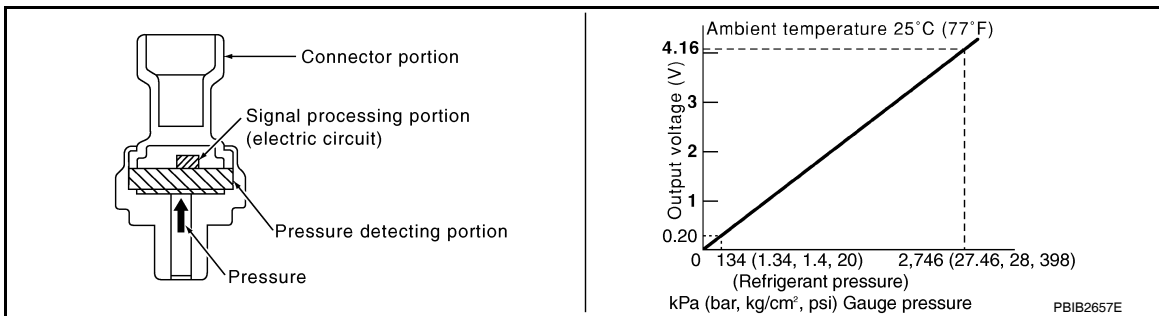
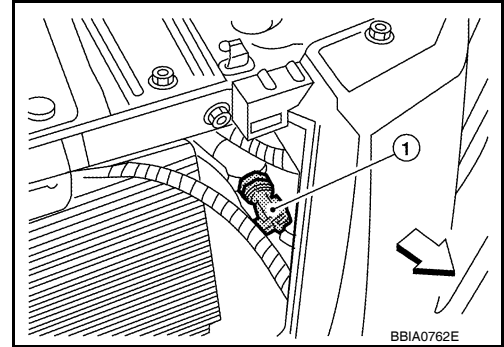
REFRIGERANT PRESSURE SENSOR

Component Description

INFOID:000000006580289

The refrigerant pressure sensor (1) 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.

- ←: Vehicle front



REFRIGERANT PRESSURE SENSOR

< SERVICE INFORMATION >

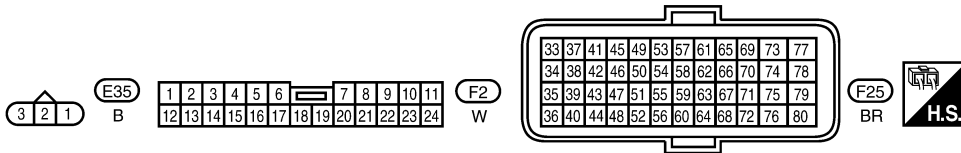
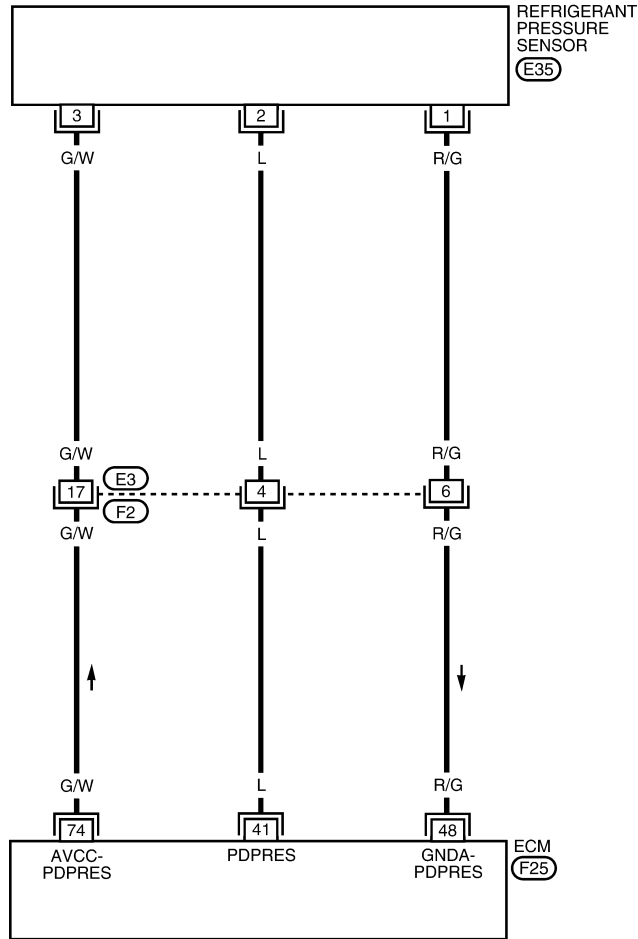
[MR20DE (FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580290

EC-RP/SEN-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA2911E

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

CAUTION:

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

REFRIGERANT PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
41	L	Refrigerant pressure sensor	[Engine is running] • Warm-up condition • Both A/C switch and blower fan switch: ON (Compressor operates)	1.0 - 4.0 V
48	R/G	Sensor ground (Refrigerant pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

INFOID:000000006580291

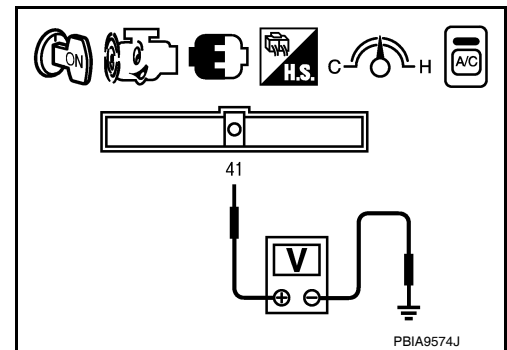
1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower fan switch ON.
3. Check voltage between ECM terminal 41 and ground with CONSULT-III or tester.

Voltage : 1.0 - 4.0 V

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 2.



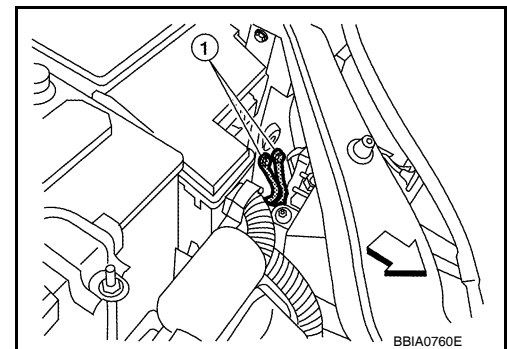
2. CHECK GROUND CONNECTIONS

1. Turn A/C switch and blower fan switch OFF.
2. Stop engine and turn ignition switch OFF.
3. Loosen and retighten ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).

- ⇐: Vehicle front
- Body ground (1)

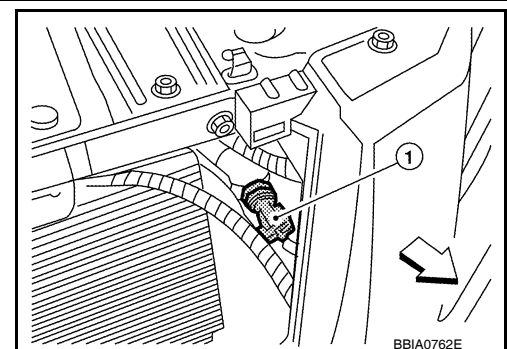
OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace ground connections.



3. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor (1) harness connector.
- ⇐: Vehicle front
2. Turn ignition switch ON.



REFRIGERANT PRESSURE SENSOR

[MR20DE (FOR CALIFORNIA)]

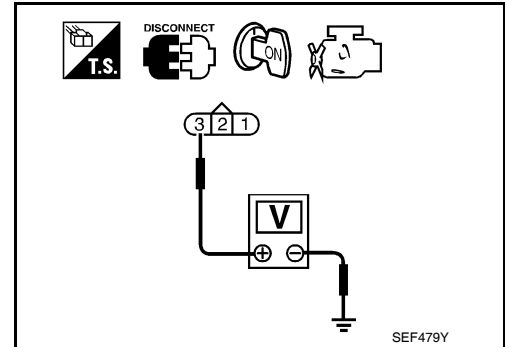
< SERVICE INFORMATION >

3. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-III or tester.

Voltage : Approximately 5 V

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between refrigerant pressure sensor and ECM

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

5. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between refrigerant pressure sensor terminal 1 and ECM terminal 48. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between refrigerant pressure sensor and ECM

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

7. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between refrigerant pressure sensor terminal 2 and ECM terminal 41. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between refrigerant pressure sensor and ECM

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

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

REFRIGERANT PRESSURE SENSOR

[MR20DE (FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

- OK >> Replace refrigerant pressure sensor. Refer to [MTC-92, "Removal and Installation for Refrigerant Pressure Sensor"](#).
- NG >> Repair or replace.

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MIL AND DATA LINK CONNECTOR

< SERVICE INFORMATION >

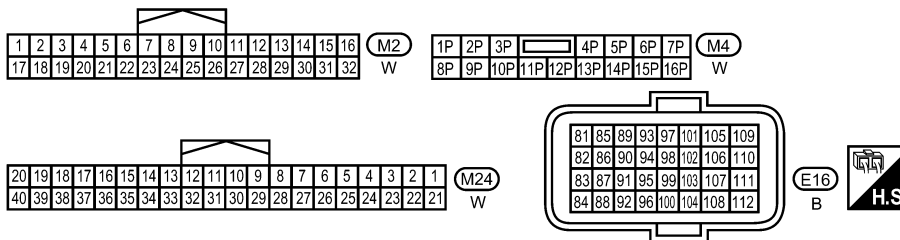
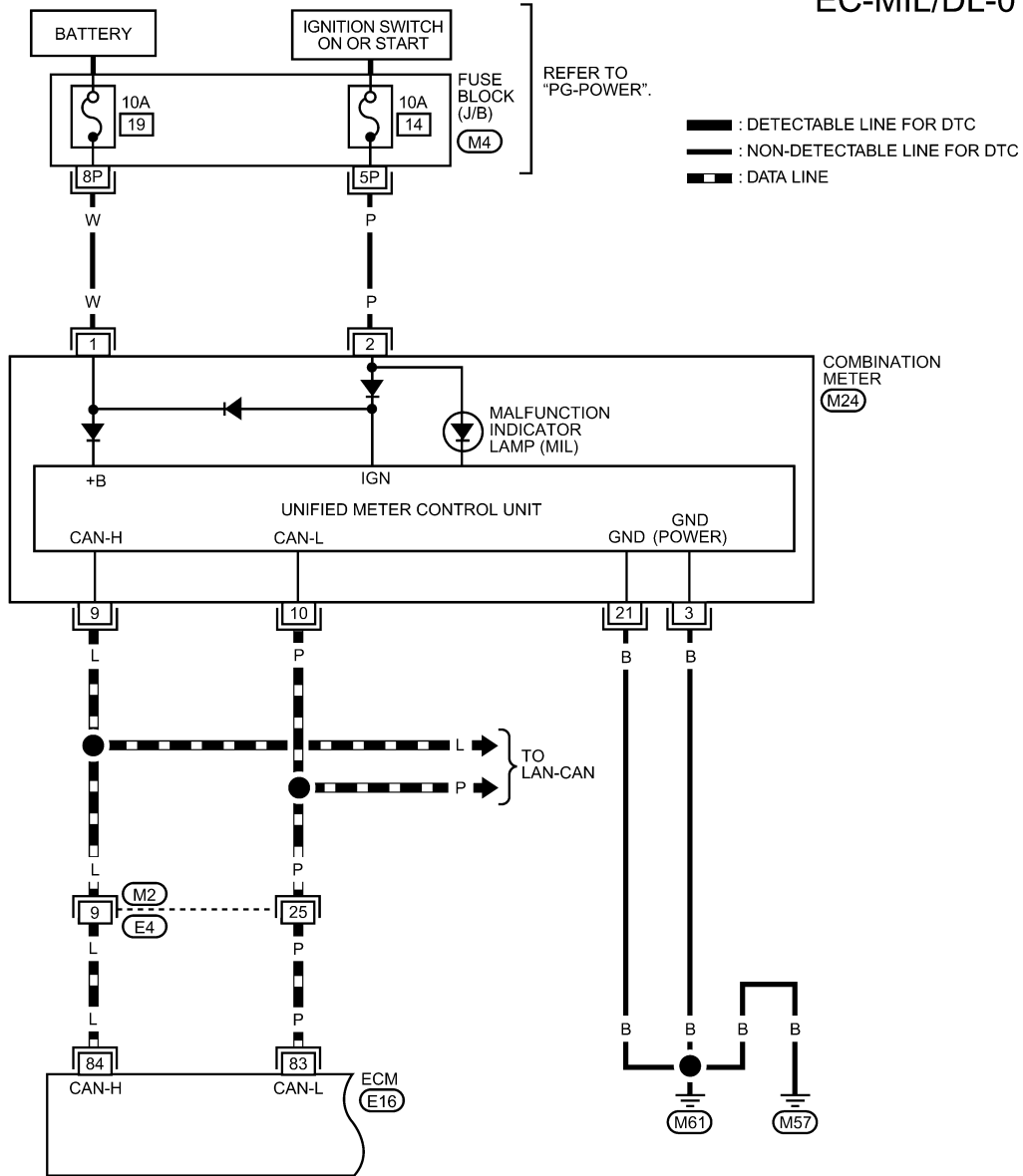
[MR20DE (FOR CALIFORNIA)]

MIL AND DATA LINK CONNECTOR

Wiring Diagram

INFOID:000000006580293

EC-MIL/DL-01



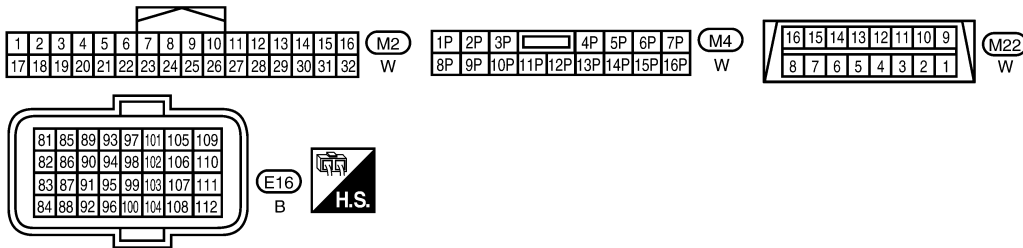
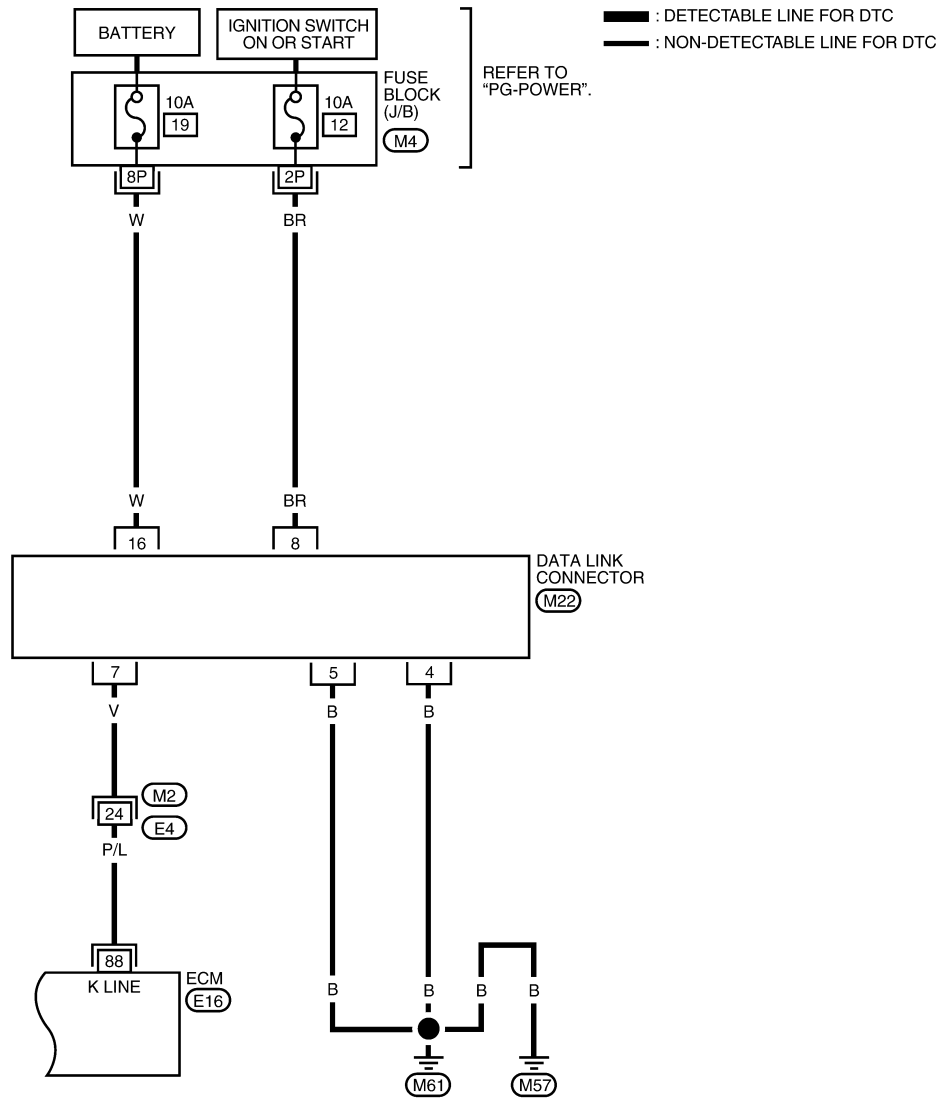
ABBWA0156GB

MIL AND DATA LINK CONNECTOR

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

EC-MIL/DL-02



BBWA2913E

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SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Pressure

INFOID:000000006580294

Fuel pressure at idle	Approximately 350 kPa (3.57 kg/cm ² , 51 psi)
-----------------------	--

Idle Speed and Ignition Timing

INFOID:000000006580295

Target idle speed	CVT	No load* ¹ (In P or N position)	700 ± 50 rpm
	M/T	No load* ¹ (in Neutral position)	675 ± 50 rpm
Air conditioner: ON	CVT	In P or N position	800 rpm or more
	M/T	In Neutral position	
Ignition timing	CVT	In P or N position	6 ± 5° BTDC
	M/T	In Neutral position	

*1: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Calculated Load Value

INFOID:000000006580296

	Calculated load value (Using CONSULT-III or GST)
At idle	10 - 35 %
At 2,500 rpm	10 - 35 %

Mass Air Flow Sensor

INFOID:000000006580297

Supply voltage	Battery voltage (11 - 14 V)
Output voltage at idle	0.9 - 1.2* V
Mass air flow (Using CONSULT-III or GST)	1.0 - 4.0 g/sec at idle* 2.0 - 10.0 g·m/sec at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no load.

Intake Air Temperature Sensor

INFOID:000000006580298

Temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200

Engine Coolant Temperature Sensor

INFOID:000000006580299

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.37 - 2.63
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

Air Fuel Ratio (A/F) Sensor 1 Heater

INFOID:000000006580300

Resistance [at 25°C (77°F)]	1.8 - 2.44 Ω
-----------------------------	--------------

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[MR20DE (FOR CALIFORNIA)]

Heated Oxygen sensor 2 Heater

INFOID:000000006580301

A

Resistance [at 25°C (77°F)]	3.4 - 4.4 Ω
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Crankshaft Position Sensor (POS)

INFOID:000000006580302

EC

Refer to [EC-320, "Component Inspection"](#).

Camshaft Position Sensor (PHASE)

INFOID:000000006580303

C

Refer to [EC-325, "Component Inspection"](#).

Throttle Control Motor

INFOID:000000006580304

D

Resistance [at 25°C (77°F)]	Approximately 1 - 15 Ω
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E

Fuel Injector

INFOID:000000006580305

F

Resistance [at 10 - 60°C (50 - 140°F)]	11.1 - 14.3 Ω
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Fuel Pump

INFOID:000000006580306

G

Resistance [at 25°C (77°F)]	Approximately 0.2 - 5.0 Ω
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INDEX FOR DTC

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[MR20DE (EXCEPT FOR CALIFORNIA)]

SERVICE INFORMATION

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U0101-U1001

INFOID:000000006580307

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
U0101	0101*4	LOST COMM (TCM)	EC-708
U0140	0140*4	LOST COMM (BCM)	EC-710
U1001	1001*4	CAN COMM CIRCUIT	EC-712

*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: The troubleshooting for this DTC needs CONSULT-III.

P0011-P0075

INFOID:000000006580308

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0011	0011	INT/V TIM CONT-B1	EC-714
P0031	0031	A/F SEN1 HTR (B1)	EC-718
P0032	0032	A/F SEN1 HTR (B1)	EC-718
P0037	0037	HO2S2 HTR (B1)	EC-723
P0038	0038	HO2S2 HTR (B1)	EC-723
P0075	0075	INT/V TIM V/CIR-B1	EC-729

*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.

P0101-P0128

INFOID:000000006580309

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0101	0101	MAF SEN/CIRCUIT-B1	EC-734
P0102	0102	MAF SEN/CIRCUIT-B1	EC-741
P0103	0103	MAF SEN/CIRCUIT-B1	EC-741
P0112	0112	IAT SEN/CIRCUIT-B1	EC-748
P0113	0113	IAT SEN/CIRCUIT-B1	EC-748
P0116	0116	ECT SEN/CIRC	EC-752
P0117	0117	ECT SEN/CIRC	EC-755
P0118	0118	ECT SEN/CIRC	EC-755
P0122	0122	TP SEN 2/CIRC-B1	EC-760
P0123	0123	TP SEN 2/CIRC-B1	EC-760
P0125	0125	ECT SENSOR	EC-765

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[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0127	0127	IAT SENSOR-B1	EC-768
P0128	0128	THERMSTAT FNCTN	EC-771

*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.

P0130-P0198

INFOID:000000006580310

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0130	0130	A/F SENSOR1 (B1)	EC-773
P0131	0131	A/F SENSOR1 (B1)	EC-778
P0132	0132	A/F SENSOR1 (B1)	EC-783
P0137	0137	HO2S2 (B1)	EC-788
P0138	0138	HO2S2 (B1)	EC-795
P0139	0139	HO2S2 (B1)	EC-804
P014C	014C	A/F SENSOR1 (B1)	EC-812
P014D	014D	A/F SENSOR1 (B1)	EC-812
P015A	015A	A/F SENSOR1 (B1)	EC-812
P015B	015B	A/F SENSOR1 (B1)	EC-812
P0171	0171	FUEL SYS-LEAN-B1	EC-820
P0172	0172	FUEL SYS-RICH-B1	EC-826
P0181	0181	FTT SENSOR	EC-832
P0182	0182	FTT SEN/CIRCUIT	EC-836
P0183	0183	FTT SEN/CIRCUIT	EC-836
P0196	0196	EOT SEN/CIRCUIT	EC-840
P0197	0197	EOT SEN/CIRCUIT	EC-843
P0198	0198	EOT SEN/CIRCUIT	EC-843

*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.

P0222-P0420

INFOID:000000006580311

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0222	0222	TP SEN 1/CIRC-B1	EC-847
P0223	0223	TP SEN 1/CIRC-B1	EC-847
P0300	0300	MULTI CYL MISFIRE	EC-852
P0301	0301	CYL 1 MISFIRE	EC-852
P0302	0302	CYL 2 MISFIRE	EC-852
P0303	0303	CYL 3 MISFIRE	EC-852

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[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0304	0304	CYL 4 MISFIRE	EC-852
P0327	0327	KNOCK SEN/CIRC-B1	EC-858
P0328	0328	KNOCK SEN/CIRC-B1	EC-858
P0335	0335	CKP SEN/CIRCUIT	EC-862
P0340	0340	CMP SEN/CIRC-B1	EC-868
P0420	0420	TW CATALYST SYS-B1	EC-873

*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.

P0441-P0463

INFOID:000000006580312

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0441	0441	EVAP PURG FLOW/MON	EC-878
P0442	0442	EVAP SMALL LEAK	EC-883
P0443	0443	PURG VOLUME CONT/V	EC-890
P0444	0444	PURG VOLUME CONT/V	EC-898
P0445	0445	PURG VOLUME CONT/V	EC-898
P0447	0447	VENT CONTROL VALVE	EC-904
P0448	0448	VENT CONTROL VALVE	EC-910
P0451	0451	EVAP SYS PRES SEN	EC-916
P0452	0452	EVAP SYS PRES SEN	EC-919
P0453	0453	EVAP SYS PRES SEN	EC-926
P0455	0455	EVAP GROSS LEAK	EC-934
P0456	0456	EVAP VERY SML LEAK	EC-941
P0460	0460	FUEL LEV SEN SLOSH	EC-949
P0461	0461	FUEL LEVEL SENSOR	EC-951
P0462	0462	FUEL LEVL SEN/CIRC	EC-953
P0463	0463	FUEL LEVL SEN/CIRC	EC-953

*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.

P0500-P0643

INFOID:000000006580313

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0500	0500	VEH SPEED SEN/CIRC	EC-955
P0506	0506	ISC SYSTEM	EC-957
P0507	0507	ISC SYSTEM	EC-959
P050A	050A	COLD START CONTROL	EC-961

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[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P050B	050B	COLD START CONTROL	EC-961
P050E	050E	COLD START CONTROL	EC-961
P0603	0603	ECM BACK UP/CIRCUIT	EC-963
P0605	0605	ECM	EC-966
P0607	0607	ECM	EC-968
P0643	0643	SENSOR POWER/CIRC	EC-969

*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.

P0705-P0840

INFOID:000000006580314

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0705	0705	T/M RANGE SENSOR A	CVT-61
P0710	0710	FLUID TEMP SENSOR A*4	CVT-66
P0715	0715	INPUT SPEED SENSOR A	CVT-71
P0720	0720	OUTPUT SPEED SENSOR	CVT-76
P0740	0740	TORQUE CONVERTER	CVT-84
P0744	0744	TORQUE CONVERTER	CVT-89
P0745	0745	PC SOLENOID A	CVT-91
P0746	0746	PC SOLENOID A	CVT-96
P0776	0776	PC SOLENOID B	CVT-98
P0778	0778	PC SOLENOID B	CVT-100
P0840	0840	FLUID PRESS SEN/SW A	CVT-110

*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: When erasing this DTC, always use CONSULT-III or GST.

P0850-P1574

INFOID:000000006580315

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0850	0850	P-N POS SW/CIRCUIT	EC-974
P1148	1148	CLOSED LOOP-B1	EC-979
P1212	1212	TCS/CIRC	EC-980
P1217	1217	ENG OVER TEMP	EC-981
P1225	1225	CTP LEARNING-B1	EC-993
P1226	1226	CTP LEARNING-B1	EC-994
P1564	1564	ASCD SW	EC-995

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[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P1572	1572	ASCD BRAKE SW	EC-1001
P1574	1574	ASCD VHL SPD SEN	EC-1010

*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.

P1610-P1615

INFOID:000000006580316

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P1610	1610	LOCK MODE	BL-170
P1611	1611	ID DISCORD, IMM-ECM	
P1612	1612	CHAIN OF ECM-IMMU	
P1614	1614	CHAIN OF IMMU-KEY	
P1615	1615	DIFFERENCE OF KEY	

*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.

P1715-P1805

INFOID:000000006580317

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P1715	1715	IN PULY SPEED	EC-1012
P1740	1740	SLCT SOLENOID	CVT-129
P1777	1777	STEP MOTOR	CVT-135
P1778	1778	STEP MOTOR	CVT-139
P1805	1805	BRAKE SW/CIRCUIT	EC-1014

*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.

P2100-P2A00

INFOID:000000006580318

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P2100	2100	ETC MOT PWR-B1	EC-1018
P2101	2101	ETC FNCTN/CIRC-B1	EC-1022
P2103	2103	ETC MOT PWR	EC-1018
P2118	2118	ETC MOT-B1	EC-1028
P2119	2119	ETC ACTR-B1	EC-1032
P2122	2122	APP SEN 1/CIRC	EC-1034

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[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P2123	2123	APP SEN 1/CIRC	EC-1034
P2127	2127	APP SEN 2/CIRC	EC-1039
P2128	2128	APP SEN 2/CIRC	EC-1039
P2135	2135	TP SENSOR-B1	EC-1046
P2138	2138	APP SENSOR	EC-1051
P2A00	2A00	A/F SENSOR1 (B1)	EC-1058

*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.

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PRECAUTIONS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

PRECAUTIONS

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

INFOID:000000006580319

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 and SB section of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized 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 the SRS section.
- Do not 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:

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT 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.

On Board Diagnosis (OBD) System of Engine and CVT

INFOID:000000006580320

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

CAUTION:

- Be sure to turn the ignition switch OFF and disconnect the battery ground cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to [PG-60](#).
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EVAP system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

PRECAUTIONS

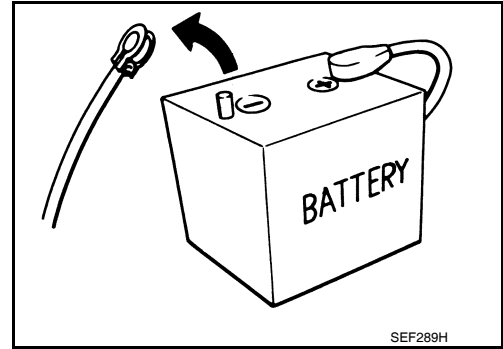
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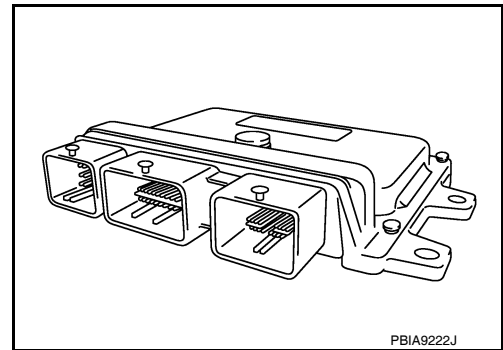
Precaution

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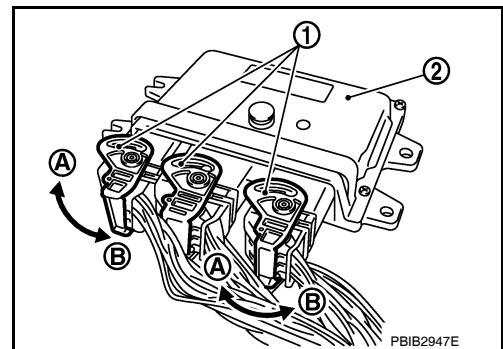
- Always use a 12 V battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.
- Before removing parts, turn ignition switch OFF and then disconnect negative battery cable.



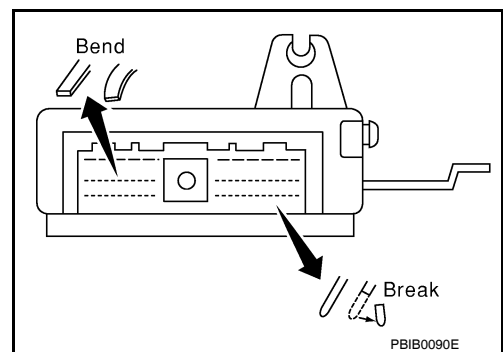
- Do not disassemble ECM.
- If battery cable is disconnected, the memory will return to the initial ECM values.
The ECM will now start to self-control at its initial values. Engine operation can vary slightly in this case. However, this is not an indication of a malfunction. Do not replace parts because 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, take care not to damage pin terminals (bend or break).
Make sure 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.



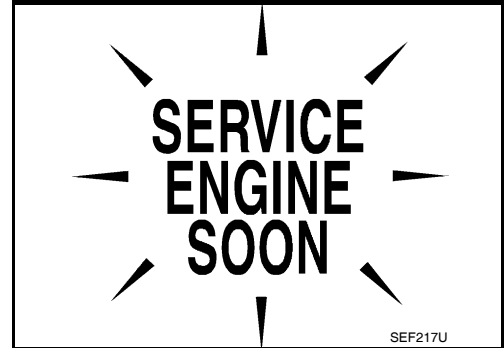
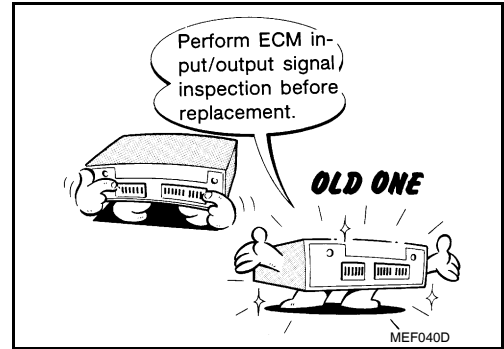
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PRECAUTIONS

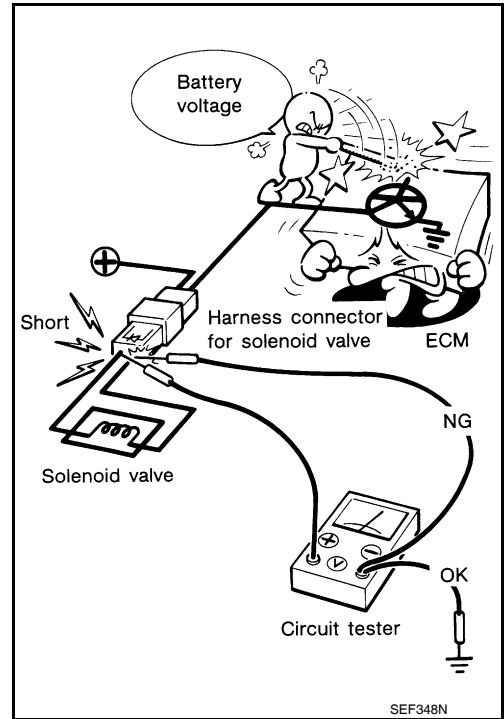
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[MR20DE (EXCEPT FOR CALIFORNIA)]

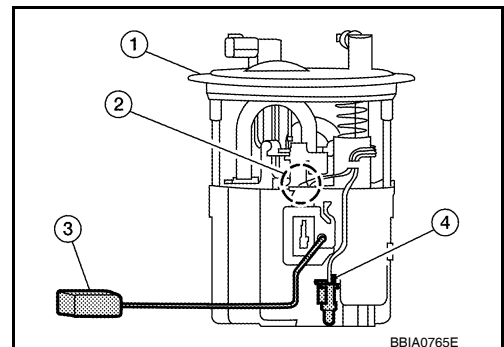
- Before replacing ECM, perform “ECM Terminals and Reference Value” inspection and make sure ECM functions properly. Refer to [EC-673, "ECM Terminal and Reference Value"](#).
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble electric throttle control actuator.
- Even a slight leak in the air intake system can cause serious incidents.
- Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).
- After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Overall Function Check. The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Overall Function Check should be a good result if the repair is completed.



- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.



- Do not operate fuel pump when there is no fuel in lines.
- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)
- Fuel tank temperature sensor (4)
- Tighten fuel hose clamps to the specified torque.

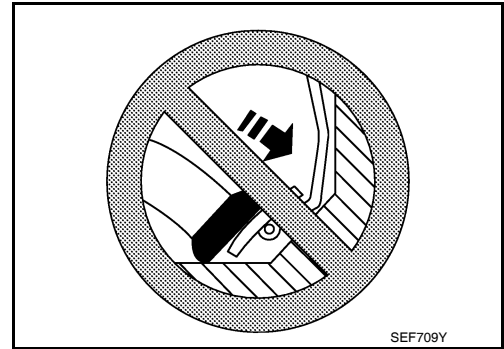


PRECAUTIONS

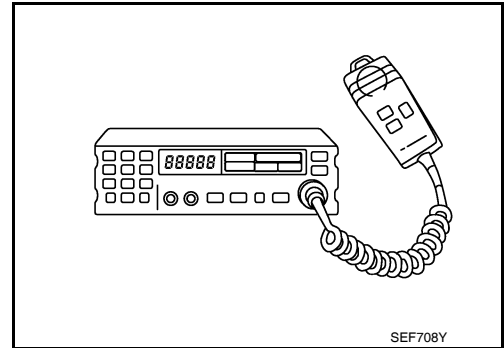
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[MR20DE (EXCEPT FOR CALIFORNIA)]

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



- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
 - 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. Do not 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.



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PREPARATION

< SERVICE INFORMATION >

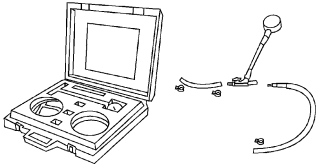
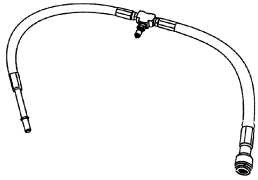
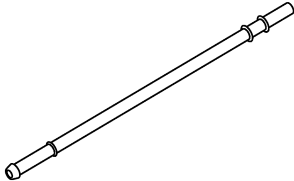
[MR20DE (EXCEPT FOR CALIFORNIA)]

PREPARATION

Special Service Tool

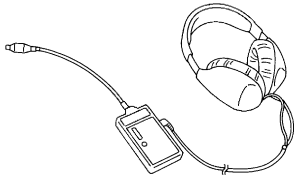
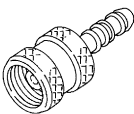
INFOID:000000006580322

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

Tool number (Kent-Moore No.) Tool name	Description
(J-44321) Fuel pressure gauge Kit <div style="text-align: center;">  <p>LEC642</p> </div>	Checking fuel pressure
(J-44321-6) Fuel pressure adapter <div style="text-align: center;">  <p>LBIA0376E</p> </div>	Connecting fuel pressure gauge to quick connector type fuel lines.
KV10118400 Fuel tube adapter <div style="text-align: center;">  <p>PBIB3043E</p> </div>	Measuring fuel pressure

Commercial Service Tool

INFOID:000000006580323

Tool number (Kent-Moore No.) Tool name	Description
Leak detector i.e.: (J-41416) <div style="text-align: center;">  <p>S-NT703</p> </div>	Locating the EVAP leak
EVAP service port adapter i.e.: (J-41413-OBD) <div style="text-align: center;">  <p>S-NT704</p> </div>	Applying positive pressure through EVAP service port

PREPARATION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Tool number (Kent-Moore No.) Tool name	Description	A
Fuel filler cap adapter i.e.: (MLR-8382) <div style="text-align: center;"> </div> <div style="text-align: center;">S-NT815</div>	Checking fuel tank vacuum relief valve opening pressure	EC C
Socket wrench <div style="text-align: center;"> </div> <div style="text-align: center;">S-NT705</div>	Removing and installing engine coolant temperature sensor	D E F
Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12) <div style="text-align: center;"> </div> <div style="text-align: center;">AEM488</div>	Reconditioning 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 Zirconia Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titanium Oxygen Sensor	G H
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907) <div style="text-align: center;"> </div> <div style="text-align: center;">S-NT779</div>	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.	I J K

ENGINE CONTROL SYSTEM

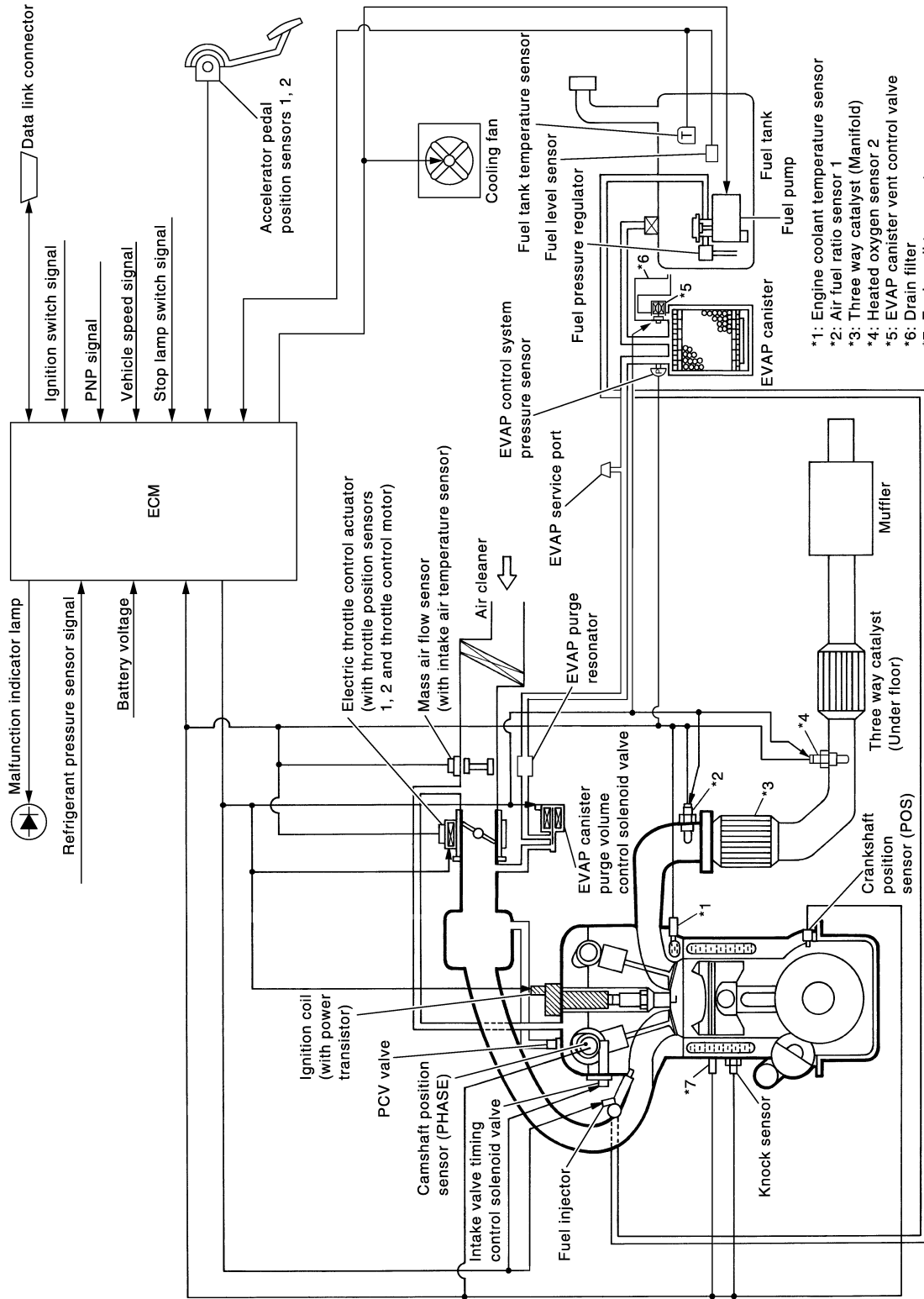
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

ENGINE CONTROL SYSTEM

Schematic

INFOID:000000006580324



JPBIA3044GB

Multiport Fuel Injection (MFI) System

INFOID:000000006580325

INPUT/OUTPUT SIGNAL CHART

ENGINE CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*3 Piston position	Fuel injection & mixture ratio control	Fuel injector
Camshaft position sensor (PHASE)			
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		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) switch (M/T) Transmission range switch (CVT)	Gear position		
Battery	Battery voltage*3		
Knock sensor	Engine knocking condition		
EPS control unit	Power steering operation*2		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
Air conditioner switch	Air conditioner operation*2		
ABS actuator and electric unit (control unit)	Vehicle speed*2		
Combination meter			

- *1: This sensor is not used to control the engine system under normal conditions.
- *2: This signal is sent to the ECM through 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.

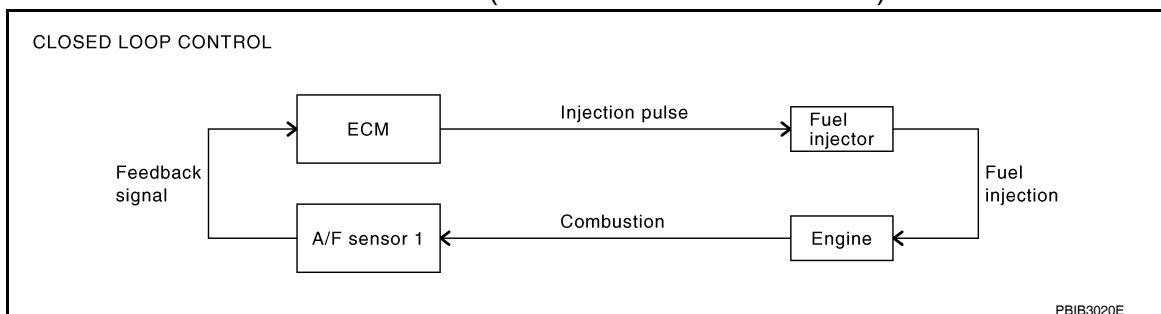
VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

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 is changed from N to D (CVT models)
 - High-load, high-speed operation

- <Fuel decrease>
- During deceleration
 - During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



ENGINE CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

The mixture ratio feedback system provides the best air/fuel mixture ratio for drivability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses air fuel ratio (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 air fuel ratio (A/F) sensor 1, refer to [EC-778](#). 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 air fuel ratio (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 control stops in order to maintain stabilized fuel combustion.

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

MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from air fuel ratio (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.

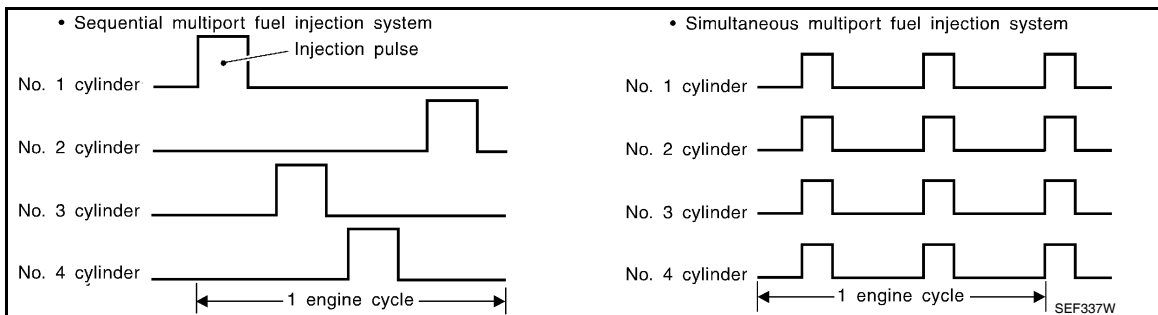
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"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 air fuel ratio (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 long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

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 firing order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System

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

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

ENGINE CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

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.

Electronic Ignition (EI) System

INFOID:000000006580326

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2	Ignition timing control	Power transistor
Camshaft position sensor (PHASE)	Piston position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Battery	Battery voltage*2		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch (M/T) Transmission range switch (CVT)	Gear position		
ABS actuator and electric unit (control unit)	Vehicle speed*1		
Combination meter			

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

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

SYSTEM DESCRIPTION

Firing order: 1 - 3 - 4 - 2

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

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.

Fuel Cut Control (at No Load and High Engine Speed)

INFOID:000000006580327

INPUT/OUTPUT SIGNAL CHART

ENGINE CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Sensor	Input Signal to ECM	ECM function	Actuator
Park/neutral position (PNP) switch (M/T) Transmission range switch (CVT)	Neutral position	Fuel cut control	Fuel injector
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
ABS actuator and electric unit (control unit) Combination meter	Vehicle speed*		

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

SYSTEM DESCRIPTION

If the engine speed is above 2,000 rpm under no load (for example, the shift lever position is P or N (CVT), Neutral (M/T) and engine speed is over 2,400 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 1,500 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under [EC-584. "Multiport Fuel Injection \(MFI\) System"](#).

AIR CONDITIONING CUT CONTROL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

AIR CONDITIONING CUT CONTROL

Input/Output Signal Chart

INFOID:000000006580328

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner ON signal*1	Air conditioner cut control	Air conditioner relay
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*2		
Refrigerant pressure sensor	Refrigerant pressure		
EPS control unit	Power steering operation*1		
ABS actuator and electric unit (control unit)	Vehicle speed*1		
Combination meter			

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

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

System Description

INFOID:000000006580329

This system improves engine operation when the air conditioner is used. Under the following conditions, the air conditioner is turned off.

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

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Description

INFOID:000000006580330

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch	Brake pedal operation		
ASCD clutch switch (M/T models)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/neutral position (PNP) switch (M/T) Transmission range switch (CVT)	Gear position		
ABS actuator and electric unit (control unit)	Vehicle speed*		
Combination meter			
TCM (CVT models)	Powertrain revolution*		

*: This signal is sent to the ECM through 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 indicator and SET indicator in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.

NOTE:

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

SET OPERATION

Press MAIN switch. (The CRUISE indicator in 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. (Then SET indicator in combination meter illuminates.)

ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is depressed 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 keep the new set speed.

CANCEL OPERATION

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

- CANCEL switch is pressed
- More than two switches at ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to the neutral position (M/T models)
- Selector lever is changed to N, P, R position (CVT models)
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.

- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.

When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ACCELERATE switch.

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

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

COAST OPERATION

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

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RESUME OPERATION

When the RESUME/ACCELERATE switch is depressed after cancel operation other than depressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

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- Brake pedal is released.
- Clutch pedal is released (M/T models)
- Selector lever is in other than P and N positions (CVT models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

C

Component Description

INFOID:000000006580331

D

ASCD STEERING SWITCH

Refer to [EC-995](#).

E

ASCD BRAKE SWITCH

Refer to [EC-1001](#) and [EC-1065](#).

F

ASCD CLUTCH SWITCH

Refer to [EC-1001](#) and [EC-1065](#).

STOP LAMP SWITCH

Refer to [EC-1001](#), [EC-1014](#) and [EC-1065](#).

G

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EC-1018](#), [EC-1022](#), [EC-1028](#) and [EC-1032](#).

H

ASCD INDICATOR

Refer to [EC-1073](#).

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CAN COMMUNICATION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

CAN COMMUNICATION

System Description

INFOID:000000006580332

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.

EVAPORATIVE EMISSION SYSTEM

< SERVICE INFORMATION >

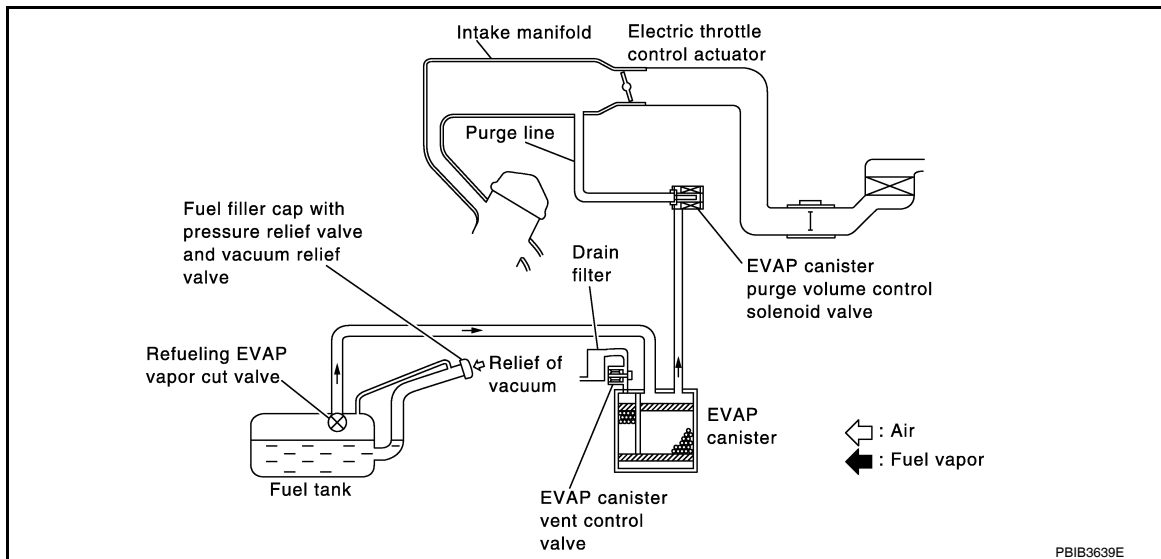
[MR20DE (EXCEPT FOR CALIFORNIA)]

EVAPORATIVE EMISSION SYSTEM

Description

INFOID:000000006580333

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.

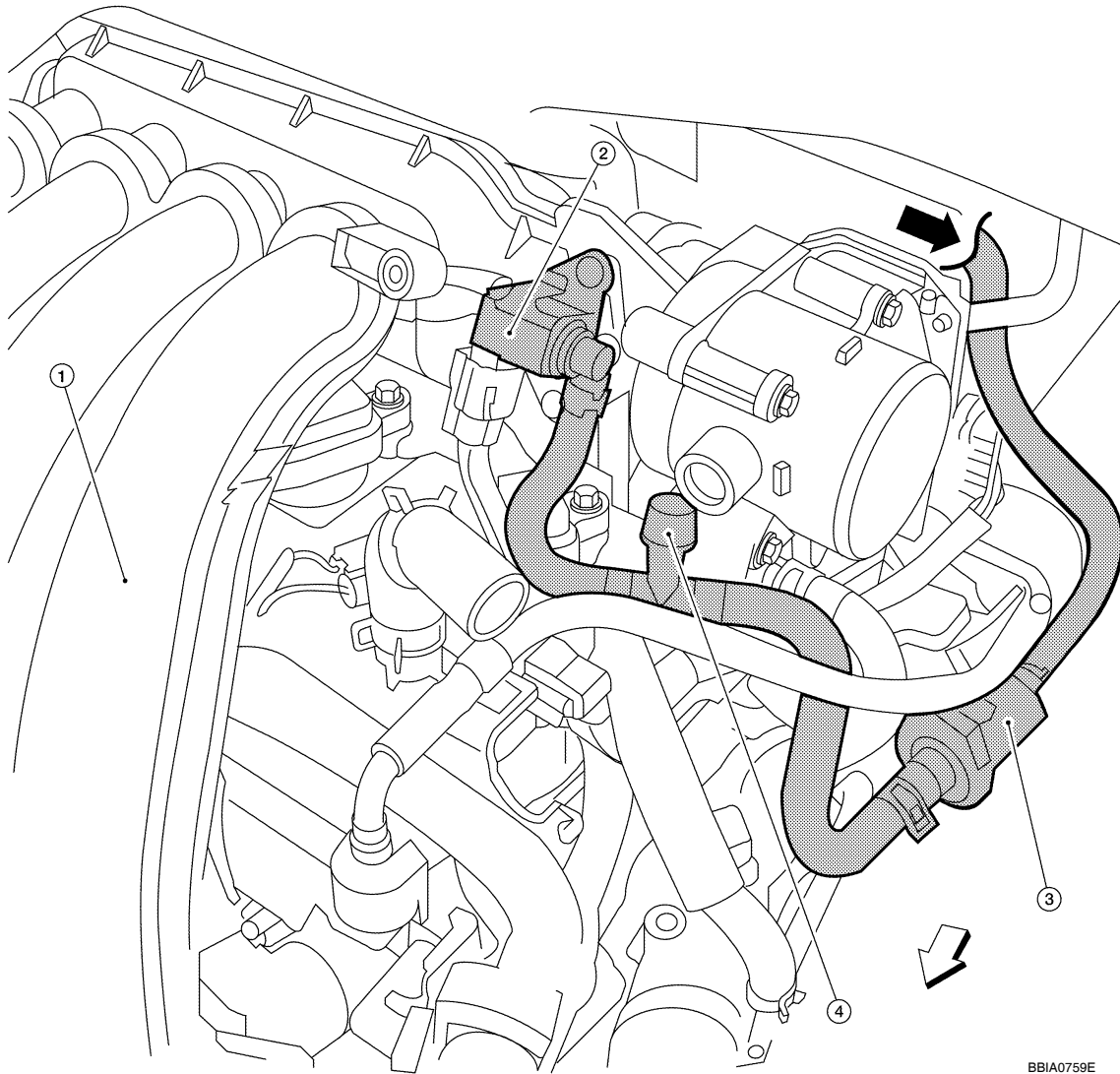
EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating and idling.

EVAPORATIVE EMISSION LINE DRAWING

EVAPORATIVE EMISSION SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]



B8IA0759E

⇐ : Vehicle front

→ : From next figure

1. Intake manifold

2. EVAP canister purge volume control solenoid valve

3. EVAP purge resonator

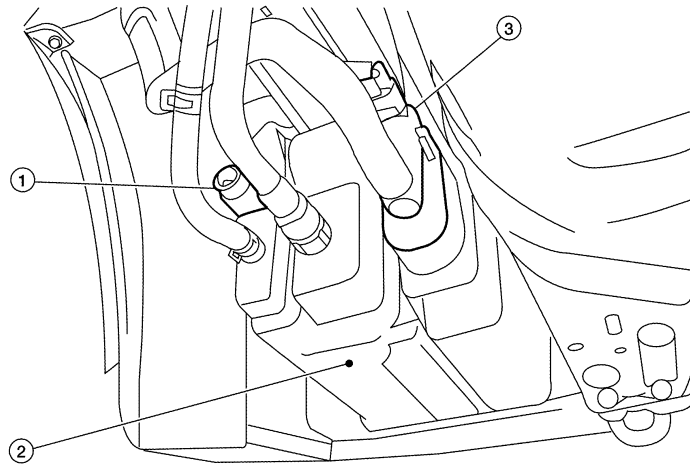
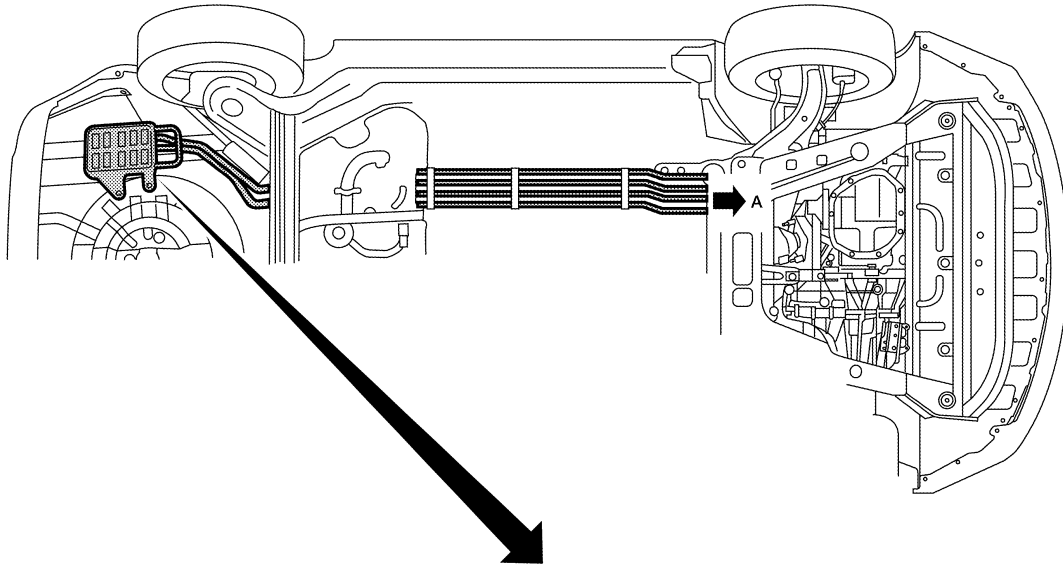
4. EVAP service port

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

EVAPORATIVE EMISSION SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]



BBIA0746E

← To previous figure

1. EVAP control system pressure sensor 2. EVAP canister 3. EVAP canister vent control valve

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

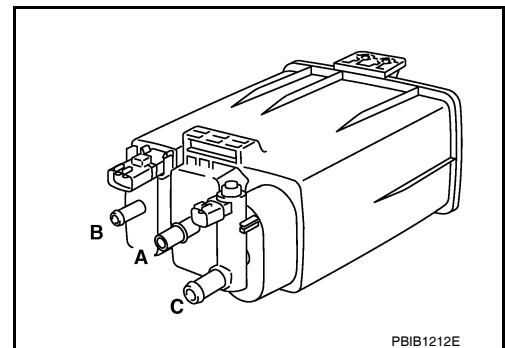
Component Inspection

INFOID:000000006580334

EVAP CANISTER

Check EVAP canister as follows:

1. Block port (B).
2. Blow air into port (A) and confirm that it flows freely out of port (C).
3. Release blocked port (B).
4. Apply vacuum pressure to port (B) and confirm that vacuum pressure exists at the ports (A) and (C).
5. Block port (A) and (B).
6. Apply pressure to port (C) and check that there is no leakage.



PBIB1212E

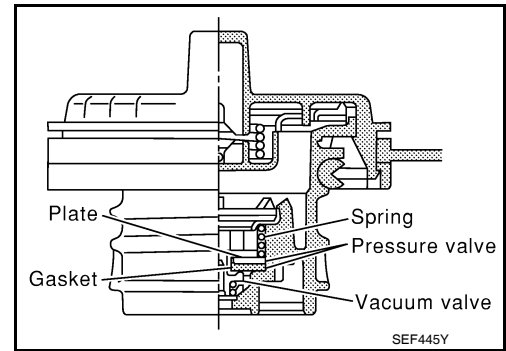
FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FILLER CAP)

EVAPORATIVE EMISSION SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

1. Wipe clean valve housing.



2. Check valve opening pressure and vacuum.

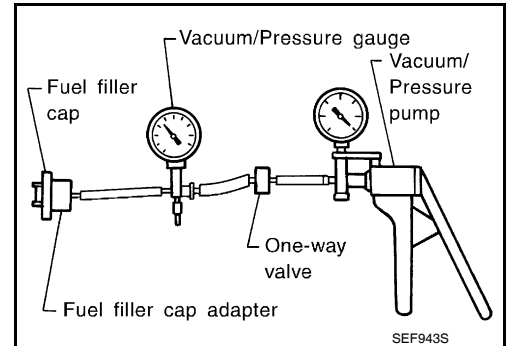
Pressure: 15.3 - 20.0 kPa
(0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.4 kPa
(-0.061 to -0.035 kg/cm², -0.87 to -0.48 psi)

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

CAUTION:

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



EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-903, "Component Inspection"](#).

FUEL TANK TEMPERATURE SENSOR

Refer to [EC-839, "Component Inspection"](#).

EVAP CANISTER VENT CONTROL VALVE

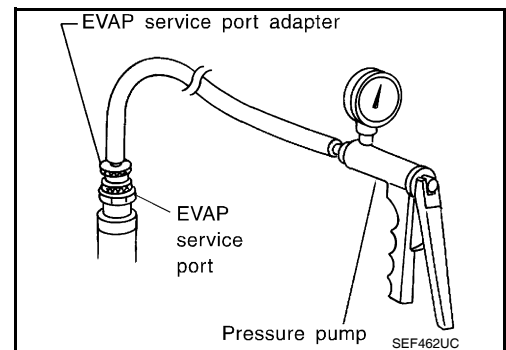
Refer to [EC-908, "Component Inspection"](#).

EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-925, "Component Inspection"](#).

EVAP SERVICE PORT

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



ON BOARD REFUELING VAPOR RECOVERY (ORVR)

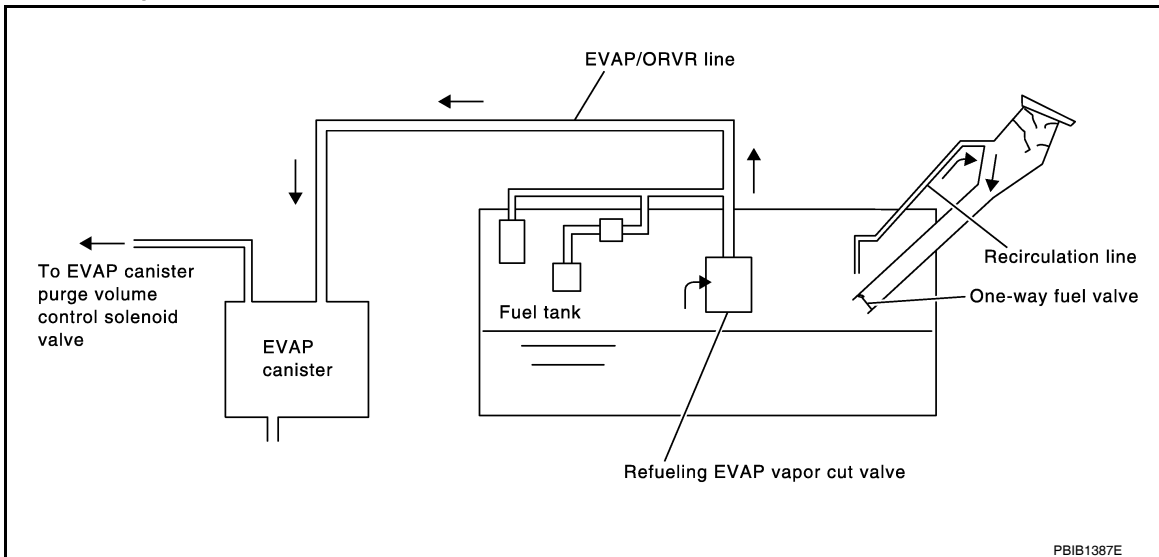
< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

System Description

INFOID:000000006580337



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.

WARNING:

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

- Put a "CAUTION: FLAMMABLE" sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO₂ 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-650, "Fuel Pressure Check"](#).
 - Disconnect negative battery cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

Diagnosis Procedure

INFOID:000000006580338

SYMPTOM: FUEL ODOR FROM EVAP CANISTER IS STRONG.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 2.
- NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

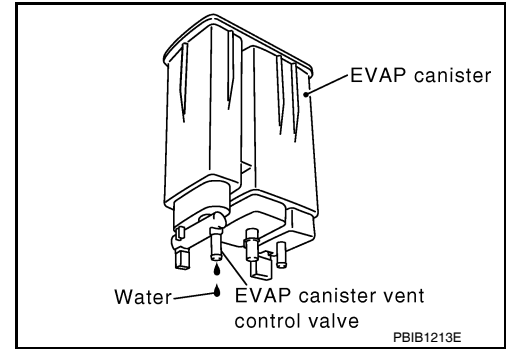
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 3.
- No >> GO TO 6.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 4.

4. CHECK DRAIN FILTER

Refer to [EC-600, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace drain filter.

5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

6. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-600, "Component Inspection"](#).

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace refueling EVAP vapor cut valve with fuel tank.

SYMPTOM: CANNOT REFUEL/FUEL ODOR FROM THE FUEL FILLER OPENING IS STRONG WHILE REFUELING.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 2.
- NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[MR20DE (EXCEPT FOR CALIFORNIA)]

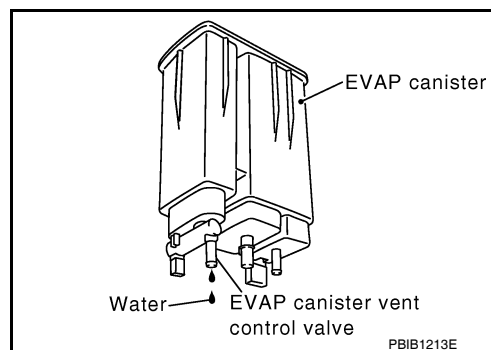
< SERVICE INFORMATION >

Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 3.

No >> GO TO 5.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 4.

4. CHECK DRAIN FILTER

Refer to [EC-600, "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace drain filter.

5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

6. CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling EVAP vapor cut valve for clogging, kink, looseness and improper connection.

OK or NG

OK >> GO TO 7.

NG >> Repair or replace hoses and tubes.

7. CHECK FILLER NECK TUBE

Check recirculation line for clogging, dents and cracks.

OK or NG

OK >> GO TO 8.

NG >> Replace filler neck tube.

8. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-600, "Component Inspection"](#).

OK or NG

OK >> GO TO 9.

NG >> Replace refueling EVAP vapor cut valve with fuel tank.

9. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

OK or NG

OK >> GO TO 10.

NG >> Replace fuel filler tube.

10. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

OK or NG

OK >> GO TO 11.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

NG >> Repair or replace one-way fuel valve with fuel tank.

11. CHECK ONE-WAY FUEL VALVE-II

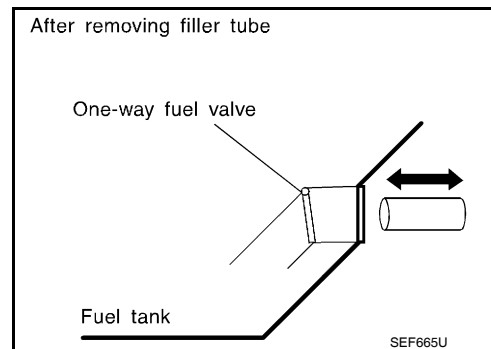
1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.
3. Check one-way fuel valve for operation as follows.
When a stick is inserted, the valve should open, when removing stick it should close.

Do not drop any material into the tank.

OK or NG

OK >> **INSPECTION END**

NG >> Replace fuel filler tube or replace one-way fuel valve with fuel tank.



INFOID:000000006580339

Component Inspection

REFUELING EVAP VAPOR CUT VALVE

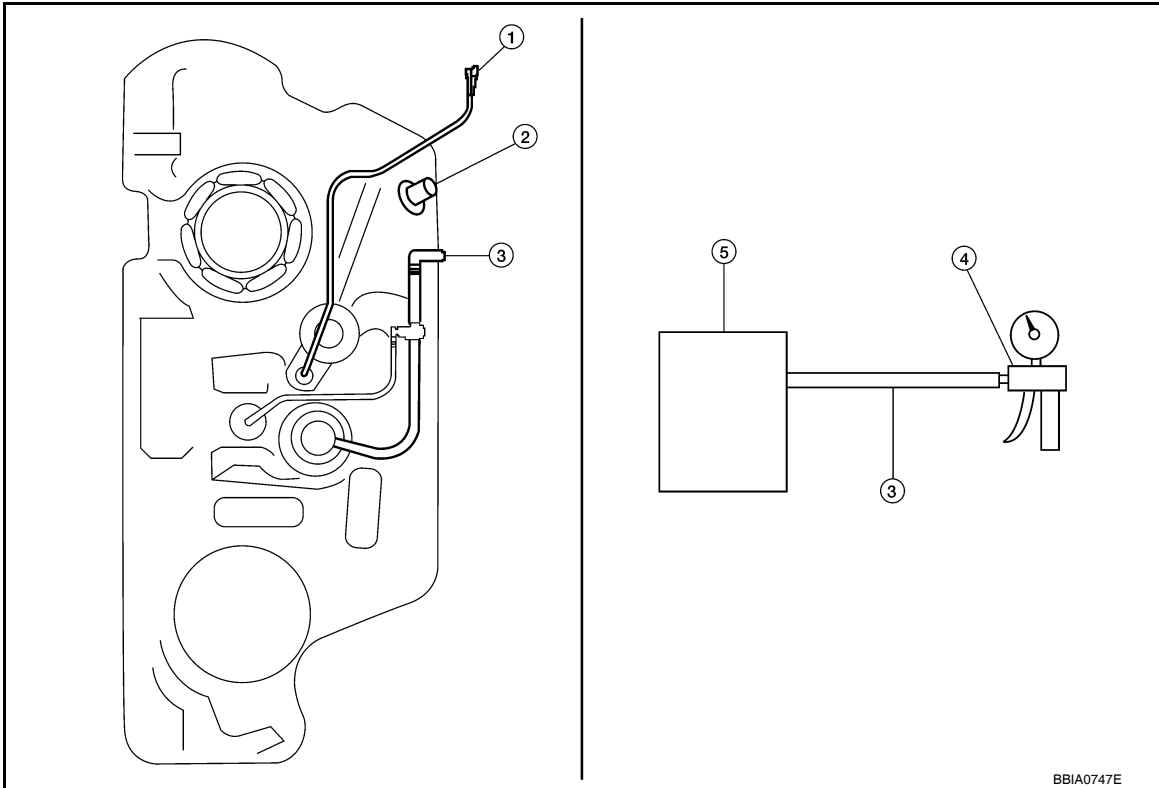
Ⓟ WITH CONSULT-III

1. Remove fuel tank. Refer to [FL-10](#).
2. Drain fuel from the tank as follows:
 - a. Remove fuel feed hose located on the fuel gauge retainer.
 - b. Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
 - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-III.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose end.
 - b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to hose end [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]



- | | | |
|-------------------------------|----------------|-------------------|
| 1. Recirculation line | 2. Filler tube | 3. EVAP/ORVR line |
| 4. Vacuum/pressure handy pump | 5. Fuel tank | |

⊗ WITHOUT CONSULT-III

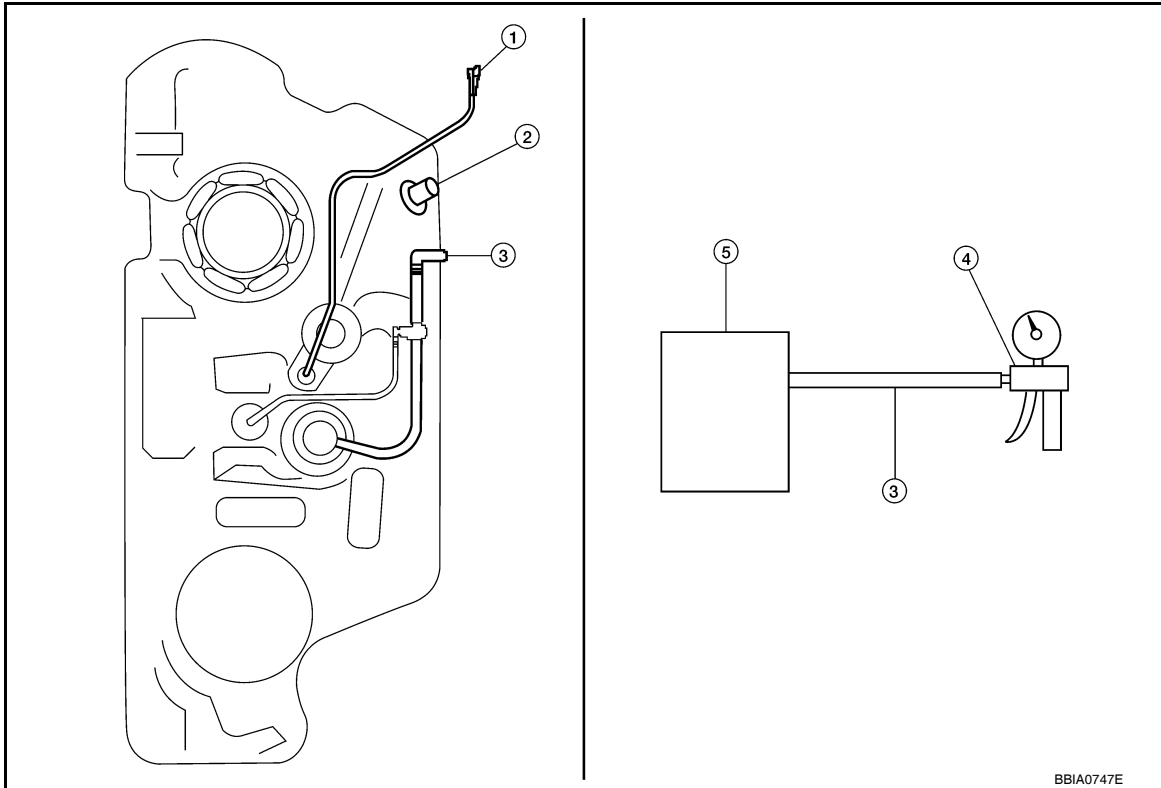
1. Remove fuel tank. Refer to [FL-10](#).
2. Drain fuel from the tank as follows:
 - a. Remove fuel gauge retainer.
 - b. Drain fuel from the tank using a handy pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose end.
 - b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to hose end [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.

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ON BOARD REFUELING VAPOR RECOVERY (ORVR)

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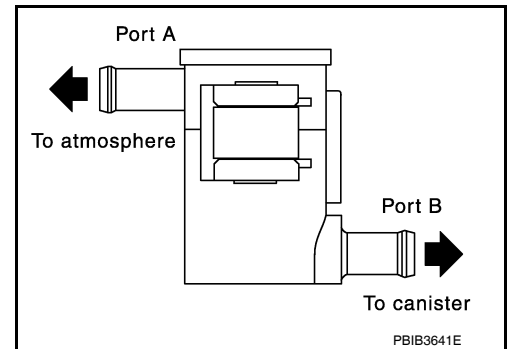
[MR20DE (EXCEPT FOR CALIFORNIA)]



- 1. Recirculation line
- 2. Filler tube
- 3. EVAP/ORVR line
- 4. Vacuum/pressure handy pump
- 5. Fuel tank

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter.



POSITIVE CRANKCASE VENTILATION

< SERVICE INFORMATION >

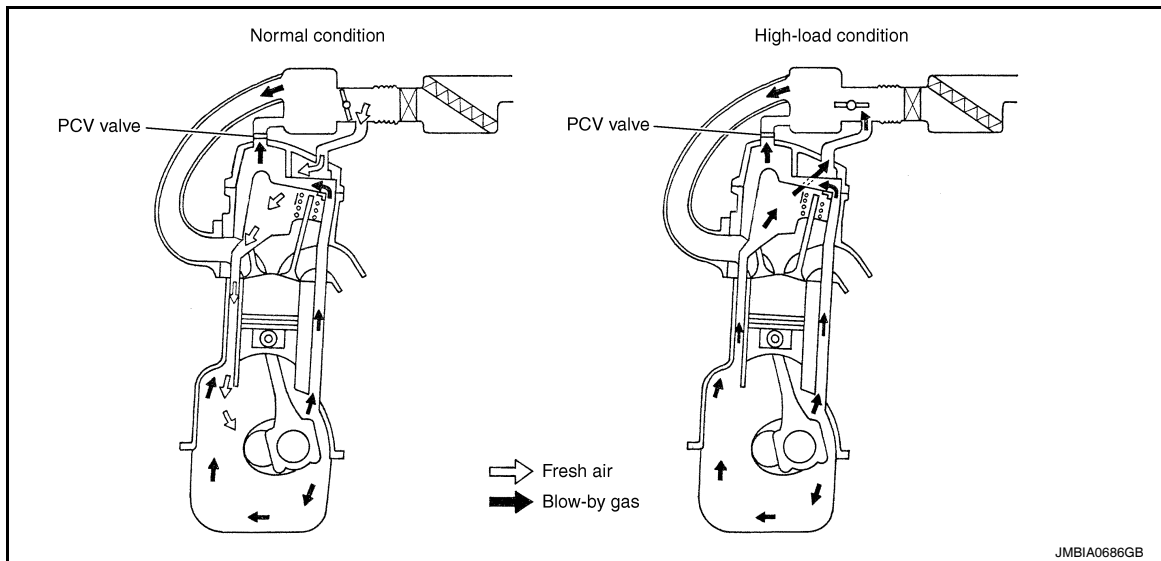
[MR20DE (EXCEPT FOR CALIFORNIA)]

POSITIVE CRANKCASE VENTILATION

Description

INFOID:000000006580340

SYSTEM DESCRIPTION

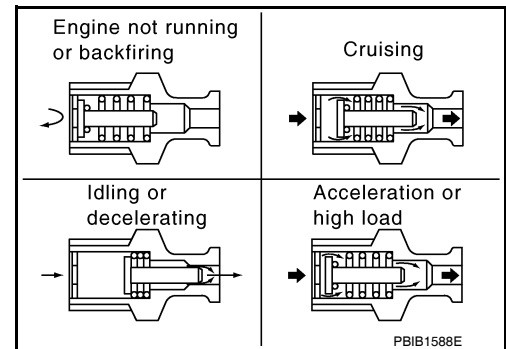


This system returns blow-by gas to the intake manifold.

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 then 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.

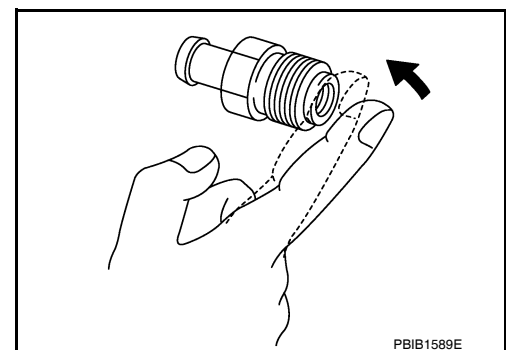


Component Inspection

INFOID:000000006580341

PCV (POSITIVE CRANKCASE VENTILATION) 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.



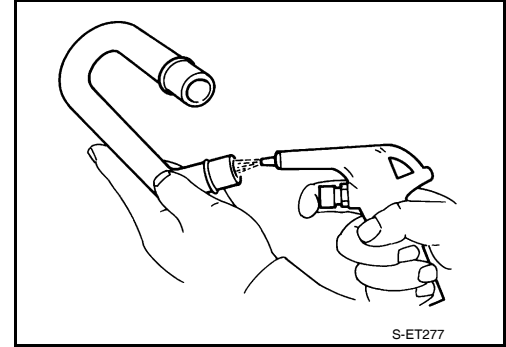
POSITIVE CRANKCASE VENTILATION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

PCV VALVE VENTILATION HOSE

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



NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)

Description

INFOID:000000006580342

- If the security indicator illuminates with the ignition switch ON or DTC P1610 - P1615 is displayed in “SELF DIAGNOSTIC RESULT” mode, perform the trouble diagnosis for corresponding to the detected DTC. Refer to [EC-576, "P1610-P1615"](#).
- Check that no DTC is displayed in “SELF DIAGNOSIS RESULT” mode of “BCM” before erasing the detected DTC in “ENGINE” mode with CONSULT-III.
- When replacing ECM, refer to [EC-647, "Procedure After Replacing ECM"](#).

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FUEL FILLER CAP WARNING SYSTEM

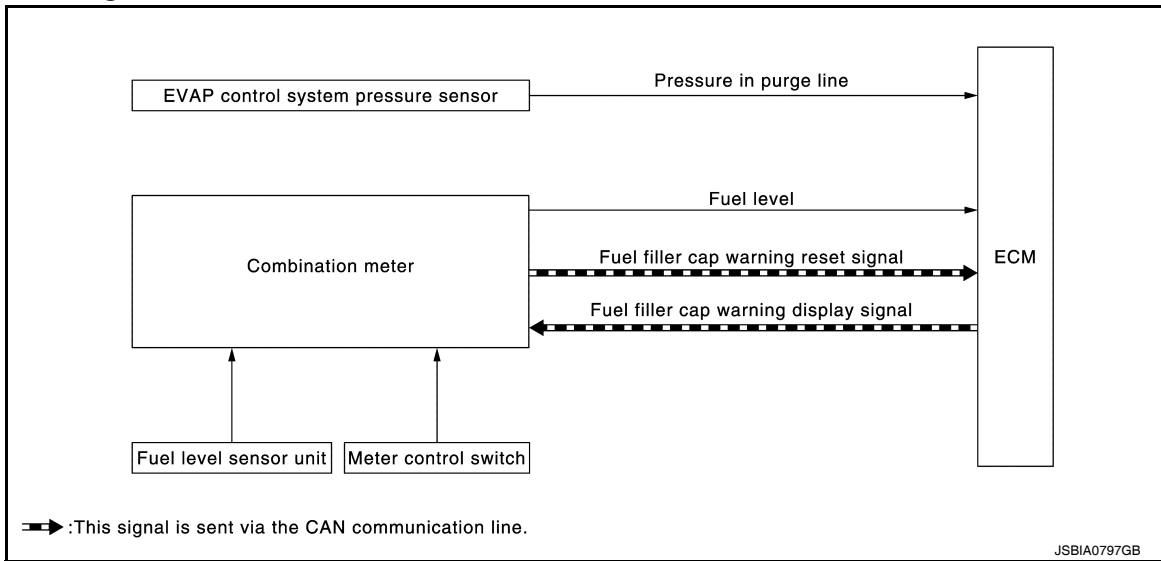
< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

FUEL FILLER CAP WARNING SYSTEM

System Diagram

INFOID:000000006612521



System Description

INFOID:000000006612522

INPUT/OUTPUT SIGNAL CHART

Input

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

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 turns OFF, according to any condition listed below:

- Reset operation is performed by operating the odometer/trip meter 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.
- Fuel refilled.

FUEL FILLER CAP WARNING SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

- DTC erased by using CONSULT-III.

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.

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Introduction

INFOID:000000006580343

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

Emission-related diagnostic information	Diagnostic service
Diagnostic Trouble Code (DTC)	Service \$03 of SAE J1979/ISO 15031-5
Freeze Frame data	Service \$02 of SAE J1979/ISO 15031-5
System Readiness Test (SRT) code	Service \$01 of SAE J1979/ISO 15031-5
1st trip Diagnostic Trouble Code (1st Trip DTC)	Service \$07 of SAE J1979/ISO 15031-5
1st trip Freeze Frame data	—
Test values and Test limits	Service \$06 of SAE J1979/ISO 15031-5
Calibration ID	Service \$09 of SAE J1979/ISO 15031-5
Permanent Diagnostic Trouble Code (Permanent DTC)	Service \$0A* of SAE J1979/ISO 15031-5

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

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

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	SRT status	Test value	Permanent DTC status
CONSULT-III	×	×	×	×	×	×	—	×
GST	×	×	×	—	×	×	×	×
ECM	×	x*	—	—	—	×	—	—

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

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

(Refer to [EC-658, "Fail-Safe Chart"](#).)

Two Trip Detection Logic

INFOID:000000006580344

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

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

×: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnoses (Refer to EC-609, "Emission-related Diagnostic Information" .)	—	×	—	—	×	—	—	—
Except above	—	—	—	×	—	×	×	—

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by MIL lighting up 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 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.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut
--	--

Emission-related Diagnostic Information

INFOID:000000006580345

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

×: Applicable —: Not applicable

Items (CONSULT-III screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT-III GST*2	ECM*3					
LOST COMM (TCM)	U0101	0101*5	—	1	×	B	EC-708
LOST COMM (BCM)	U0140	0140*5	—	1	×	B	EC-710
CAN COMM CIRCUIT	U1001	1001*5	—	2	—	—	EC-712
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	0000	—	—	Flashing*6	—	EC-633
INT/V TIM CONT-B1	P0011	0011	×	2	×	B	EC-714
A/F SEN1 HTR (B1)	P0031	0031	—	2	×	B	EC-718
A/F SEN1 HTR (B1)	P0032	0032	—	2	×	B	EC-718
HO2S2 HTR (B1)	P0037	0037	—	2	×	B	EC-723
HO2S2 HTR (B1)	P0038	0038	—	2	×	B	EC-723
INT/V TIM V/CIR-B1	P0075	0075	—	2	×	B	EC-729
MAF SEN/CIRCUIT-B1	P0101	0101	—	2	×	B	EC-734
MAF SEN/CIRCUIT-B1	P0102	0102	—	1	×	B	EC-741
MAF SEN/CIRCUIT-B1	P0103	0103	—	1	×	B	EC-741
IAT SEN/CIRCUIT-B1	P0112	0112	—	2	×	B	EC-748
IAT SEN/CIRCUIT-B1	P0113	0113	—	2	×	B	EC-748
ECT SEN/CIRC	P0116	0116	—	2	×	B	EC-752
ECT SEN/CIRC	P0117	0117	—	1	×	B	EC-755
ECT SEN/CIRC	P0118	0118	—	1	×	B	EC-755
TP SEN 2/CIRC-B1	P0122	0122	—	1	×	B	EC-760
TP SEN 2/CIRC-B1	P0123	0123	—	1	×	B	EC-760
ECT SENSOR	P0125	0125	—	2	×	B	EC-765
IAT SENSOR-B1	P0127	0127	—	2	×	B	EC-768
THERMSTAT FNCTN	P0128	0128	—	2	×	B	EC-771
A/F SENSOR1 (B1)	P0130	0130	—	2	×	A	EC-773
A/F SENSOR1 (B1)	P0131	0131	—	2	×	B	EC-778
A/F SENSOR1 (B1)	P0132	0132	—	2	×	B	EC-783
HO2S2 (B1)	P0137	0137	×	2	×	A	EC-788
HO2S2 (B1)	P0138	0138	×	2	×	A	EC-795
HO2S2 (B1)	P0139	0139	×	2	×	A	EC-804
A/F SENSOR1 (B1)	P014C	014C	×	2	×	A	EC-812

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Items (CONSULT-III screen terms)	DTC ^{*1}		SRT code	Trip	MIL	Permanent DTC group ^{*4}	Reference
	CONSULT-III GST ^{*2}	ECM ^{*3}					
A/F SENSOR1 (B1)	P014D	014D	×	2	×	A	EC-812
A/F SENSOR1 (B1)	P015A	015A	×	2	×	A	EC-812
A/F SENSOR1 (B1)	P015B	015B	×	2	×	A	EC-812
FUEL SYS-LEAN-B1	P0171	0171	—	2	×	B	EC-820
FUEL SYS-RICH-B1	P0172	0172	—	2	×	B	EC-826
FTT SENSOR	P0181	0181	—	2	×	B	EC-832
FTT SEN/CIRCUIT	P0182	0182	—	2	×	B	EC-836
FTT SEN/CIRCUIT	P0183	0183	—	2	×	B	EC-836
EOT SEN/CIRCUIT	P0196	0196	—	2	×	B	EC-840
EOT SEN/CIRCUIT	P0197	0197	—	2	×	B	EC-843
EOT SEN/CIRCUIT	P0198	0198	—	2	×	B	EC-843
TP SEN 1/CIRC-B1	P0222	0222	—	1	×	B	EC-847
TP SEN 1/CIRC-B1	P0223	0223	—	1	×	B	EC-847
MULTI CYL MISFIRE	P0300	0300	—	1 or 2	×	B	EC-852
CYL 1 MISFIRE	P0301	0301	—	1 or 2	×	B	EC-852
CYL 2 MISFIRE	P0302	0302	—	1 or 2	×	B	EC-852
CYL 3 MISFIRE	P0303	0303	—	1 or 2	×	B	EC-852
CYL 4 MISFIRE	P0304	0304	—	1 or 2	×	B	EC-852
KNOCK SEN/CIRC-B1	P0327	0327	—	2	—	—	EC-858
KNOCK SEN/CIRC-B1	P0328	0328	—	2	—	—	EC-858
CKP SEN/CIRCUIT	P0335	0335	—	2	×	B	EC-862
CMP SEN/CIRC-B1	P0340	0340	—	2	×	B	EC-868
TW CATALYST SYS-B1	P0420	0420	×	2	×	A	EC-873
EVAP PURG FLOW/MON	P0441	0441	×	2	×	A	EC-878
EVAP SMALL LEAK	P0442	0442	×	2	×	A	EC-883
PURG VOLUME CONT/V	P0443	0443	—	2	×	A	EC-890
PURG VOLUME CONT/V	P0444	0444	—	2	×	B	EC-898
PURG VOLUME CONT/V	P0445	0445	—	2	×	B	EC-898
VENT CONTROL VALVE	P0447	0447	—	2	×	B	EC-904
VENT CONTROL VALVE	P0448	0448	—	2	×	B	EC-910
EVAP SYS PRES SEN	P0451	0451	—	2	×	A	EC-916
EVAP SYS PRES SEN	P0452	0452	—	2	×	B	EC-919
EVAP SYS PRES SEN	P0453	0453	—	2	×	B	EC-926
EVAP GROSS LEAK	P0455	0455	—	2	×	A	EC-934
EVAP VERY SML LEAK	P0456	0456	× ^{*7}	2	×	A	EC-941
FUEL LEV SEN SLOSH	P0460	0460	—	2	×	A	EC-949
FUEL LEVEL SENSOR	P0461	0461	—	2	×	B	EC-951
FUEL LEVL SEN/CIRC	P0462	0462	—	2	×	B	EC-953
FUEL LEVL SEN/CIRC	P0463	0463	—	2	×	B	EC-953
VEH SPEED SEN/CIRC ^{*8}	P0500	0500	—	2	×	B	EC-955
ISC SYSTEM	P0506	0506	—	2	×	B	EC-957
ISC SYSTEM	P0507	0507	—	2	×	B	EC-959

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Items (CONSULT-III screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT-III GST*2	ECM*3					
COLD START CONTROL	P050A	050A	—	2	×	A	EC-961
COLD START CONTROL	P050B	050B	—	2	×	A	EC-961
COLD START CONTROL	P050E	050E	—	2	×	A	EC-961
ECM BACK UP/CIRCUIT	P0603	0603	—	2	×	B	EC-963
ECM	P0605	0605	—	1 or 2	— or ×	B	EC-966
ECM	P0607	0607	—	1 (CVT) 2 (M/T)	× (CVT) — (M/T)	B	EC-968
SENSOR POWER/CIRC	P0643	0643	—	1	×	B	EC-969
T/M RANGE SENSOR A	P0705	0705	—	2	×	B	CVT-61
FLUID TEMP SENSOR A*9	P0710	0710	—	1	×	B	CVT-66
INPUT SPEED SENSOR A	P0715	0715	—	2	×	B	CVT-71
OUTPUT SPEED SENSOR*8	P0720	0720	—	2	×	B	CVT-76
TORQUE CONVERTER	P0740	0740	—	2	×	B	CVT-84
TORQUE CONVERTER	P0744	0744	—	2	×	B	CVT-89
PC SOLENOID A	P0745	0745	—	2	×	B	CVT-91
PC SOLENOID A	P0746	0746	—	1	×	B	CVT-96
PC SOLENOID B	P0776	0776	—	2	×	B	CVT-98
PC SOLENOID B	P0778	0778	—	2	×	B	CVT-100
FLUID PRESS SEN/SW A	P0840	0840	—	2	×	B	CVT-110
P-N POS SW/CIRCUIT	P0850	0850	—	2	×	B	EC-974
CLOSED LOOP-B1	P1148	1148	—	1	×	A	EC-979
TCS/CIRC	P1212	1212	—	2	—	—	EC-980
ENG OVER TEMP	P1217	1217	—	1	×	B	EC-981
CTP LEARNING-B1	P1225	1225	—	2	—	—	EC-993
CTP LEARNING-B1	P1226	1226	—	2	—	—	EC-994
ASCD SW	P1564	1564	—	1	—	—	EC-995
ASCD BRAKE SW	P1572	1572	—	1	—	—	EC-1001
ASCD VHL SPD SEN	P1574	1574	—	1	—	—	EC-1010
LOCK MODE	P1610	1610	—	2	—	—	BL-173
ID DISCORD,IMMU-ECM	P1611	1611	—	2	—	—	BL-173
CHAIN OF ECM-IMMU	P1612	1612	—	2	—	—	BL-173
CHAIN OF IMMU-KEY	P1614	1614	—	2	—	—	BL-173
DIFFERENCE OF KEY	P1615	1615	—	2	—	—	BL-173
IN PULY SPEED	P1715	1715	—	2	—	—	EC-1012
SLCT SOLENOID	P1740	1740	—	2	×	B	CVT-129
STEP MOTOR	P1777	1777	—	1	×	B	CVT-135
STEP MOTOR	P1778	1778	—	2	×	B	CVT-139
BRAKE SW/CIRCUIT	P1805	1805	—	2	—	—	EC-1014
ETC MOT PWR-B1	P2100	2100	—	1	×	B	EC-1018
ETC FNCTN/CIRC-B1	P2101	2101	—	1	×	B	EC-1022
ETC MOT PWR	P2103	2103	—	1	×	B	EC-1018
ETC MOT-B1	P2118	2118	—	1	×	B	EC-1028

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Items (CONSULT-III screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT-III GST*2	ECM*3					
ETC ACTR-B1	P2119	2119	—	1	×	B	EC-1032
APP SEN 1/CIRC	P2122	2122	—	1	×	B	EC-1034
APP SEN 1/CIRC	P2123	2123	—	1	×	B	EC-1034
APP SEN 2/CIRC	P2127	2127	—	1	×	B	EC-1039
APP SEN 2/CIRC	P2128	2128	—	1	×	B	EC-1039
TP SENSOR-B1	P2135	2135	—	1	×	B	EC-1046
APP SENSOR	P2138	2138	—	1	×	B	EC-1051
A/F SENSOR1 (B1)	P2A00	2A00	—	2	×	A	EC-1058

*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-609, "Emission-related Diagnostic Information"](#), "PERMANENT DIAGNOSTIC TROUBLE CODE (PERMANENT DTC)".

*5: The troubleshooting for this DTC needs CONSULT-III.

*6: When the ECM in the mode of displaying SRT status, MIL may flash. For the details, refer to "How to Display SRT Status".

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

*8: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

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

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

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

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

For malfunctions in which 1st trip DTCs are displayed, refer to "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS". 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-III.

1st trip DTC is specified in Service \$07 of SAE J1979/ISO 15031-5. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to [EC-653, "Trouble Diagnosis Introduction"](#). Then perform DTC Confirmation Procedure or Overall Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

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

 **WITH CONSULT-III**

 **WITH GST**

CONSULT-III or GST Examples: P0340, P0850, P1148, etc.

These DTCs are prescribed by SAE J2012/ISO 15031-6.

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

 **NO TOOLS**

The number of blinks of the MIL in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0340, 0850, 1148, etc.

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These DTCs are controlled by NISSAN.

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

DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-III. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

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

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

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-III or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen, not on the GST. For details, see [EC-680, "CONSULT-III Function \(ENGINE\)"](#).

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

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

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

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

SYSTEM READINESS TEST (SRT) CODE

System Readiness Test (SRT) code is specified in Service \$01 of SAE J1979.

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

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

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

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

NOTE:

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

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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 Item

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

SRT item (CONSULT-III indication)	Performance Priority*	Required self-diagnostic items to set the SRT to “CMPLT”	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420
EVAP SYSTEM	2	EVAP control system purge flow monitoring	P0441
	1	EVAP control system	P0442
	2	EVAP control system	P0456
HO2S	2	Air fuel ratio (A/F) sensor 1	P014C, P014D, P015A, P015B
		Heated oxygen sensor 2	P0137
		Heated oxygen sensor 2	P0138
		Heated oxygen sensor 2	P0139
EGR/VVT SYSTEM	3	Intake valve timing control function	P0011

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

SRT Set Timing

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

Self-diagnosis result		Example					
		Diagnosis	Ignition cycle				
			← ON →	OFF	← ON →	OFF	
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)	
		P0402	OK (1)	— (1)	— (1)	OK (2)	
		P1402	OK (1)	OK (2)	— (2)	— (2)	
		SRT of EGR	“CMPLT”	“CMPLT”	“CMPLT”	“CMPLT”	
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)	
		P0402	— (0)	— (0)	OK (1)	— (1)	
		P1402	OK (1)	OK (2)	— (2)	— (2)	
		SRT of EGR	“INCMP”	“INCMP”	“CMPLT”	“CMPLT”	
NG exists	Case 3	P0400	OK	OK	—	—	
		P0402	—	—	—	—	
		P1402	NG	—	NG	NG	NG (Consecutive NG)
		(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.

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—: Self-diagnosis is not carried out.

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

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

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

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

NOTE:

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

SRT Service Procedure

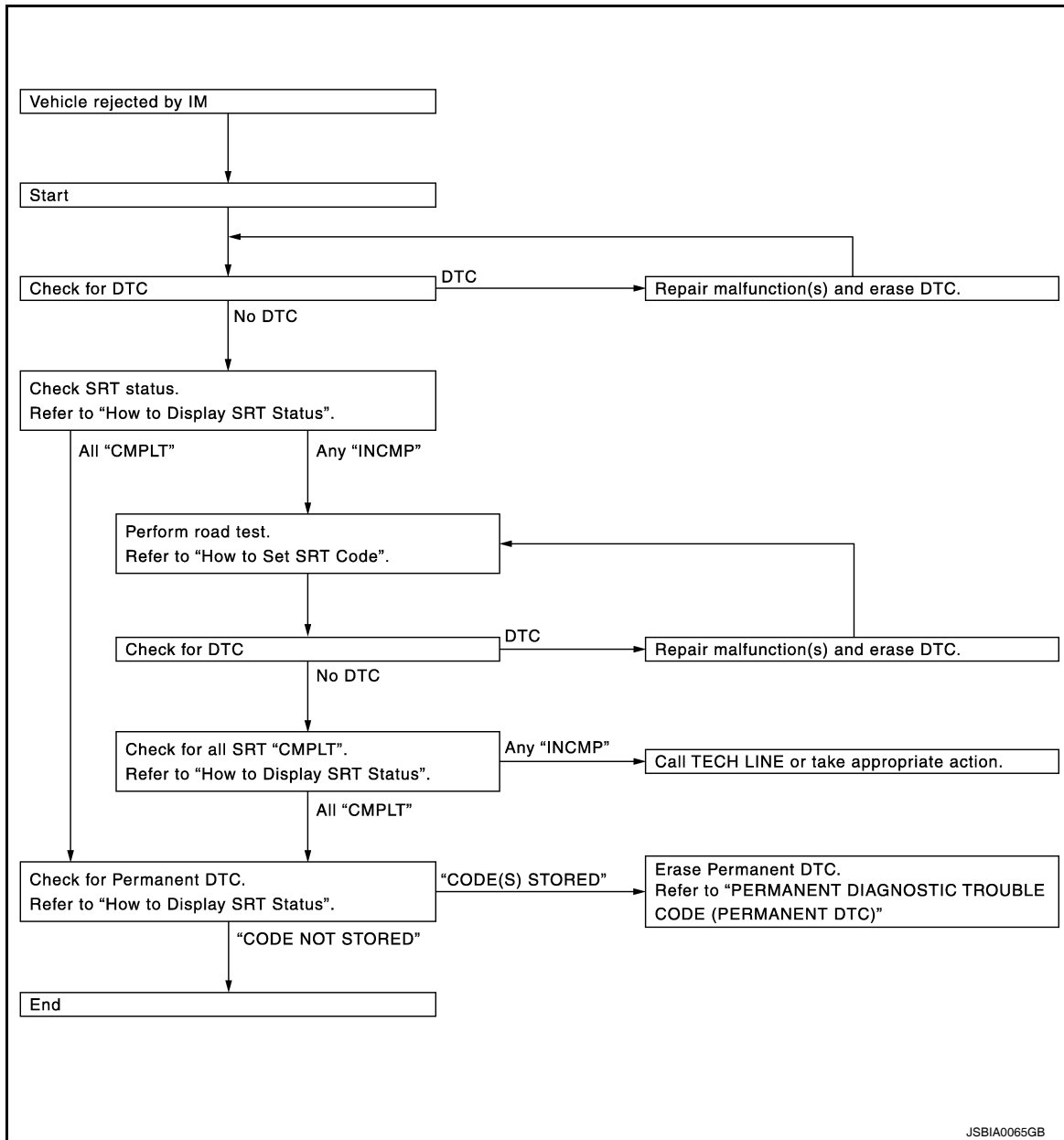
If a vehicle has failed the state emissions inspection due to one or more SRT items indicating "INCMP", review the flowchart diagnostic sequence referring to the following flow chart.

A
EC
C
D
E
F
G
H
I
J
K
L
M
N
O
P

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How to Display SRT Status

WITH CONSULT-III

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

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

NOTE:

- Though displayed on the CONSULT-III screen, "HO2S HTR" is not SRT item.
- "SRT STATUS" provides the presence or absence of permanent DTCs stored in ECM memory.

WITH GST

Selecting Service \$01 with GST

NO TOOLS

A SRT code itself cannot be displayed, however SRT status can.

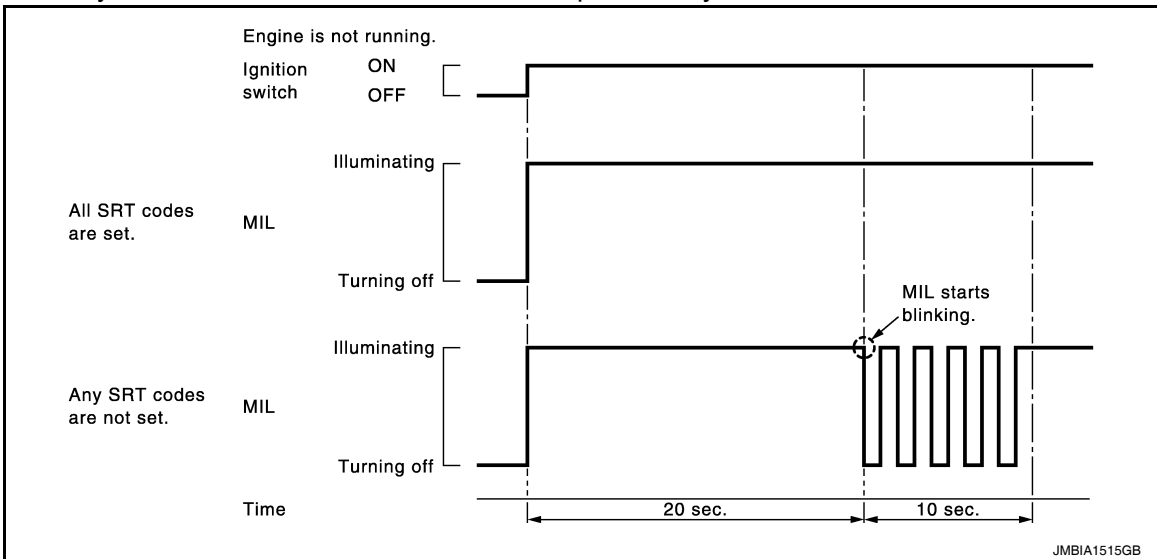
1. Turn ignition switch ON and wait 20 seconds.
2. SRT status is indicated as shown below.
 - When all SRT codes are set, MIL illuminates continuously.

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- When any SRT codes are not set, MIL will blink periodically for 10 seconds.



How to Set SRT Code

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

🔧 WITH CONSULT-III

Perform corresponding DTC Confirmation Procedure one by one based on Performance Priority in the table on "SRT Item".

🚗 WITHOUT CONSULT-III

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

A
EC
C
D
E
F
G
H
I
J
K
L
M
N
O
P

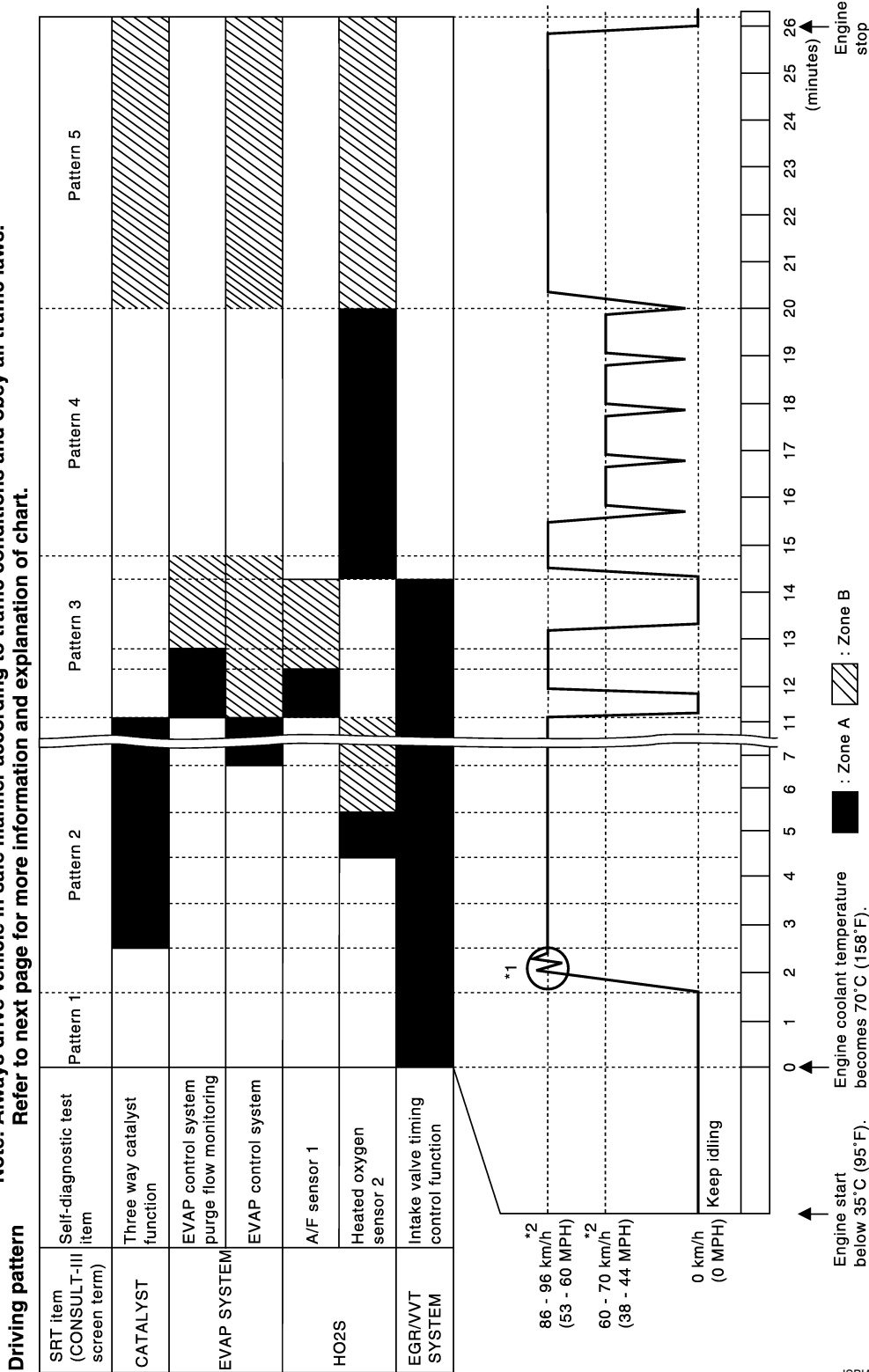
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Driving Pattern

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



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*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.

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Zone A refers to the range where the time, required for the diagnosis under normal conditions*, is the shortest.

Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.

Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

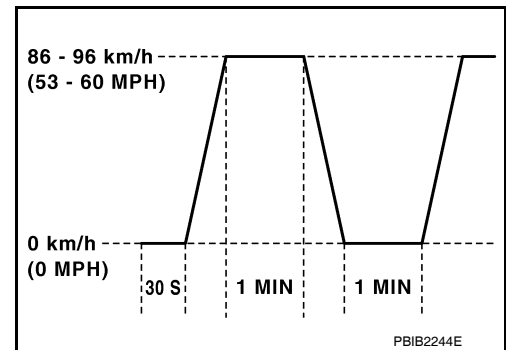
- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 38 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 38 and ground is lower than 1.4V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 43 and ground is less than 4.1V).**

Pattern 2:

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

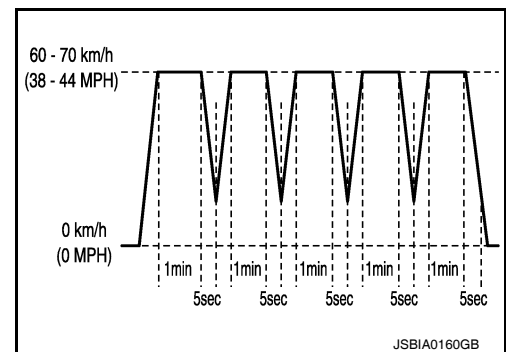
Pattern 3:

- Operate vehicle following the driving pattern shown in the figure.
- Release the accelerator pedal during decelerating vehicle speed from 90 km/h (56 MPH) to 0 km/h (0 MPH).



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 maintain the speed.
- Release the accelerator pedal fully at least 5 seconds.
- Repeat the above two steps at least 5 times.



Pattern 5:

- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

Suggested Transmission Gear Position for CVT Models

Set the selector lever in the D position.

Suggested upshift speeds for M/T models

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

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	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:	For quick acceleration in low altitude areas	For high altitude areas [over 1,219m (4,000 ft)]:
Gear change	ACCEL shift point km/h (MPH)	km/h (MPH)	km/h (MPH)
1st to 2nd	13 (8)	24 (15)	24 (15)
2nd to 3rd	27 (17)	40 (25)	40 (25)
3rd to 4th	40 (25)	53 (33)	65 (40)
4th to 5th	58 (36)	71 (44)	72 (45)
5th to 6th	82 (51)	82 (51)	82 (51)

Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate.

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

Gear	km/h (MPH)
1st	50 (30)
2nd	90 (55)
3rd	—
4th	—
5th	—
6th	—

PERMANENT DIAGNOSTIC TROUBLE CODE (PERMANENT DTC)

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 shutoff 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.

Permanent DTC Item

For permanent DTC items, MIL turns ON. Refer to [EC-609, "Emission-related Diagnostic Information"](#), "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS".

Permanent DTC Set Timing

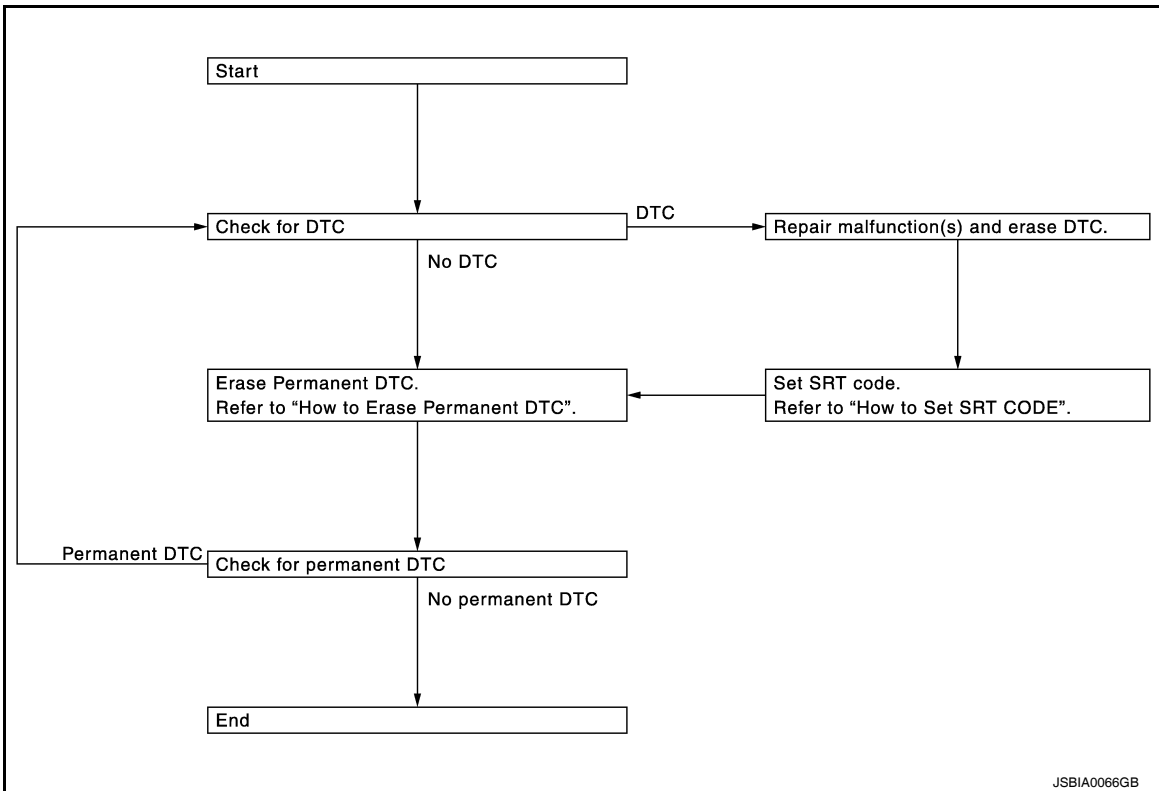
The setting timing of permanent DTC is stored in ECM with the lighting of MIL when a DTC is confirmed.

Permanent DTC Service Procedure

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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[MR20DE (EXCEPT FOR CALIFORNIA)]



How to Display Permanent DTC Status

WITH CONSULT-III

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

NOTE:

Permanent DTCs stored in ECM memory are displayed on the CONSULT-III screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).

CAUTION:

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".

PERMANENT DTC & SRT CONFIRMATION : PERMANENT DTC STATUS		
<p>CAUTION: Turn ignition switch from ON to OFF twice to update the information on the status screen.</p>		
PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D
XXXX	INCMP	INCMP
XXXX	CMPLT	INCMP
XXXX	INCMP	CMPLT
XXXX	CMPLT	INCMP
XXXX	INCMP	INCMP
XXXX	INCMP	INCMP
<p>The previous trip information is displayed. →</p>		

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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.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

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

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)

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
HO2S	01H	Air fuel ratio (A/F) sensor 1 (Bank 1)	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	89H	84H	The amount of shift in air fuel ratio
			P2A00	8AH	84H	The amount of shift in air fuel ratio
			P0130	8BH	0BH	Difference in sensor output voltage
			P0133	8CH	83H	Response gain at the limited frequency
			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
			P014D	90H	84H	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		
	02H	Heated oxygen sensor 2 (Bank 1)	P0138	07H	0CH	Minimum sensor output voltage for test cycle
			P0137	08H	0CH	Maximum sensor output voltage for test cycle
P0138			80H	0CH	Sensor output voltage	
P0139			81H	0CH	Difference in sensor output voltage	
03H	Heated oxygen sensor 3 (Bank 1)	P0143	07H	0CH	Minimum sensor output voltage for test cycle	
		P0144	08H	0CH	Maximum sensor output voltage for test cycle	
		P0146	80H	0CH	Sensor output voltage	
		P0145	81H	0CH	Difference in sensor output voltage	

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
HO2S	05H	Air fuel ratio (A/F) sensor 1 (Bank 2)	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
			P0153	87H	04H	Response rate: Response ratio (Lean to Rich)
			P0153	88H	04H	Response rate: Response ratio (Rich to Lean)
			P2A03	89H	84H	The amount of shift in air fuel ratio
			P2A03	8AH	84H	The amount of shift in air fuel ratio
			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		
	P015D	94H	01H	O2 Sensor Delayed Response - Lean to Rich Bank 2 Sensor 1		
	06H	Heated oxygen sensor 2 (Bank 2)	P0158	07H	0CH	Minimum sensor output voltage for test cycle
			P0157	08H	0CH	Maximum sensor output voltage for test cycle
			P0158	80H	0CH	Sensor output voltage
			P0159	81H	0CH	Difference in sensor output voltage
	07H	Heated oxygen sensor 3 (Bank2)	P0163	07H	0CH	Minimum sensor output voltage for test cycle
			P0164	08H	0CH	Maximum sensor output voltage for test cycle
			P0166	80H	0CH	Sensor output voltage
			P0165	81H	0CH	Difference in sensor output voltage

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[MR20DE (EXCEPT FOR CALIFORNIA)]

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
CATA- LYST	21H	Three way catalyst function (Bank1)	P0420	80H	01H	O2 storage index
			P0420	82H	01H	Switching time lag engine exhaust index value
			P2423	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2423	84H	84H	O2 storage index in HC trap catalyst
	22H	Three way catalyst function (Bank2)	P0430	80H	01H	O2 storage index
			P0430	82H	01H	Switching time lag engine exhaust index value
			P2424	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2424	84H	84H	O2 storage index in HC trap catalyst
EGR SYSTEM	31H	EGR function	P0400	80H	96H	Low Flow Faults: EGR temp change rate (short term)
			P0400	81H	96H	Low Flow Faults: EGR temp change rate (long term)
			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
VVT SYSTEM	35H	VVT Monitor (Bank1)	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)
			P0014	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)
	36H	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)
			P0024	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
EVAP SYSTEM	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)
	3CH	EVAP control system leak (Very small leak)	P0456	80H	05H	Leak area index (for more than 0.02 inch)
			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	
O2 SENSOR HEATER	41H	A/F sensor 1 heater (Bank 1)	Low Input:P0031 High Input:P0032	81H	0BH	Converted value of Heater electric current to voltage
	42H	Heated oxygen sensor 2 heater (Bank 1)	Low Input:P0037 High Input:P0038	80H	0CH	Converted value of Heater electric current to voltage
	43H	Heated oxygen sensor 3 heater (Bank 1)	P0043	80H	0CH	Converted value of Heater electric current to voltage
	45H	A/F sensor 1 heater (Bank 2)	Low Input:P0051 High Input:P0052	81H	0BH	Converted value of Heater electric current to voltage
	46H	Heated oxygen sensor 2 heater (Bank 2)	Low Input:P0057 High Input:P0058	80H	0CH	Converted value of Heater electric current to voltage
	47H	Heated oxygen sensor 3 heater (Bank 2)	P0063	80H	0CH	Converted value of Heater electric current to voltage
Secondary Air	71H	Secondary Air system	P0411	80H	01H	Secondary Air Injection System Incorrect Flow Detected
			Bank1: P0491 Bank2: P0492	81H	01H	Secondary Air Injection System Insufficient 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 Switching Valve Stuck Open
			P2440	85H	01H	Secondary Air Injection System Switching 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
	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

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
MISFIRE	A1H	Multiple Cylinder Misfires	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
			P0301	89H	24H	Misfiring counter at 200 revolution of the first cylinder
			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

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
MISFIRE	A2H	No. 1 Cylinder Misfire	P0301	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving 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 driving 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 driving 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 driving 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 driving 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 driving 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 driving 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 driving cycles
			P0308	0CH	24H	Misfire counts for last/current driving cycles

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC

 With CONSULT-III

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 CVT related items, skip step 1.
 1. Erase DTC in TCM.
 2. Select "ENGINE" with CONSULT-III.
 3. Select "SELF-DIAG RESULTS".

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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4. Touch "ERASE". (The DTC in the ECM will be erased.)

With GST

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.

1. Select Service \$04 with GST.

No Tools

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.

1. Erase DTC in ECM. Refer to How to Erase Diagnostic Test Mode II (Self-diagnostic Results).

• **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**

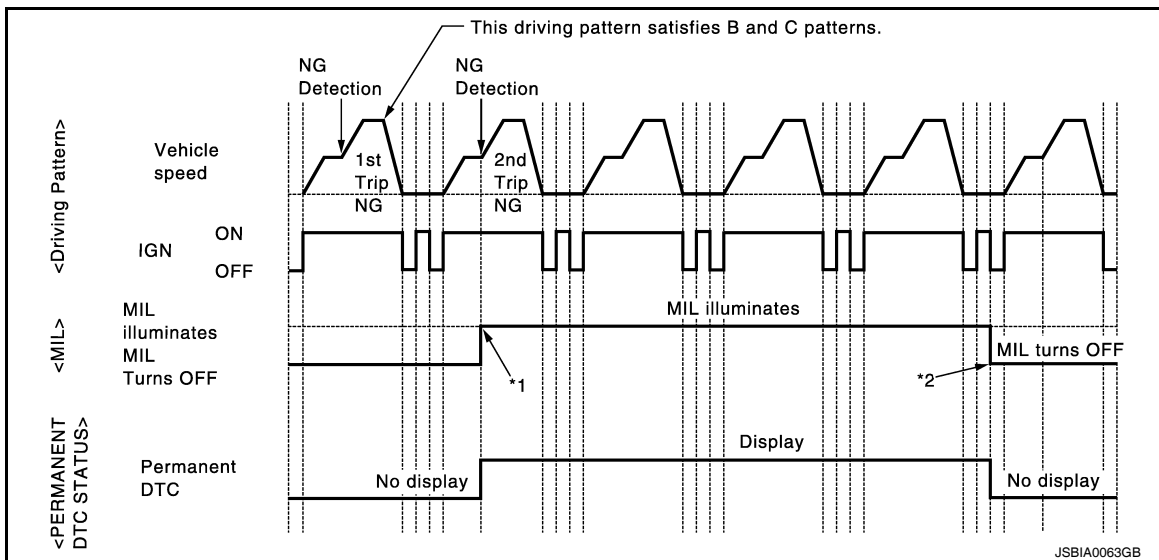
• **The following data are cleared when the ECM memory is erased.**

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

How to Erase Permanent DTC

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 row.



*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 (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.

x: Applicable —: Not applicable

Group *	Perform "DTC CONFIRMATION PROCEDURE" for applicable DTCs.	Driving pattern	
		B	D
A	x	—	—
B	—	x	x

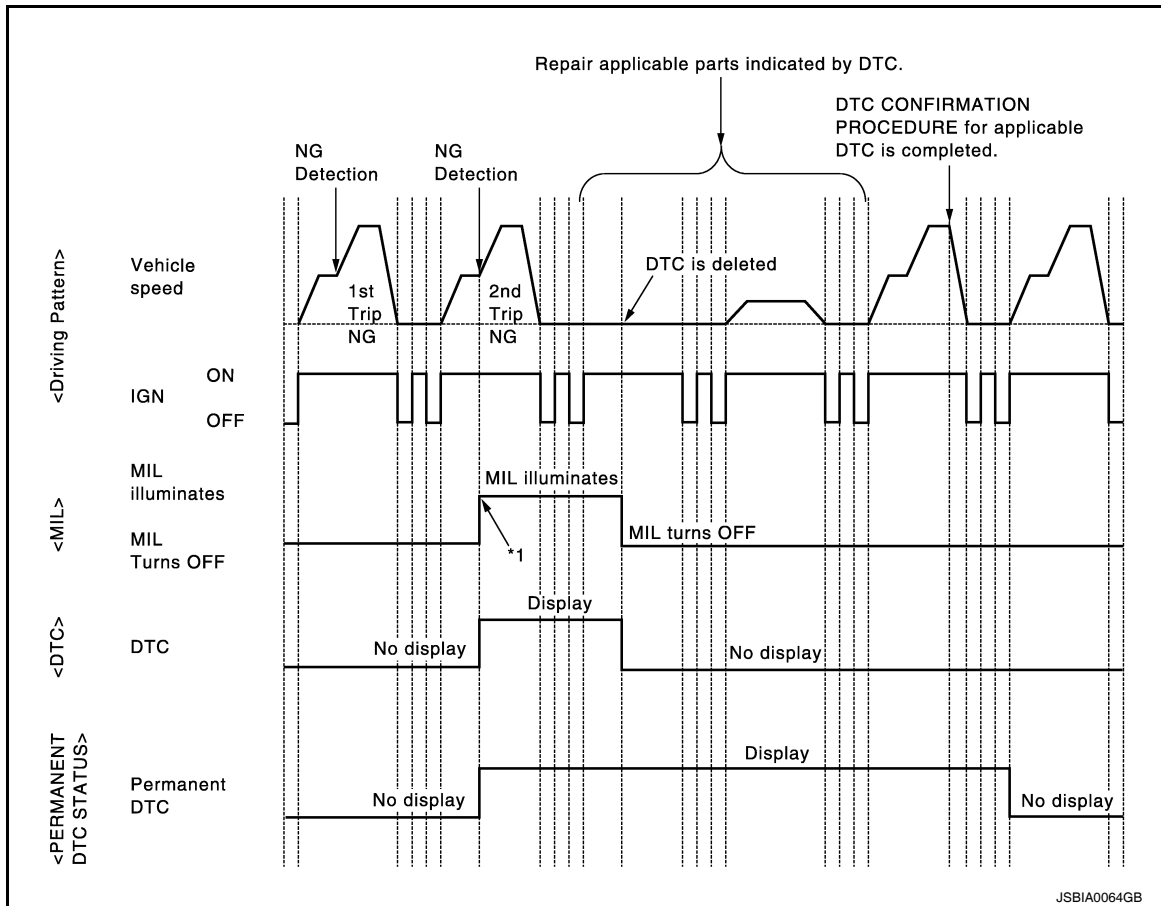
*: For group, refer to [EC-609. "Emission-related Diagnostic Information"](#), "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS".

Group A

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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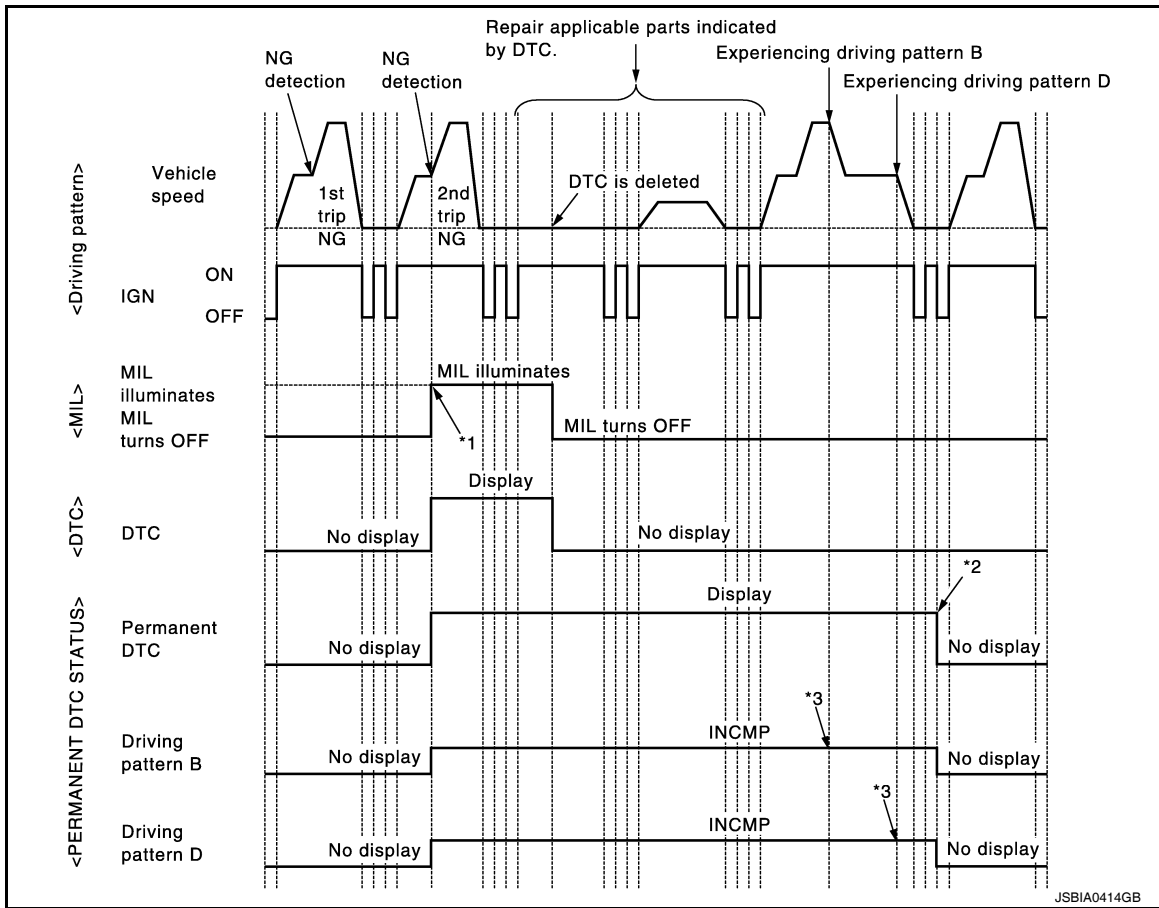
*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.

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. Check permanent DTC. Refer to [EC-609, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
 6. Perform "DTC CONFIRMATION PROCEDURE" for DTCs which are the same as permanent DTCs stored in ECM.
 7. Turn ignition switch OFF and wait at least 10 seconds.
 8. Turn ignition switch ON.
 9. Turn ignition switch OFF and wait at least 10 seconds.
 10. Turn ignition switch ON.
 11. Check permanent DTC. Refer to [EC-609, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
 12. Check that the permanent DTCs have been erased.
- Group B

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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

*2: After experiencing Driving pattern B and D, permanent DTC is erased.

*3: 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.
- When experiencing both driving pattern B and D during the same trip, the experience of driving pattern D is counted by priority.

With CONSULT-III

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. Check permanent DTC. Refer to [EC-609, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
6. Start engine and warm it up to normal operating temperature.
7. Use "PERMANENT DTC WORK SUPPORT" to drive the vehicle according to driving pattern B.

CAUTION:

- Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
8. Turn ignition switch OFF and wait at least 10 seconds.
 9. Turn ignition switch ON.
 10. Turn ignition switch OFF and wait at least 10 seconds.

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11. Turn ignition switch ON.
12. Check permanent DTC. Refer to [EC-609, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
13. Drive the vehicle according to driving pattern D.
CAUTION:
 - Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
14. Turn ignition switch OFF and wait at least 10 seconds.
15. Turn ignition switch ON.
16. Turn ignition switch OFF and wait at least 10 seconds.
17. Turn ignition switch ON.
18. Check permanent DTC. Refer to [EC-609, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
19. Check that the permanent DTCs have been erased.

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.
4. Turn ignition switch ON.
5. Check permanent DTC. Refer to [EC-609, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
6. Start engine and warm it up to normal operating temperature.
7. Drive the vehicle according to driving pattern B.
CAUTION:
 - Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
8. Turn ignition switch OFF and wait at least 10 seconds.
9. Turn ignition switch ON.
10. Turn ignition switch OFF and wait at least 10 seconds.
11. Turn ignition switch ON.
12. Check permanent DTC. Refer to [EC-609, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
13. Drive the vehicle according to driving pattern D.
CAUTION:
 - Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
14. Turn ignition switch OFF and wait at least 10 seconds.
15. Turn ignition switch ON.
16. Turn ignition switch OFF and wait at least 10 seconds.
17. Turn ignition switch ON.
18. Check permanent DTC. Refer to [EC-609, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
19. Check that the permanent DTCs have been erased.

DRIVING PATTERN

Driving Pattern B

- Driving pattern B means a trip satisfying the following conditions.
- Engine speed reaches 400 rpm or more.

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- Water temperature reaches 70°C (158°F) or more.
- Vehicle speed of 70 – 120 km/h (44 – 75 MPH) is maintained for 60 seconds or more under the control of closed loop.
- Vehicle speed of 30 – 60 km/h (19 – 37 MPH) is maintained for 10 seconds or more under the control of closed loop.
- 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.
- The state of driving at 10 km/h (7 MPH) or more reaches 10 minutes or more in total.
- A lapse of 22 minutes or more after engine start.

CAUTION:

Always drive at a safe speed.

NOTE:

- Drive the vehicle at a constant velocity.
- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern B.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern B.

Driving Pattern D

- Driving pattern D means operating vehicle as per the following.
- 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.

CAUTION:

Always drive at a safe speed.

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.

Malfunction Indicator Lamp (MIL)

INFOID:000000006580346

DESCRIPTION

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.

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

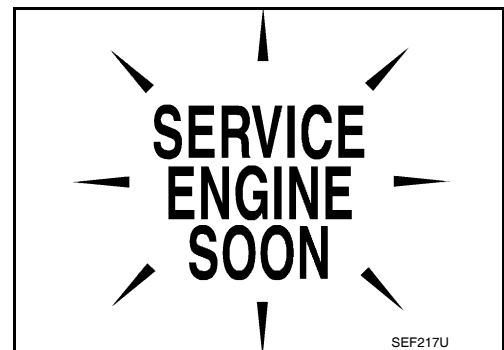
NOTE:

Check the MIL circuit if MIL does not illuminate. Refer to [EC-1102, "Wiring Diagram"](#).

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 DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following three functions.

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Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position  Engine stopped 	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> • Misfire (Possible three way catalyst damage) • One trip detection diagnoses
Mode II	Ignition switch in ON position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by MIL lighting up 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 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.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut
--	--

MIL Flashing Without DTC

When any SRT codes are not set, MIL may flash without DTC. For the details, refer to [EC-609. "Emission-related Diagnostic Information"](#).

HOW TO SWITCH DIAGNOSTIC TEST 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 malfunction.
- Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.

How to Set Diagnostic Test Mode II (Self-diagnostic Results)

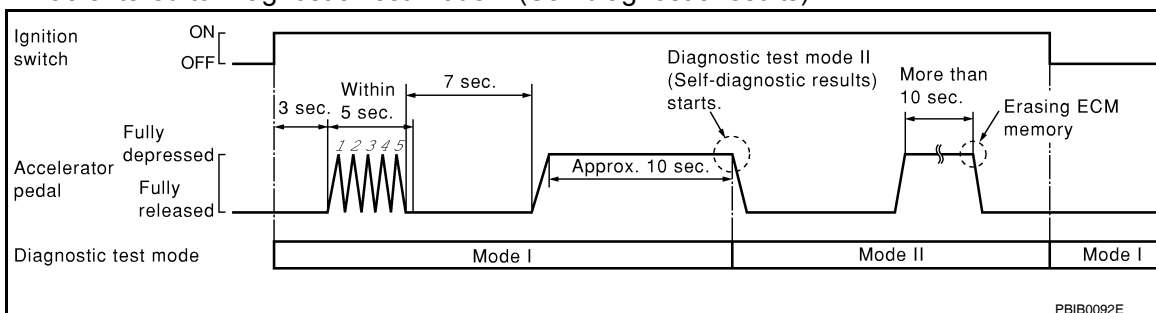
1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.
 - a. Fully depress the accelerator pedal.
 - b. Fully release the accelerator pedal.
3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MIL starts blinking.
4. Fully release the accelerator pedal.

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ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to "How to Set Diagnostic Test Mode II (Self-diagnostic Results)".
2. Fully depress the accelerator pedal and keep it for more than 10 seconds. The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to [DI-34](#) or [EC-1102](#).

DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MIL	Condition
ON	When the malfunction is detected.
OFF	No malfunction

These DTC numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

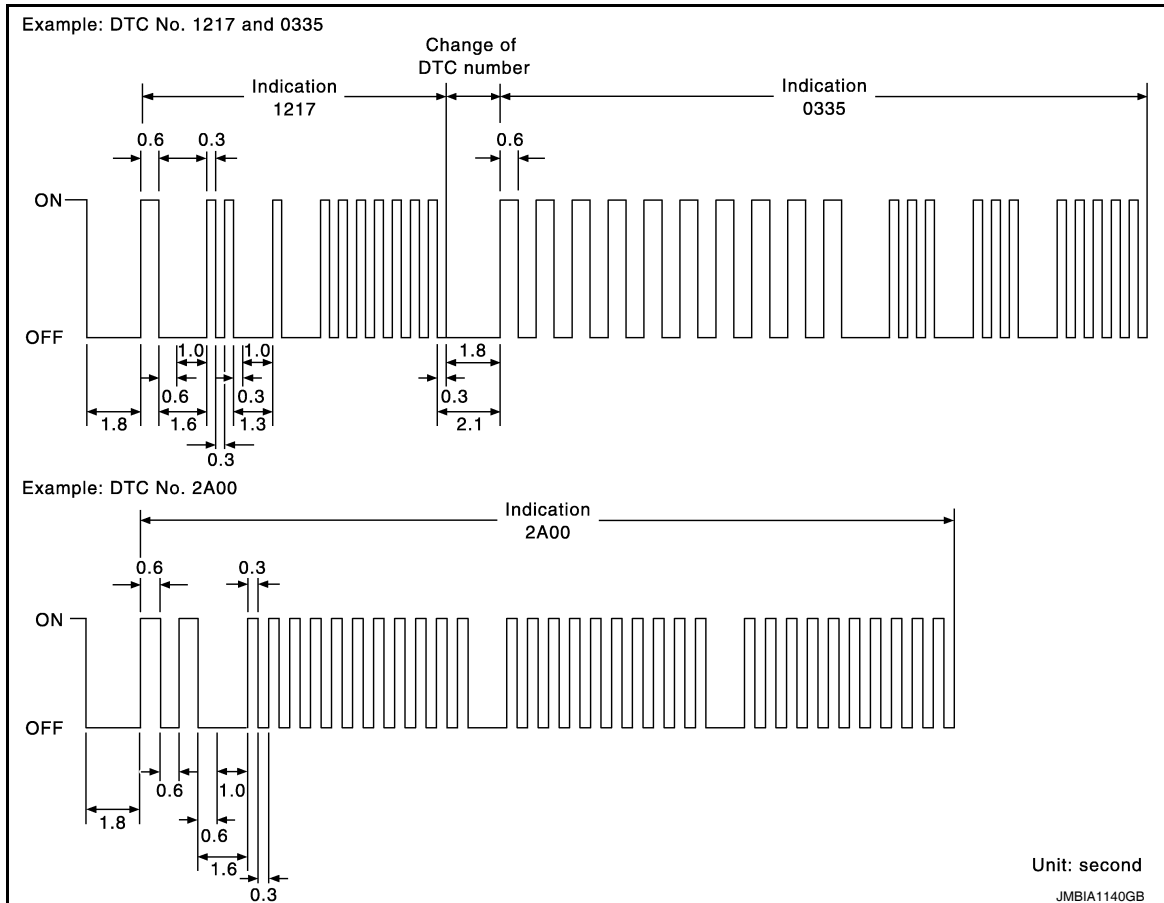
In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), 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 uniden-

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tified codes can be identified by using the CONSULT-III 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. The "zero" is indicated by the number of ten flashes. The "A" is indicated by the number of eleven flash. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle. The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second 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-second OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See [EC-572](#))

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back-up memory in the ECM by depressing accelerator pedal.

Refer to "How to Erase Diagnostic Test Mode II (Self-diagnostic Results)".

- If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.
- Be careful not to erase the stored memory before starting trouble diagnoses.

OBD System Operation Chart

INFOID:000000006580347

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. For details, refer to [EC-58, "Two Trip Detection Logic"](#).
- The MIL will go 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

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C) without the same malfunction recurring. The "TIME" in "SELF-DIAGNOSTIC RESULTS" mode of CONSULT-III 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.

SUMMARY CHART

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

For details about patterns B and C under "Fuel Injection System" and "Misfire", see "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 "MISFIRE <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.

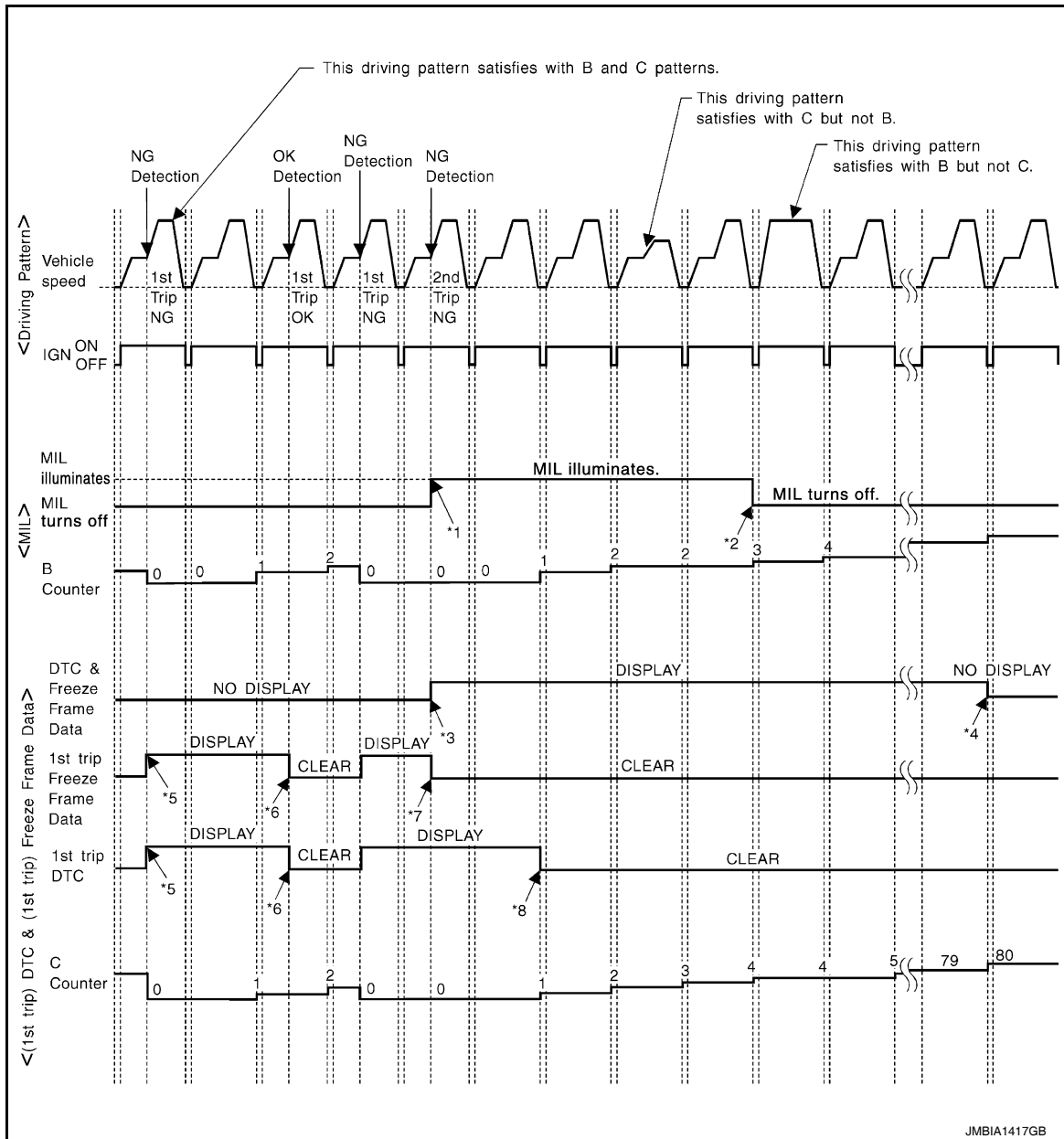
RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

A
EC
C
D
E
F
G
H
I
J
K
L
M
N
O
P

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*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 (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

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

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

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

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

<Driving Pattern C>

Driving pattern C means the vehicle operation as follows:

The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data) ± 375 rpm

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

Engine coolant temperature (T) condition:

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

Example:

If the stored freeze frame data is as follows:

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

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

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

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

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

A

EC

C

D

E

F

G

H

I

J

K

L

M

N

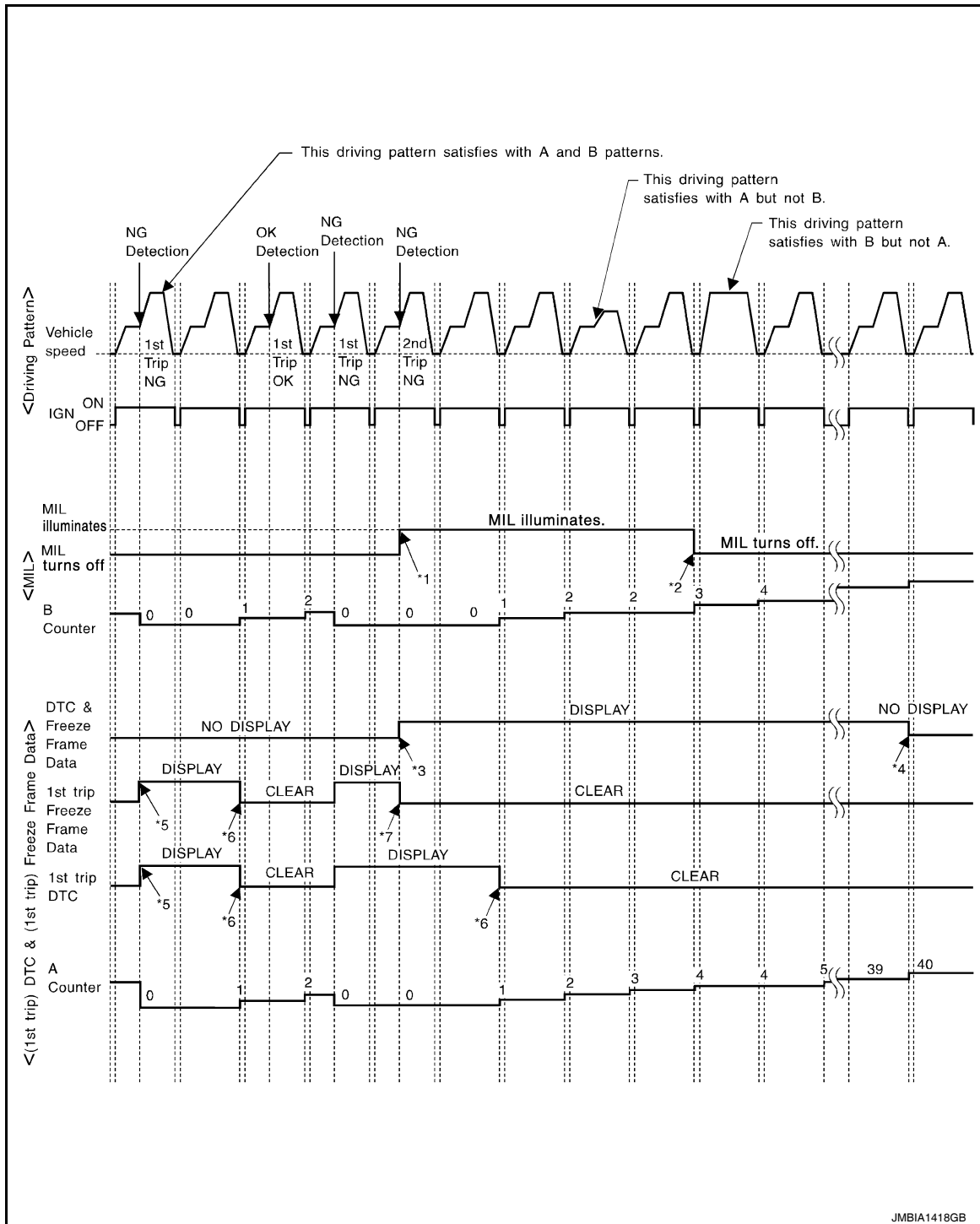
O

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[MR20DE (EXCEPT FOR CALIFORNIA)]



*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 (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

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*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction.
(The DTC and the freeze frame data still remain in ECM.)

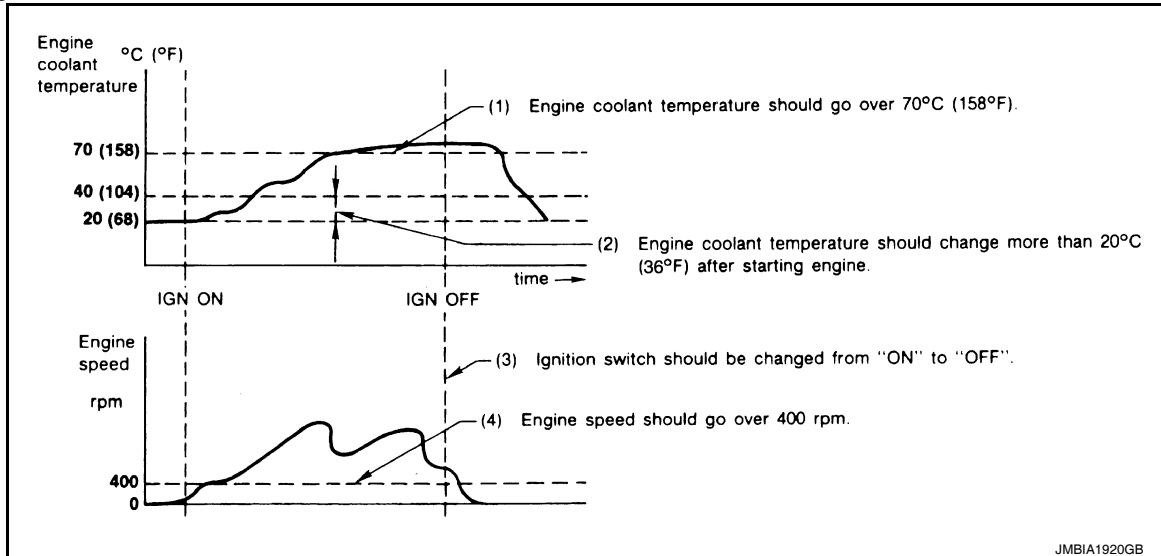
*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

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

<Driving Pattern A>



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

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

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

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

BASIC SERVICE PROCEDURE

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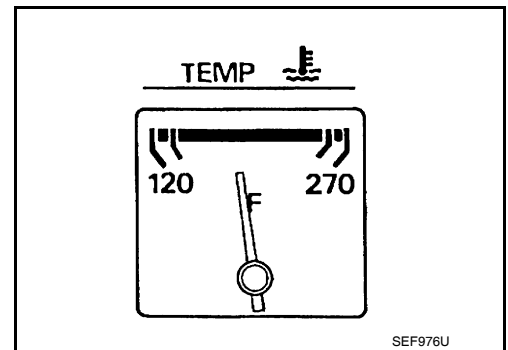
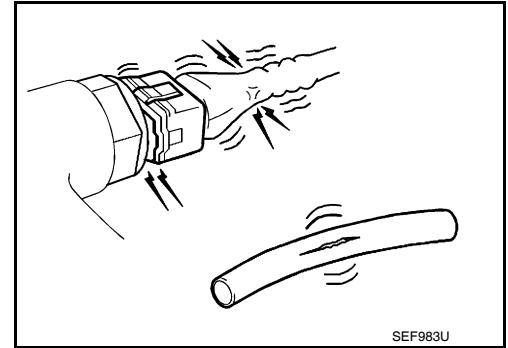
BASIC SERVICE PROCEDURE

Basic Inspection

INFOID:000000006580348

1.INSPECTION START

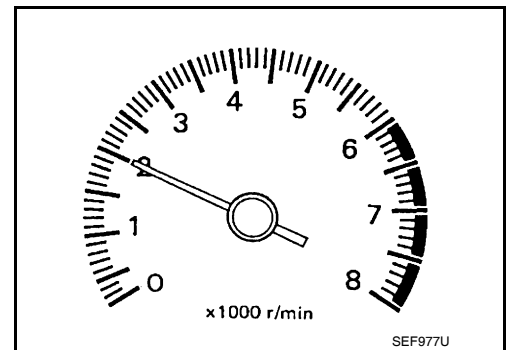
1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Wiring harness for improper connections, pinches and cut
 - Vacuum hoses for splits, kinks and improper connections
 - Hoses and ducts for leaks
 - Air cleaner clogging
 - Gasket
3. Confirm that electrical or mechanical loads are not applied.
 - Headlamp switch is OFF.
 - Air conditioner switch is OFF.
 - Rear window defogger switch is OFF.
 - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge. Ensure engine stays below 1,000 rpm.



5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-III or GST.

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2.REPAIR OR REPLACE

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

>> GO TO 3.

3.CHECK TARGET IDLE SPEED

Ⓟ With CONSULT-III

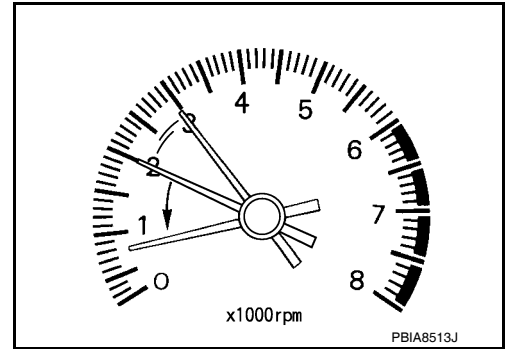
1. Run engine at about 2,000 rpm for about 2 minutes under no load.

BASIC SERVICE PROCEDURE

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



- Read idle speed in "DATA MONITOR" mode with CONSULT-III. Refer to [EC-646, "Idle Speed and Ignition Timing Check"](#).

M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

⊗ Without CONSULT-III

- Run engine at about 2,000 rpm for about 2 minutes under no load.
- Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
- Check idle speed. Refer to [EC-646, "Idle Speed and Ignition Timing Check"](#).

M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

- Stop engine.
- Perform [EC-648, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-648, "Throttle Valve Closed Position Learning"](#).

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-649, "Idle Air Volume Learning"](#).

Is Idle Air Volume Learning carried out successfully?

Yes or No

- Yes >> GO TO 7.
- No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

Ⓜ With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Read idle speed in "DATA MONITOR" mode with CONSULT-III. Refer to [EC-646, "Idle Speed and Ignition Timing Check"](#).

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M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

⊗ **Without CONSULT-III**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed. Refer to [EC-646, "Idle Speed and Ignition Timing Check"](#).

M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.

NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Check crankshaft position sensor (POS) and circuit.
Refer to [EC-862](#).
- Check camshaft position sensor (PHASE) and circuit.
Refer to [EC-868](#).

OK or NG

OK >> GO TO 9.

NG >> 1. Repair or replace.
2. GO TO 4.

9. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).

>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.
 2. Check ignition timing with a timing light.
Refer to [EC-646, "Idle Speed and Ignition Timing Check"](#).
- Timing indicator (1)

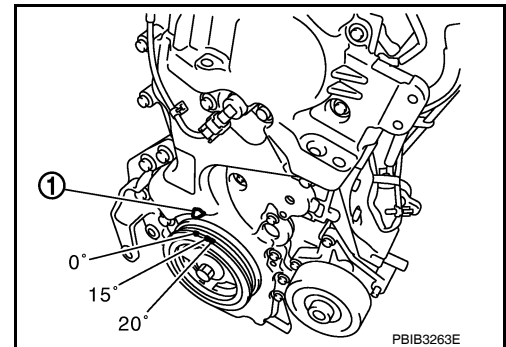
M/T: 6 ± 5° BTDC (in Neutral position)

CVT: 6 ± 5° BTDC (in P or N position)

OK or NG

OK >> GO TO 19.

NG >> GO TO 11.



11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-648, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-648, "Throttle Valve Closed Position Learning"](#).

>> GO TO 13.

BASIC SERVICE PROCEDURE

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13. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-649, "Idle Air Volume Learning"](#).

Is Idle Air Volume Learning carried out successfully?

Yes or No

- Yes >> GO TO 14.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

 **With CONSULT-III**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-III. Refer to [EC-646, "Idle Speed and Ignition Timing Check"](#).

M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

 **Without CONSULT-III**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed. Refer to [EC-646, "Idle Speed and Ignition Timing Check"](#).

M/T: 675 ± 50 rpm (in Neutral position)

CVT: 700 ± 50 rpm (in P or N position)

OK or NG

- OK >> GO TO 15.
NG >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

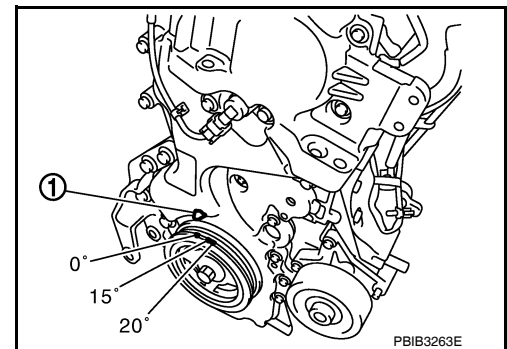
1. Run engine at idle.
 2. Check ignition timing with a timing light.
Refer to [EC-646, "Idle Speed and Ignition Timing Check"](#).
- Timing indicator (1)

M/T: 6 ± 5° BTDC (in Neutral position)

CVT: 6 ± 5° BTDC (in P or N position)

OK or NG

- OK >> GO TO 19
NG >> GO TO 16.



16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to [EM-40](#).

OK or NG

- OK >> GO TO 17.
NG >> 1. Repair the timing chain installation.
2. GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

- Check crankshaft position sensor (POS) and circuit.
Refer to [EC-862](#).
- Check camshaft position sensor (PHASE) and circuit.
Refer to [EC-868](#).

OK or NG

- OK >> GO TO 18.
NG >> 1. Repair or replace.

BASIC SERVICE PROCEDURE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-171, "ECM Re-communicating Function"](#).

>> GO TO 4.

19. INSPECTION END

Did you replace ECM, referring this Basic Inspection procedure?

Yes or No

Yes >> 1. Perform [EC-648, "VIN Registration"](#).

2. **INSPECTION END**

No >> **INSPECTION END**

Idle Speed and Ignition Timing Check

INFOID:000000006580349

IDLE SPEED

 WITH CONSULT-III

Check idle speed in "DATA MONITOR" mode with CONSULT-III.


 WITH GST

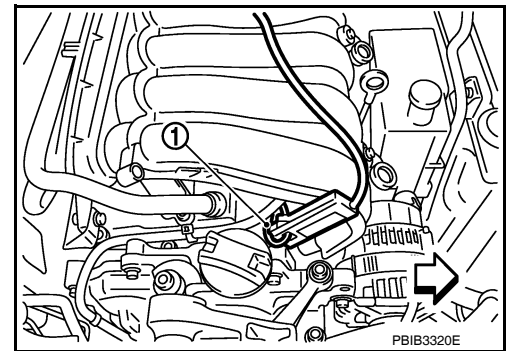
Check idle speed in Service \$01 with GST.

IGNITION TIMING

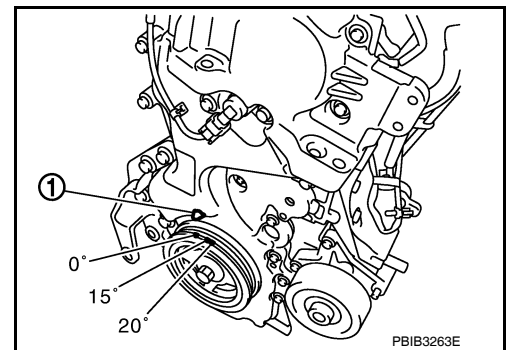
Any of following two methods may be used.

Method A

1. Attach timing light to loop wire (1) as shown.
 -  : Vehicle front



2. Check ignition timing.
 - Timing indicator (1)



Method B

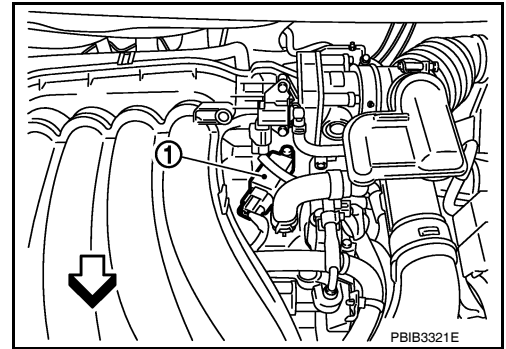
1. Remove No. 4 ignition coil (1).

BASIC SERVICE PROCEDURE

[MR20DE (EXCEPT FOR CALIFORNIA)]

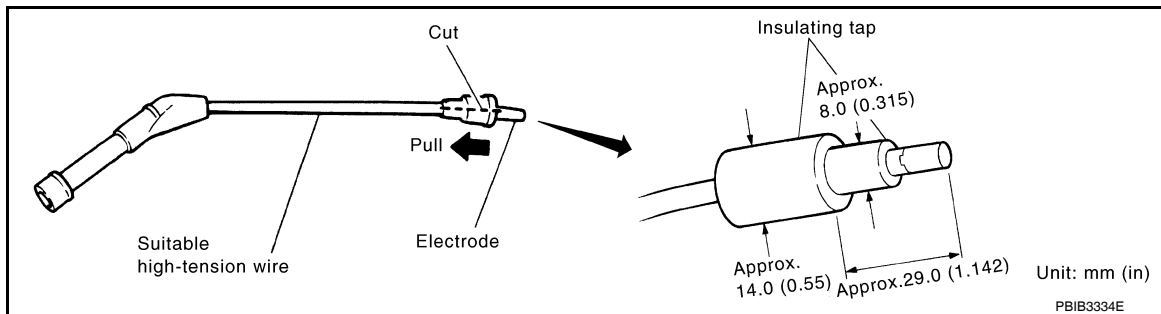
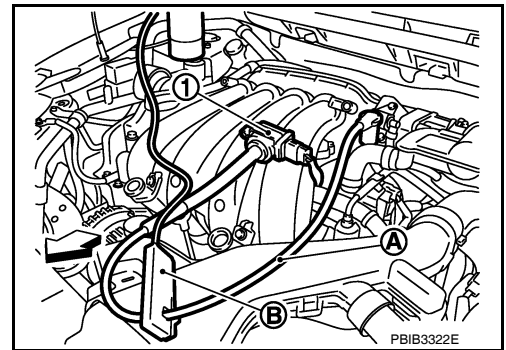
< SERVICE INFORMATION >

- ⇐ : Vehicle front

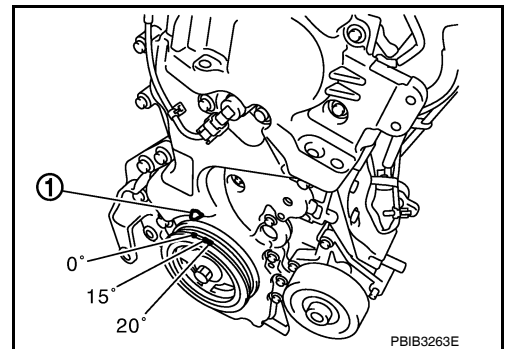


2. Connect No. 4 ignition coil (1) and No. 4 spark plug with suitable high-tension wire (A) as shown, and attach timing light clamp (B) to this wire.

- ⇐ : Vehicle front



3. Check ignition timing.
 - Timing indicator (1)



Procedure After Replacing ECM

INFOID:000000006580350

When replacing ECM, the following procedure must be performed.

1. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-171, "ECM Re-communicating Function"](#).
2. Perform [EC-648, "VIN Registration"](#).
3. Perform [EC-648, "Accelerator Pedal Released Position Learning"](#).
4. Perform [EC-648, "Throttle Valve Closed Position Learning"](#).

BASIC SERVICE PROCEDURE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

5. Perform [EC-649, "Idle Air Volume Learning"](#).

VIN Registration

INFOID:000000006580351

DESCRIPTION

VIN Registration is an operation to registering 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).

OPERATION PROCEDURE

④ With CONSULT-III

1. Check the VIN of the vehicle and note it. Refer to [GI-45](#).
2. Turn ignition switch ON and engine stopped.
3. Select "VIN REGISTRATION" in "WORK SUPPORT" mode.
4. Follow the instruction of CONSULT-III display.

Accelerator Pedal Released Position Learning

INFOID:000000006580352

DESCRIPTION

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

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF and wait at least 10 seconds.

Throttle Valve Closed Position Learning

INFOID:000000006580353

DESCRIPTION

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 the electric throttle control actuator or ECM is disconnected or electric throttle control actuator inside is cleaned.

OPERATION PROCEDURE

④ With CONSULT-III

1. Turn ignition switch ON.
2. Select "CLSD THL POS LEARN" in "WORK SUPPORT" mode of "ENGINE" using CONSULT-III.
3. Follow the instructions on the CONSULT-III 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-III

1. Start the engine.
NOTE:
Engine coolant temperature is 25°C (77°F) or less before engine starts.
2. Warm up the engine.
NOTE:
Raise engine coolant temperature until it reaches 65°C (149°F) or more.
3. 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.

BASIC SERVICE PROCEDURE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Idle Air Volume Learning

INFOID:00000006580354

DESCRIPTION

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

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

PREPARATION

Before performing Idle Air Volume Learning, make sure that all of the following conditions are satisfied. Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9 V (At idle)
- Engine coolant temperature: 70 - 95°C (158 - 203°F)
- Park/neutral position (PNP) switch (M/T): ON
- Selector lever (CVT): P or N
- Electric load switch: OFF

[Air conditioner, headlamp rear window defogger]

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

- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
 - For CVT models
- With CONSULT-III: Drive vehicle until "ATF TEMP SEN" in "DATA MONITOR" mode of "TRANSMISSION" system indicates less than 0.9 V.
- Without CONSULT-III: Drive vehicle for 10 minutes.
 - For M/T models
- Drive vehicle for 10 minutes.

OPERATION PROCEDURE

☑ With CONSULT-III

1. Perform [EC-648, "Accelerator Pedal Released Position Learning"](#).
2. Perform [EC-648, "Throttle Valve Closed Position Learning"](#).
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.
6. Touch "START" and wait 20 seconds.
7. Make sure that "CMPLT" is displayed on CONSULT-III screen. If "CMPLT" is not displayed, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the DIAGNOSTIC PROCEDURE below.
8. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.
Refer to [EC-642, "Basic Inspection"](#).

Item	Specification
Idle speed	M/T: 675 ± 50 rpm (in Neutral position) CVT: 700 ± 50 rpm (in P or N position)
Ignition timing	M/T: 6 ± 5° BTDC (in Neutral position) CVT: 6 ± 5° BTDC (in P or N position)

☒ Without CONSULT-III

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.

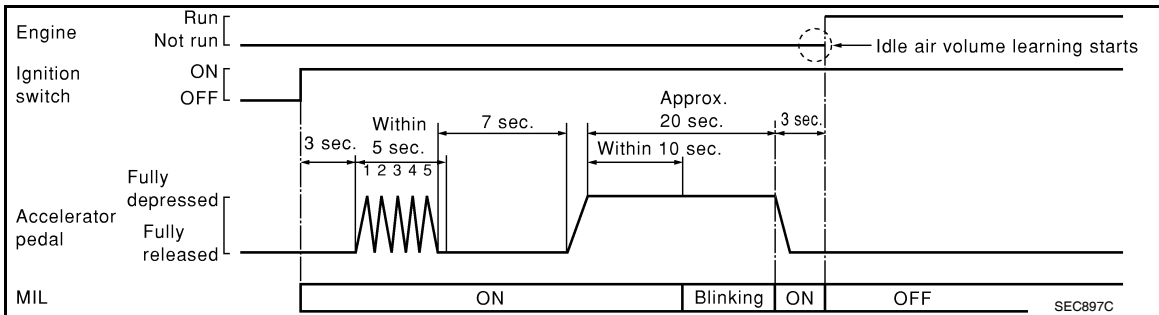
1. Perform [EC-648, "Accelerator Pedal Released Position Learning"](#).
2. Perform [EC-648, "Throttle Valve Closed Position Learning"](#).

BASIC SERVICE PROCEDURE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
7. Repeat the following procedure quickly five times within 5 seconds.
 - a. Fully depress the accelerator pedal.
 - b. Fully release the accelerator pedal.
8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
9. Fully release the accelerator pedal within 3 seconds after the MIL turned ON.
10. Start engine and let it idle.
11. Wait 20 seconds.



12. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications. Refer to [EC-642, "Basic Inspection"](#).

Item	Specification
Idle speed	M/T: 675 ± 50 rpm (in Neutral position) CVT: 700 ± 50 rpm (in P or N position)
Ignition timing	M/T: 6 ± 5° BTDC (in Neutral position) CVT: 6 ± 5° BTDC (in P or N position)

13. If idle speed and ignition timing are not within the specification, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the DIAGNOSTIC PROCEDURE below.

DIAGNOSTIC PROCEDURE

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

1. **Check that throttle valve is fully closed.**
2. **Check PCV valve operation.**
3. **Check that downstream of throttle valve is free from air leakage.**
4. **When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.**
It is useful to perform [EC-693](#).
5. **If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle air volume learning all over again:**
 - **Engine stalls.**
 - **Erroneous idle.**

Fuel Pressure Check

INFOID:000000006580355

FUEL PRESSURE RELEASE

Ⓟ With CONSULT-III

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

BASIC SERVICE PROCEDURE

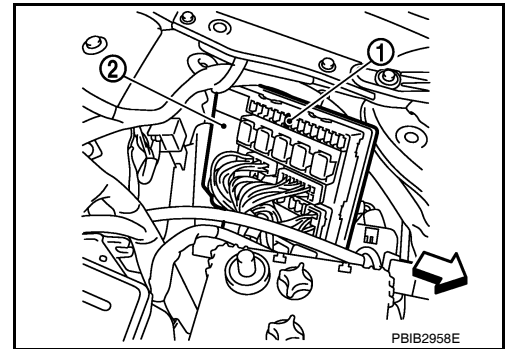
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

5. Turn ignition switch OFF.

⊗ Without CONSULT-III

1. Remove fuel pump fuse (1) located in IPDM E/R (2).
 - ↶: Vehicle front
2. Start engine.
3. After engine stalls, crank it two or three 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.

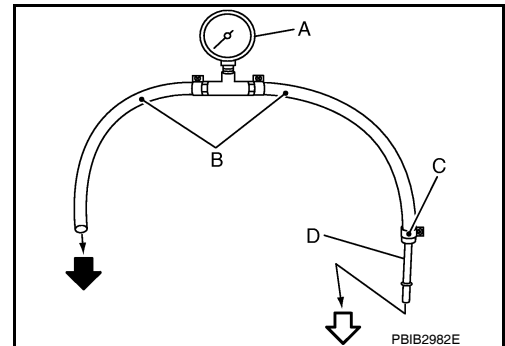
NOTE:

- Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because B16 models do not have fuel return system.
- The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.
- Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains seal ability with O-rings inside.
- Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C, etc.) Fuel pressure gauge may indicate false readings due to varying engine load and changes in manifold vacuum.

1. Release fuel pressure to zero. Refer to "FUEL PRESSURE RELEASE".

2. Prepare fuel hose for fuel pressure check B and fuel tube adapter (KV10118400) D, then connect fuel pressure gauge A.

- ↶: To quick connector
- ↷: To fuel tube (engine side)
- C: Clamp
- Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
- To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
- Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
- Use pressure gauge to check fuel pressure.

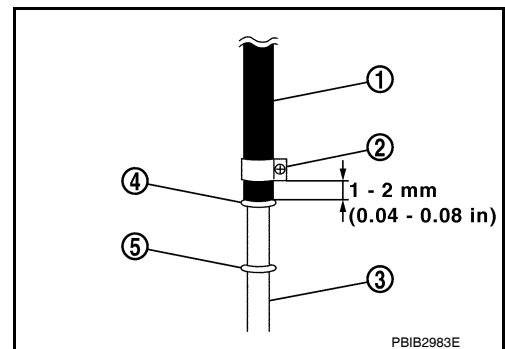


3. Remove fuel hose. Refer to [EM-36](#).

- Do not twist or kink fuel hose because it is plastic hose.

4. Connect fuel hose for fuel pressure check (1) to fuel tube (engine side) with clamp (2) as shown in the figure.

- No.2 spool (5)
- Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
- Apply proper amount of gasoline between top of the fuel tube (3) and No.1 spool (4).
- Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
- Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
- When reconnecting fuel line, always use new clamps.
- Use a torque driver to tighten clamps.
- Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).



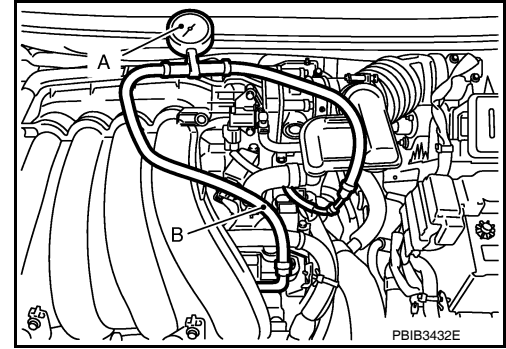
Tightening torque: 1 - 1.5 N·m (0.1 - 0.15 kg·m, 9 - 13 in·lb)

BASIC SERVICE PROCEDURE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Make sure that clamp screw does not contact adjacent parts.
5. Connect fuel tube adapter to quick connector.
 - A: Fuel pressure gauge
 - B: Fuel hose for fuel pressure check
 6. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
 7. Turn ignition switch ON and check for fuel leakage.
 8. Start engine and check for fuel leakage.
 9. Read the indication of fuel pressure gauge.
 - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
 - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.



At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

10. If result is unsatisfactory, go to next step.
11. Check the following.
 - Fuel hoses and fuel tubes for clogging
 - Fuel filter for clogging
 - Fuel pump
 - Fuel pressure regulator for cloggingIf OK, replace fuel pressure regulator.
If NG, repair or replace.
12. Check the following.
 - Fuel hoses and fuel tubes for clogging
 - Fuel filter for clogging
 - Fuel pump
 - Fuel pressure regulator for cloggingIf OK, replace fuel pressure regulator.
If NG, repair or replace.
13. Before disconnecting fuel pressure gauge and fuel pressure adapter J-44321-6, release fuel pressure to zero. Refer to "FUEL PRESSURE RELEASE".

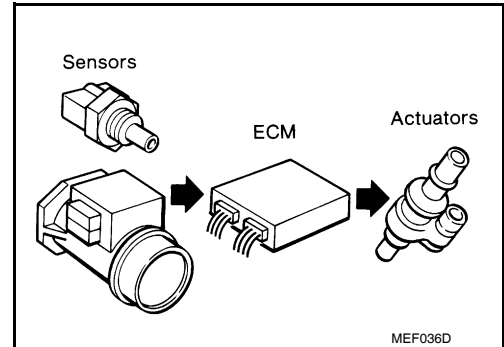
TROUBLE DIAGNOSIS

Trouble Diagnosis Introduction

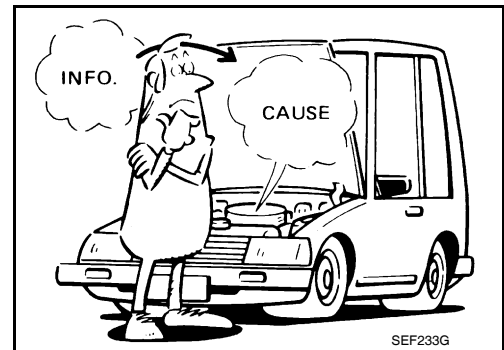
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INTRODUCTION

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



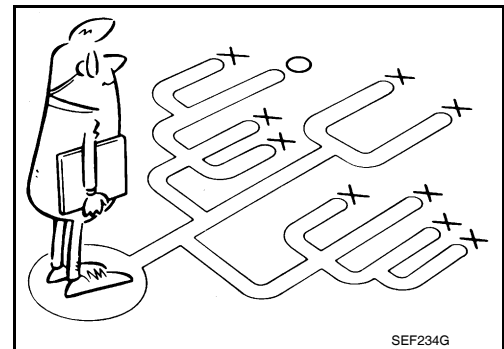
It is much more difficult to diagnose an incident that occurs intermittently rather than continuously. Most intermittent incidents are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



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

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

Start your diagnosis by looking for conventional malfunctions first. This will help troubleshoot drivability malfunctions on an electronically controlled engine vehicle.



WORK FLOW

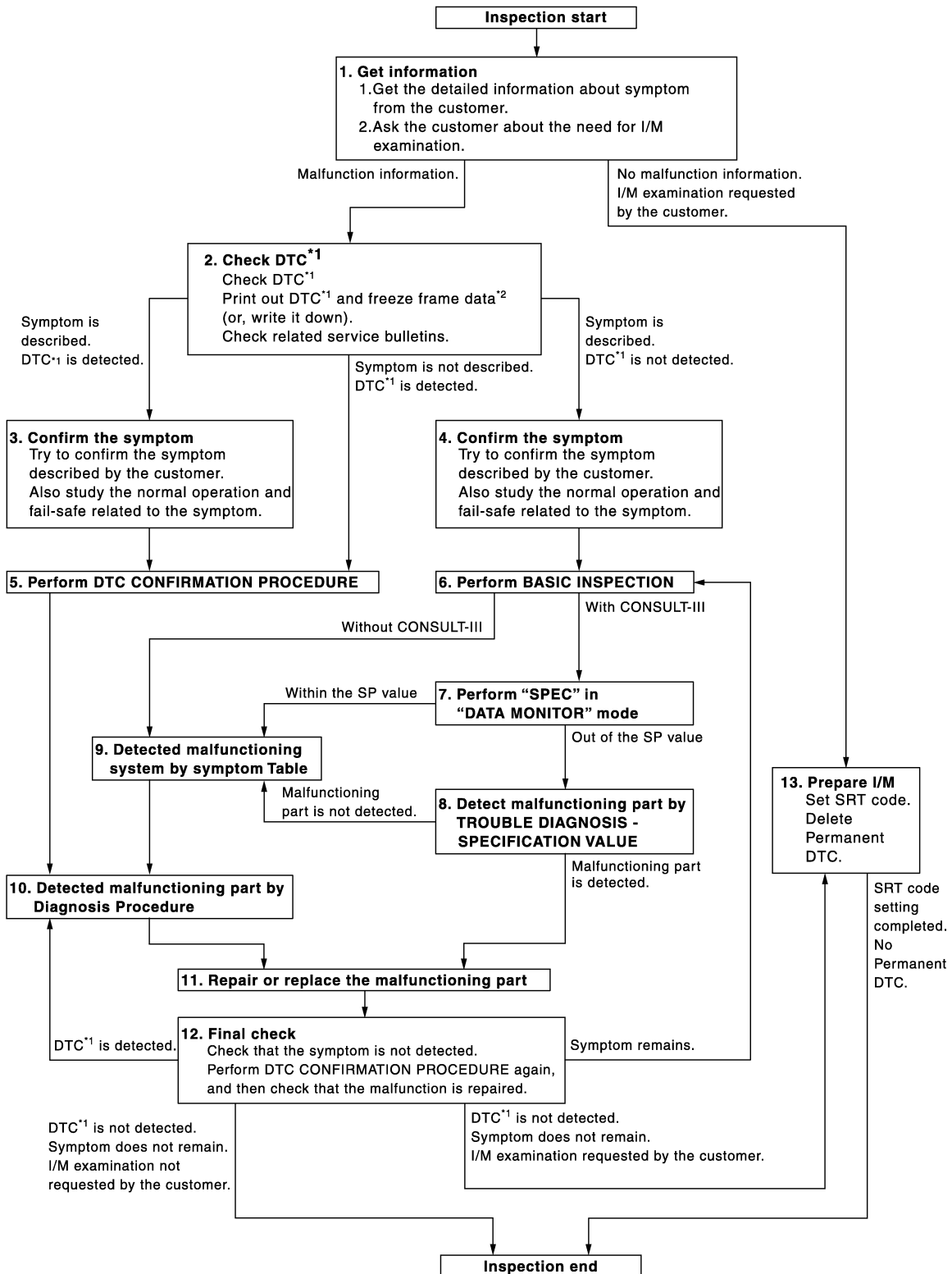
Overall Sequence

A
EC
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P

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]



JSBIA0067GB

*1: Include 1st trip DTC.

*2: Include 1st trip freeze frame data.

Detailed Flow

1. GET INFORMATION FOR SYMPTOM

TROUBLE DIAGNOSIS

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. 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".
2. Ask if the customer requests I/M examination.

Malfunction information, obtained>>GO TO 2.

No malfunction information, but a request for I/M examination>>GO TO 13.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.
 - Record DTC and freeze frame data. (Print them out with CONSULT-III or GST.)
 - Erase DTC. (Refer to [EC-609. "Emission-related Diagnostic Information"](#).)
 - Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to [EC-660. "Symptom Matrix Chart"](#).)
3. Check related service bulletins for information.

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.

Diagnosis Work Sheet is useful to verify the incident.

Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.

Also study the normal operation and fail-safe related to the symptom.

Diagnosis Work Sheet is useful to verify the incident.

Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.

If two or more DTCs are detected, refer to [EC-658. "DTC Inspection Priority Chart"](#) and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- 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 CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.

NO >> Check according to [EC-701. "Description"](#).

6.PERFORM BASIC INSPECTION

Perform [EC-642. "Basic Inspection"](#).

Do you have CONSULT-III?

YES >> GO TO 7.

NO >> GO TO 9.

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

7. PERFORM SPEC IN DATA MONITOR MODE

With CONSULT-III

Make sure that "MAS A/F SE-B1", "B/FUEL SCHDL" and "A/F ALPHA-B1" are within the SP value using CONSULT-III "SPEC" in "DATA MONITOR" mode. Refer to [EC-693, "Inspection Procedure"](#).

Is the measurement value within the SP value?

- YES >> GO TO 9.
- NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to [EC-693, "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 [EC-660, "Symptom Matrix Chart"](#) 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 [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#).

Is a malfunctioning part detected?

- YES >> GO TO 11.
- NO >> Monitor input data from related sensors or check voltage of related ECM terminals using CONSULT-III. Refer to [EC-673, "ECM Terminal and Reference Value"](#), [EC-689, "CONSULT-III Reference Value in Data Monitor"](#).

11. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it. Refer to [EC-609, "Emission-related Diagnostic Information"](#).

>> GO TO 12.

12. FINAL CHECK

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 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 (Transmission Control Module). Refer to [EC-609, "Emission-related Diagnostic Information"](#).
- NO-2 >> I/M examination, requested from the customer: GO TO 13.

13. PREPARE FOR I/M EXAMINATION

1. Set SRT codes. Refer to [EC-609, "Emission-related Diagnostic Information"](#).
2. Erase permanent DTCs. Refer to [EC-609, "Emission-related Diagnostic Information"](#).

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC Inspection Priority Chart

INFOID:000000006580357

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

Priority	Detected items (DTC)
1	<ul style="list-style-type: none"> • U0101 U0140 U1001 CAN communication line • P0101 P0102 P0103 Mass air flow sensor • P0112 P0113 P0127 Intake air temperature sensor • P0116 P0117 P0118 P0125 Engine coolant temperature sensor • P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor • P0128 Thermostat function • P0181 P0182 P0183 Fuel tank temperature sensor • P0196 P0197 P0198 Engine oil temperature sensor • P0327 P0328 Knock sensor • P0335 Crankshaft position sensor (POS) • P0340 Camshaft position sensor (PHASE) • P0460 P0461 P0462 P0463 Fuel level sensor • P0500 Vehicle speed sensor • P0605 P0607ECM • P0643 Sensor power supply • P0705 Transmission range switch • P0850 Park/neutral position (PNP) switch • P1610 - P1615 NATS • P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor
2	<ul style="list-style-type: none"> • P0031 P0032 Air fuel ratio (A/F) sensor 1 heater • P0037 P0038 Heated oxygen sensor 2 heater • P0075 Intake valve timing control solenoid valve • P0130 P0131 P0132 P014C P014D P015A P015B P2A00 Air fuel ratio (A/F) sensor 1 • P0137 P0138 P0139 Heated oxygen sensor 2 • P0441 EVAP control system purge flow monitoring • P0443 P0444 P0445 EVAP canister purge volume control solenoid valve • P0447 P0448 EVAP canister vent control valve • P0451 P0452 P0453 EVAP control system pressure sensor • P0603 ECM power supply • P1217 Engine over temperature (OVERHEAT) • P1805 Brake switch • P2100 P2103 Throttle control motor relay • P2101 Electric throttle control function • P2118 Throttle control motor
3	<ul style="list-style-type: none"> • P0011 Intake valve timing control • P0171 P0172 Fuel injection system function • P0300 - P0304 Misfire • P0420 Three way catalyst function • P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) • P0455 EVAP control system (GROSS LEAK) • P0506 P0507 Idle speed control system • P050A P050B P050E Cold start control • P0710 P0715 P0720 P0740 P0744 P0745 P0746 P0776 P0778 P0840 P0845 P1740 P1777 P1778 CVT related sensors, solenoid valves and switches • P1148 Closed loop control • P1212 TCS communication line • P1564 ASCD steering switch • P1572 ASCD brake switch • P1574 ASCD vehicle speed sensor • P1715 Input speed sensor • P2119 Electric throttle control actuator

Fail-Safe Chart

INFOID:000000006580358

When the DTC listed below is detected, the ECM enters fail-safe mode and the MIL lights up.

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC No.	Detected items	Engine operating condition in fail-safe mode								
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 temperature sensor circuit	<p>Engine coolant temperature will be determined by ECM based on the following condition. CONSULT-III displays the engine coolant temperature decided by ECM.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Engine coolant temperature decided (CONSULT-III display)</th> </tr> </thead> <tbody> <tr> <td>Just as ignition switch is turned ON or START</td> <td style="text-align: center;">40°C (104°F)</td> </tr> <tr> <td>Approx 4 minutes or more after engine starting</td> <td style="text-align: center;">80°C (176°F)</td> </tr> <tr> <td>Except as shown above</td> <td style="text-align: center;">40 - 80°C (104 - 176°F) (Depends on the time)</td> </tr> </tbody> </table> <p>When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.</p>	Condition	Engine coolant temperature decided (CONSULT-III display)	Just as ignition switch is turned ON or START	40°C (104°F)	Approx 4 minutes or more after engine starting	80°C (176°F)	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
Condition	Engine coolant temperature decided (CONSULT-III display)									
Just as ignition switch is turned ON or START	40°C (104°F)									
Approx 4 minutes or more after engine starting	80°C (176°F)									
Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)									
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	<p>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. So, the acceleration will be poor.</p>								
P0500	Vehicle speed sensor	When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (Highest) while engine is running.								
P0643	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P2100 P2103	Throttle control relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
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 actuator	<p>(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.</p> <p>(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.</p> <p>(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P (CVT), Neutral (M/T) position, and engine speed will not exceed 1,000 rpm or more.</p>								
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	<p>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. So, the acceleration will be poor.</p>								

- When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting up 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 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.

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Engine operating condition in fail-safe mode

Engine speed will not rise more than 2,500 rpm due to the fuel cut

Symptom Matrix Chart

INFOID:000000006580359

SYSTEM — BASIC ENGINE CONTROL SYSTEM

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-1083
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-650
	Fuel injector circuit	1	1	2	3	2		2	2			2			EC-1078
	Evaporative emission system	3	3	4	4	4	4	4	4	4	4	4			EC-593
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-603
	Incorrect idle speed adjustment						1	1	1	1		1			EC-642
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-1022 , EC-1032
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-642
	Ignition circuit	1	1	2	2	2		2	2			2			EC-1088
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-702
Mass air flow sensor circuit					2										EC-734 , EC-741
Engine coolant temperature sensor circuit		1					3			3					EC-753 , EC-757 , EC-766
Air fuel ratio (A/F) sensor 1 circuit			1	2	3	2		2	2			2			EC-773 , EC-778 , EC-783 , EC-812 , EC-1058
Throttle position sensor circuit							2			2					EC-760 , EC-847 , EC-993 , EC-994 , EC-1046
Accelerator pedal position sensor circuit				3	2	1									EC-969 , EC-1034 , EC-1039 , EC-1051

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Knock sensor circuit			2								3			EC-858
Engine oil temperature sensor circuit			4		2						3			EC-840
Crankshaft position sensor (POS) circuit	2	2												EC-862
Camshaft position sensor (PHASE) circuit	3	2												EC-868
Vehicle speed signal circuit		2	3		3						3			EC-955
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-966
Intake valve timing control solenoid valve circuit		3	2		1	3	2	2	3		3			EC-729
Park/neutral position (PNP) signal circuit			3		3		3	3			3			EC-974
Refrigerant pressure sensor circuit		2				3			3		4			EC-1097
Electrical load signal circuit							3							EC-1076
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	MTC-28
ABS actuator and electric unit (control unit)			4											BRC-45

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

(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

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[MR20DE (EXCEPT FOR CALIFORNIA)]

		SYMPTOM												Reference page		
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATSWATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Fuel	Fuel tank	5	5												FL-10	
	Fuel piping			5	5	5		5	5			5			FL-5	
	Vapor lock															—
	Valve deposit															—
	Poor fuel (Heavy weight gasoline, Low octane)	5			5	5	5		5	5			5			—
Air	Air duct														EM-16	
	Air cleaner														EM-16	
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)		5	5		5		5	5			5			EM-16	
	Electric throttle control actuator	5			5		5			5					EM-18	
	Air leakage from intake manifold/Collector/Gasket														EM-18	
Cranking	Battery	1	1	1		1		1	1					1	SC-5	
	Generator circuit														SC-26	
	Starter circuit	3										1			SC-11	
	Signal plate	6													EM-80	
	Park/neutral position (PNP) switch (M/T) Transmission range switch (CVT)	4													MT-144 or CVT-61	
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-65	
	Cylinder head gasket										4		3			
	Cylinder block															
	Piston												4			
	Piston ring															
	Connecting rod	6	6	6	6	6		6	6			6			EM-80	
	Bearing															
Crankshaft																

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Valve mechanism	Timing chain														EM-40
	Camshaft														EM-50
	Intake valve timing control	5	5	5	5	5		5	5			5			EM-40
	Intake valve												3		EM-65
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5			5	5		5			EM-23, EX-5
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5			5	5		5			EM-27, LU-9
	Oil level (Low)/Filthy oil														LU-6
Cooling	Radiator/Hose/Radiator filler cap														CO-15
	Thermostat									5					CO-21
	Water control valve														CO-24
	Water pump	5	5	5	5	5			5	5		4	5		CO-19
	Water gallery														EM-66
	Cooling fan														CO-17
	Coolant level (Low)/Contaminated coolant									5					CO-11
NVIS (NISSAN Vehicle Immobilizer System-NATS)		1	1												BL-170

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

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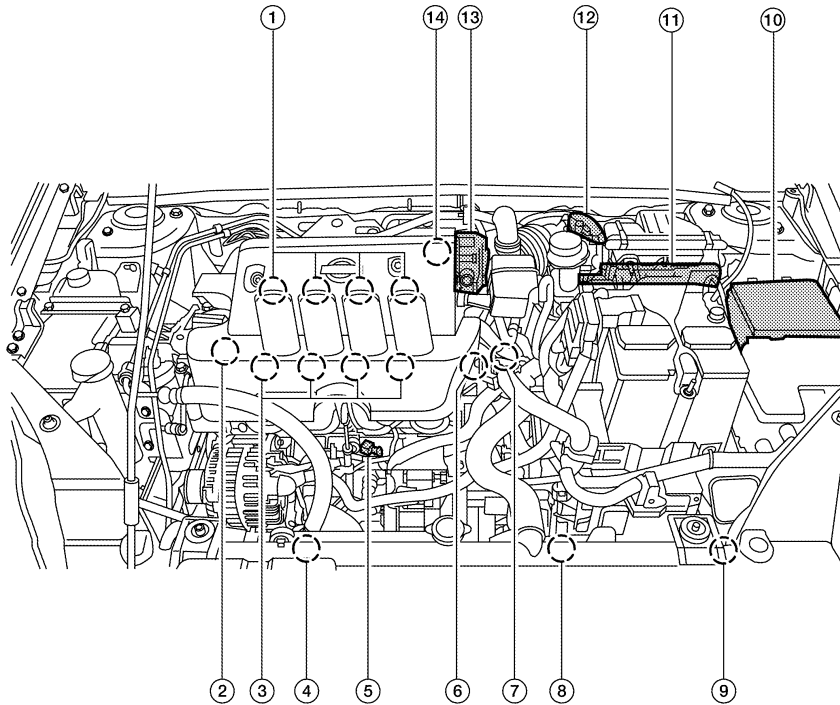
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[MR20DE (EXCEPT FOR CALIFORNIA)]

Engine Control Component Parts Location

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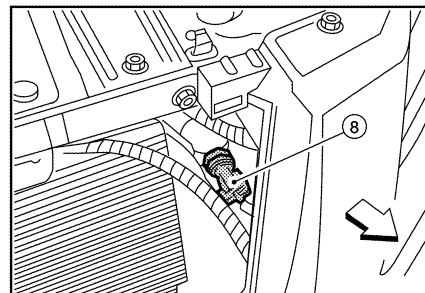
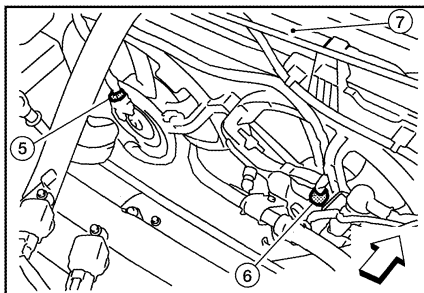
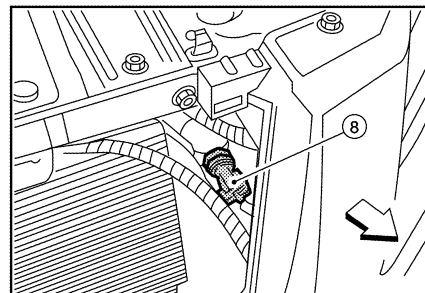
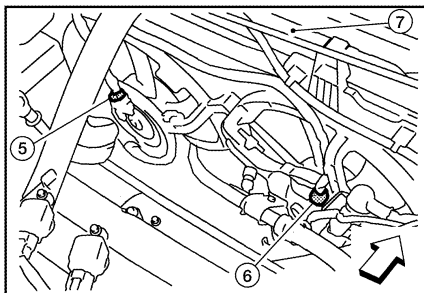
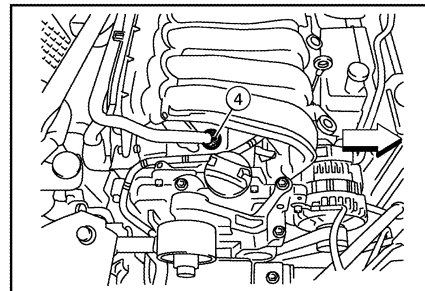
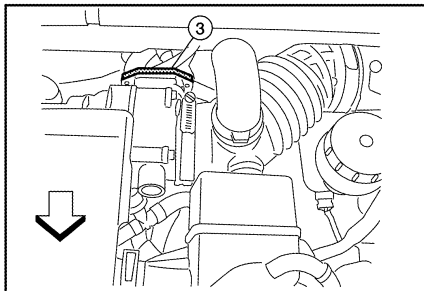
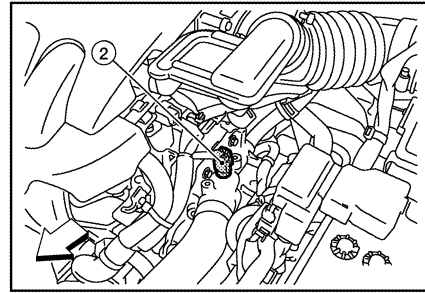
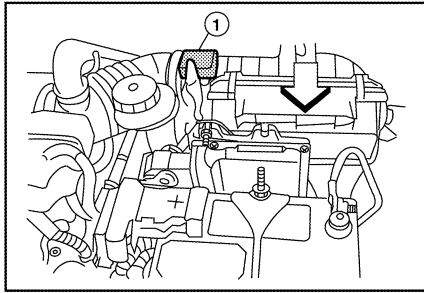
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| 1. Ignition coil (with power transistor) and spark plug | 2. Intake valve timing control solenoid valve | 3. Fuel injector |
| 4. Cooling fan motor-1 | 5. Knock sensor | 6. Camshaft position sensor (PHASE) |
| 7. Engine coolant temperature sensor | 8. Cooling fan motor-2 | 9. Refrigerant pressure sensor |
| 10. IPDM E/R | 11. ECM | 12. Mass air flow sensor (with intake air temperature sensor) |
| 13. Electric throttle control actuator (with built in throttle position sensor, throttle control motor) | 14. EVAP canister purge volume control solenoid valve | |

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]



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⇐ : Vehicle front

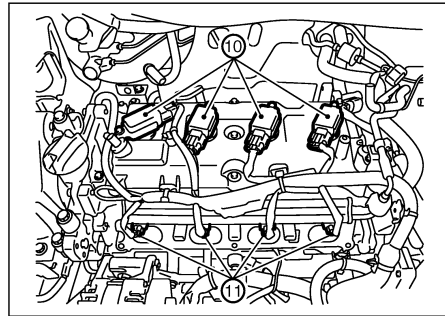
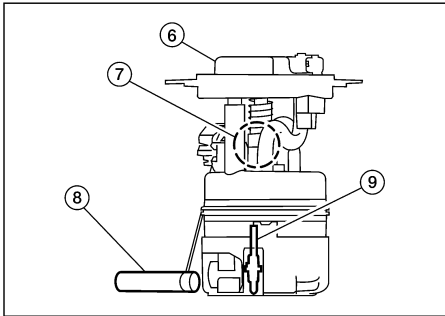
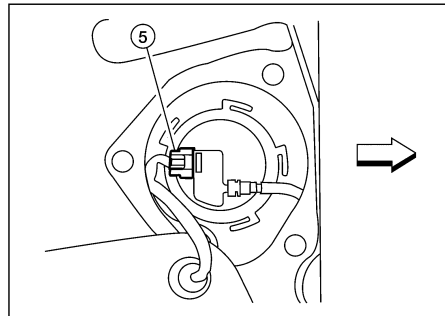
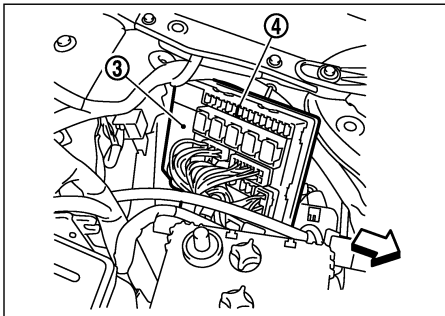
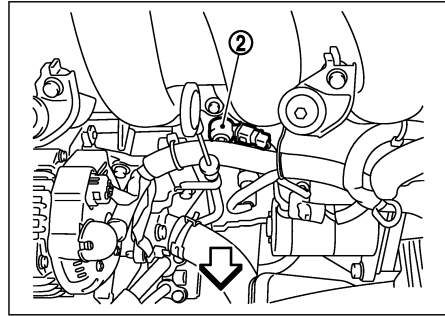
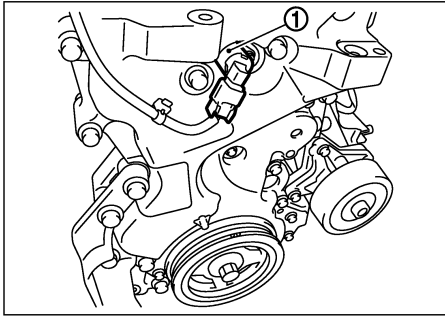
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| 1. Mass air flow sensor
(with intake air temperature sensor) | 2. Engine coolant temperature sensor | 3. Electric throttle control actuator
(with built in throttle position sensor,
throttle control motor) |
| 4. PCV valve | 5. Cooling fan motor-1 harness connector | 6. Cooling fan motor-2 harness connector |
| 7. Radiator | 8. Refrigerant pressure sensor | |

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TROUBLE DIAGNOSIS

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[MR20DE (EXCEPT FOR CALIFORNIA)]



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← : Vehicle front

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| 1. Intake valve timing control solenoid valve | 2. Knock sensor | 3. IPDM E/R |
| 4. Fuel pump fuse | 5. Fuel level sensor unit and fuel pump harness connector | 6. Fuel level sensor unit and fuel pump |
| 7. Fuel pressure regulator | 8. Fuel level sensor | 9. Fuel tank temperature sensor |
| 10. Ignition coil (with power transistor) and spark plug | | |

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

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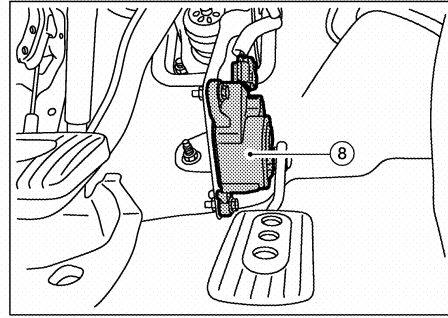
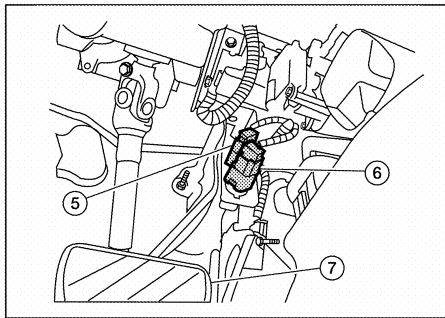
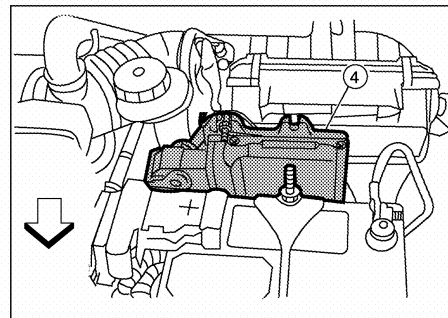
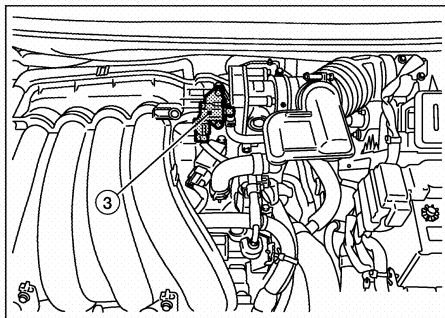
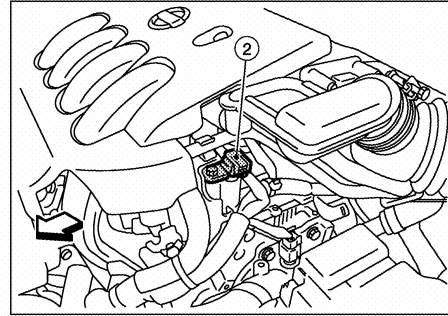
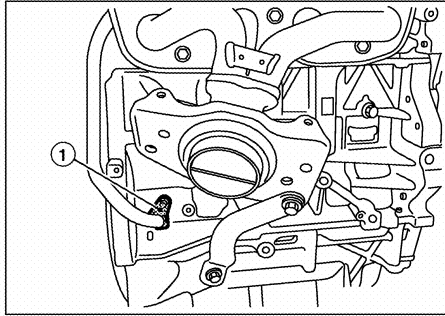
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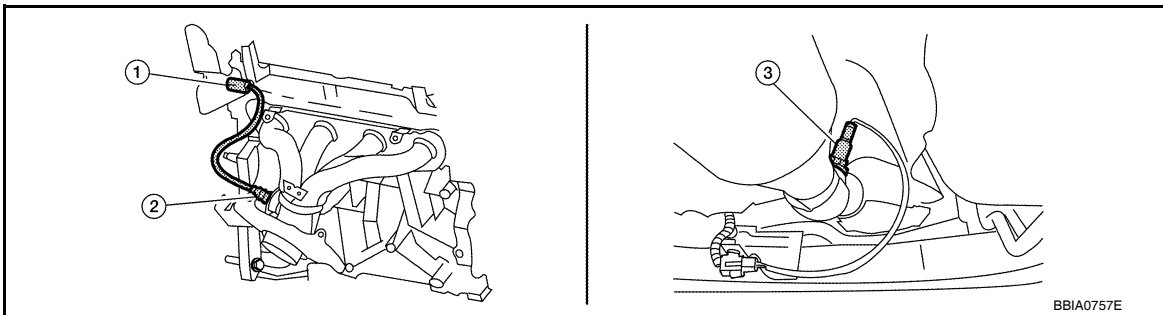
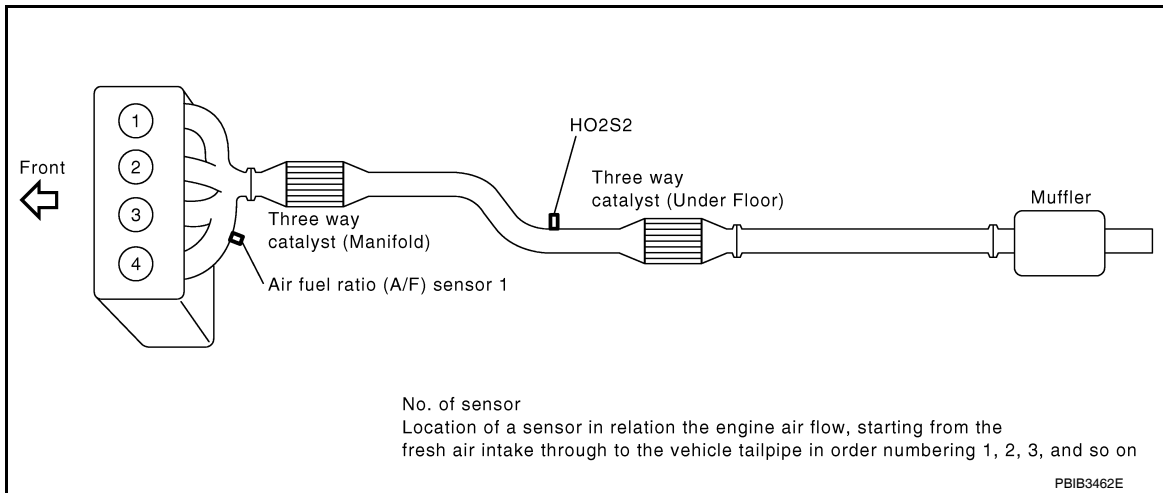
← Vehicle front

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| 1. Crankshaft position sensor (POS) | 2. Camshaft position sensor (PHASE) | 3. EVAP canister purge volume control solenoid valve |
| 4. ECM | 5. Stop lamp switch harness connector | 6. ASCD brake switch harness connector |
| 7. Brake pedal | 8. Accelerator pedal position sensor | |

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

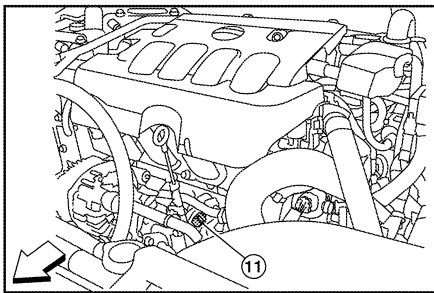
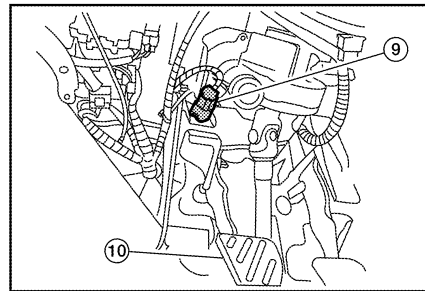
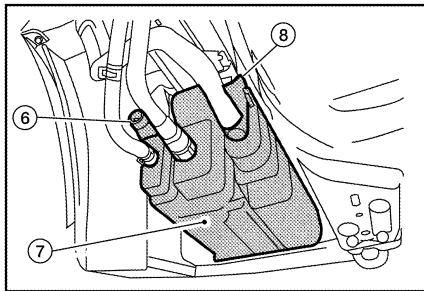
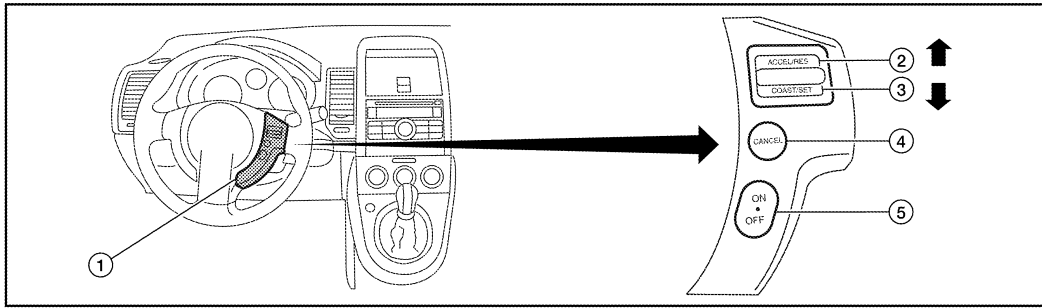


1. Air fuel ratio (A/F) sensor 1 harness
2. Air fuel ratio (A/F) sensor 1 connector
3. Heated oxygen sensor 2

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]



AWBIA0834ZZ

← : Vehicle front

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| 1. ASCD steering switch | 2. RESUME/ACCELERATOR switch | 3. SET/COAST switch |
| 4. CANCEL switch | 5. MAIN switch | 6. EVAP control system pressure sensor |
| 7. EVAP canister | 8. EVAP canister vent control valve | 9. ASCD clutch switch |
| 10. Clutch pedal | 11. Engine oil temperature sensor | |

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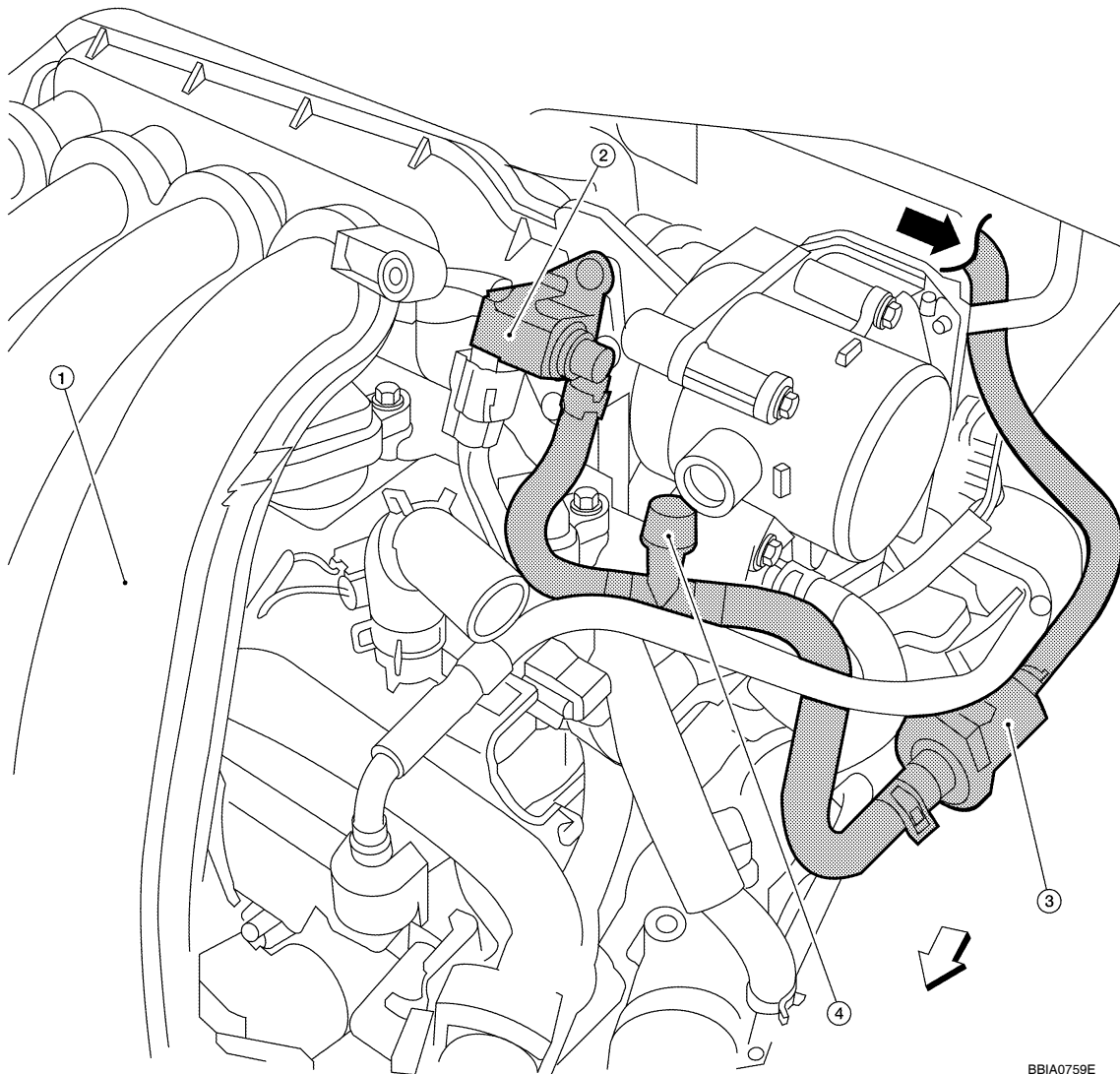
TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Vacuum Hose Drawing

INFOID:00000006580361



BBI A0759E

⇨ : Vehicle front

⇦ : From EVAP canister

1. Intake manifold

2. EVAP canister purge volume control solenoid valve 3. EVAP purge resonator solenoid valve

4. EVAP service port

NOTE:

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

Refer to [EC-584, "Schematic"](#) for Vacuum Control System.

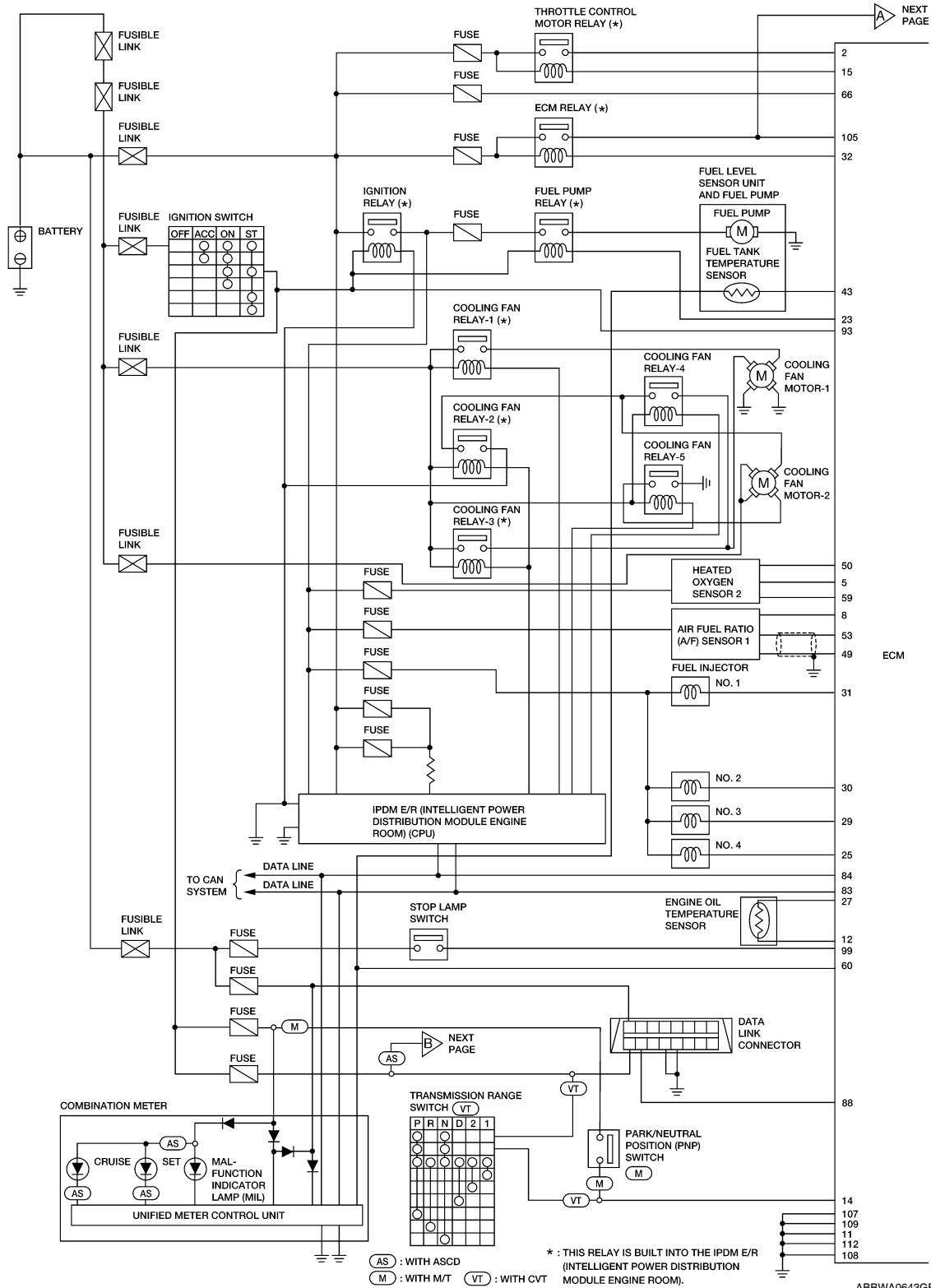
TROUBLE DIAGNOSIS

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[MR20DE (EXCEPT FOR CALIFORNIA)]

Circuit Diagram

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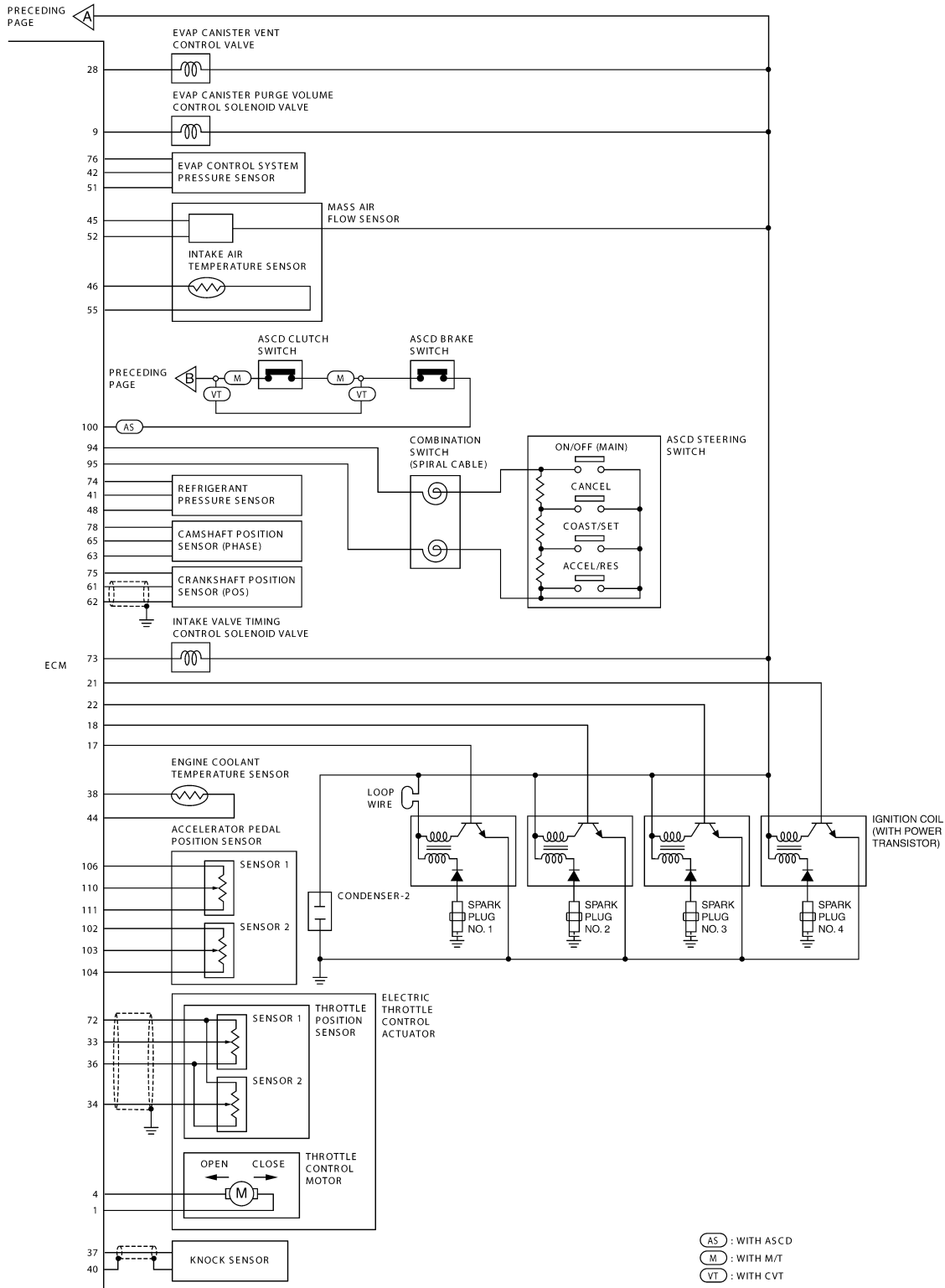


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[MR20DE (EXCEPT FOR CALIFORNIA)]



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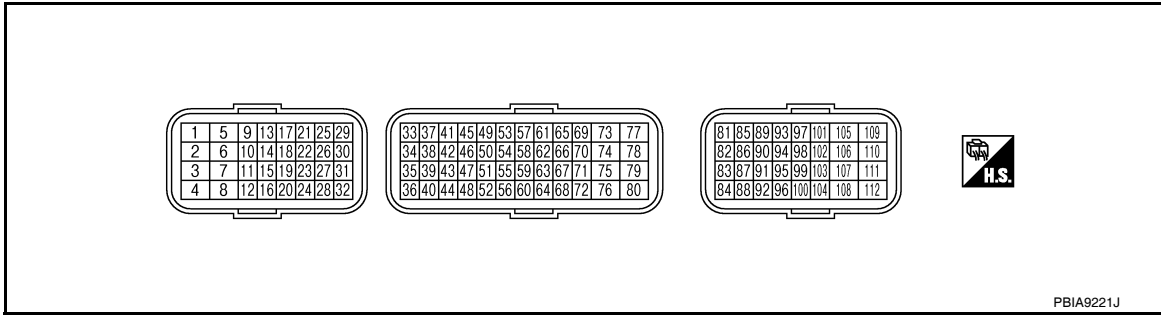
TROUBLE DIAGNOSIS

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[MR20DE (EXCEPT FOR CALIFORNIA)]

ECM Harness Connector Terminal Layout

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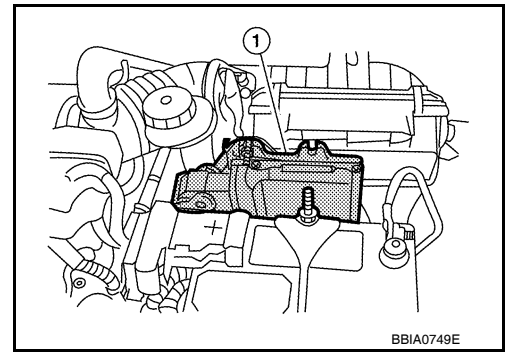
PBIA9221J

ECM Terminal and Reference Value

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PREPARATION

ECM (1) is located in the engine room left side near battery.



BBIA0749E

ECM INSPECTION TABLE

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

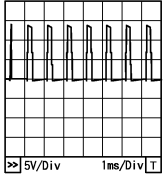
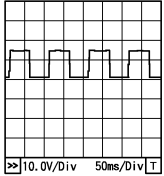
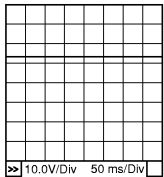
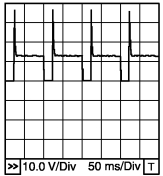
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

Terminal NO.	Wire color	Item	Condition	Data (DC Voltage)
1	V	Throttle control motor (Open)	[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully depressed 	Approximately 3.2 V★ PBIA8150J
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
3	BR/W	A/F sensor 1 heater	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed (More than 140 seconds after starting engine) 	Approximately 2.9 - 8.8 V★ PBIA8148J

TROUBLE DIAGNOSIS

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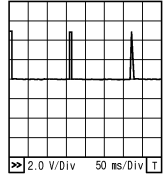
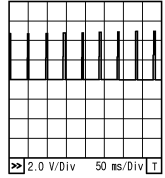
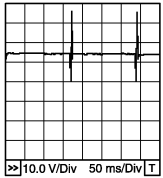
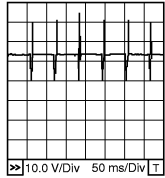
[MR20DE (EXCEPT FOR CALIFORNIA)]

Ter- minal NO.	Wire color	Item	Condition	Data (DC Voltage)
4	L/R	Throttle control motor (Close)	[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released 	Approximately 1.8 V★  <small>PBIA8149J</small>
5	B/W	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★  <small>PBIA8148J</small>
			[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped [Engine is running] <ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
9	W/B	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting. 	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIB0050E</small>
			[Engine is running] <ul style="list-style-type: none"> • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine) 	Approximately 10 V★  <small>PBIB0520E</small>
10 11	B B	ECM ground	[Engine is running] <ul style="list-style-type: none"> • Idle speed 	Body ground
12	GR	Sensor ground (Engine oil temperature sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Body ground
14	BR/R	PNP signal	[Ignition switch: ON] <ul style="list-style-type: none"> • Shift lever: P or N (CVT), Neutral (M/T) 	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON] <ul style="list-style-type: none"> • Except above 	Approximately 0 V
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

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[MR20DE (EXCEPT FOR CALIFORNIA)]

Ter- minal NO.	Wire color	Item	Condition	Data (DC Voltage)
17 18 21 22	V BR/Y G Y	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 4 Ignition signal No. 3	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle.</p>	<p>0 - 0.3 V★</p>  <p style="text-align: right; font-size: small;">PBI A9265J</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,500 rpm. 	<p>0.2 - 0.5 V★</p>  <p style="text-align: right; font-size: small;">PBI A9266J</p>
23	B/O	Fuel pump relay	<p>[Ignition switch: ON]</p> <ul style="list-style-type: none"> • For 1 second after turning ignition switch ON 	<p>0 - 1.0 V</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • More than 1 second after turning ignition switch ON 	<p>BATTERY VOLTAGE (11 - 14 V)</p>
25 29 30 31	R O GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle.</p>	<p>BATTERY VOLTAGE (11 - 14 V)★</p>  <p style="text-align: right; font-size: small;">PBI B0529E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	<p>BATTERY VOLTAGE (11 - 14 V)★</p>  <p style="text-align: right; font-size: small;">PBI A4943J</p>
27	W	Engine oil temperature sensor	<p>[Engine is running]</p>	<p>Approximately 0 - 4.8 V Output voltage varies with engine coolant temperature</p>
28	L/Y	EVAP canister vent control valve	<p>[Ignition switch: ON]</p>	<p>BATTERY VOLTAGE (11 - 14 V)</p>
32	R/G	ECM relay (Self shut-off)	<p>[Engine is running]</p> <p>[Ignition switch: OFF]</p> <ul style="list-style-type: none"> • For a few seconds after turning ignition switch OFF 	<p>0 - 1.0 V</p>
			<p>[Ignition switch: OFF]</p> <ul style="list-style-type: none"> • More than a few seconds after turning ignition switch OFF 	<p>BATTERY VOLTAGE (11 - 14 V)</p>

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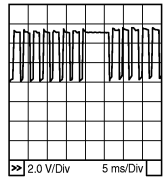
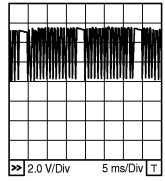
[MR20DE (EXCEPT FOR CALIFORNIA)]

Terminal NO.	Wire color	Item	Condition	Data (DC Voltage)
33	G	Throttle position sensor 1	[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released 	More than 0.36 V
			[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed 	Less than 4.75 V
34	W	Throttle position sensor 2	[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released 	Less than 4.75 V
			[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed 	More than 0.36 V
36	B	Sensor ground (Throttle position sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
37	W	Knock sensor	[Engine is running] <ul style="list-style-type: none"> • Idle speed 	Approximately 2.5 V
38	P	Engine coolant temperature sensor	[Engine is running]	Approximately 0 - 4.8 V Output voltage varies with engine coolant temperature.
40	GR	Sensor ground (Knock sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
41	L	Refrigerant pressure sensor	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Both A/C switch and blower fan switch: ON (Compressor operates.) 	1.0 - 4.0 V
42	R/Y	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8 V
43	G/O	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8 V Output voltage varies with fuel tank temperature
44	GR	Sensor ground (Engine coolant temperature sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
45	V	Mass air flow sensor	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	0.9 - 1.2 V
			[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,500 rpm 	1.5 - 1.8 V
46	BR/Y	Intake air temperature sensor	[Engine is running]	Approximately 0 - 4.8 V Output voltage varies with intake air temperature.
48	R/G	Sensor ground (Refrigerant pressure sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
49	L/R	A/F sensor 1	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	Approximately 1.8 V Output voltage varies with air fuel ratio.

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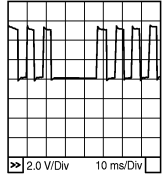
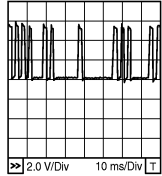
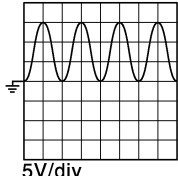
Terminal NO.	Wire color	Item	Condition	Data (DC Voltage)
50	G	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
51	V/R	Sensor ground (EVAP control system pressure sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
52	B/W	Sensor ground (Mass air flow sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V
55	O	Sensor ground (Intake air temperature sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
59	B/Y	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
60	B	Sensor ground (Fuel tank temperature sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
61	W	Crankshaft position sensor (POS)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	Approximately 4.0 V★ 
			[Engine is running] <ul style="list-style-type: none"> • Engine speed: 2,000 rpm 	Approximately 4.0 V★ 
62	R	Sensor ground [Crankshaft position sensor (POS)]	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
63	B/R	Sensor ground [Camshaft position sensor (PHASE)]	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V

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Ter- minal NO.	Wire color	Item	Condition	Data (DC Voltage)
65	R	Camshaft position sensor (PHASE)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	1.0 - 2.0 V★  <small>PBIB2986E</small>
			[Engine is running] <ul style="list-style-type: none"> • Engine speed: 2,000 rpm. 	1.0 - 2.0 V★  <small>PBIB2987E</small>
66	Y/R	Power supply for ECM (Buck-up)	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
72	R	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V
73	Y/R	Intake valve timing control sole- noid valve	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	BATTERY VOLTAGE (11 - 14 V)
			[Engine is running] <ul style="list-style-type: none"> • When revving engine up to 2,000 rpm quickly 	7 - 10 V★  <small>JMBIA1638GB</small>
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
78	G/Y	Sensor power supply [Camshaft position sensor (PHASE)]	[Ignition switch: ON]	Approximately 5 V
83	P	CAN communication line	—	—
84	L	CAN communication line	—	—
88	P/L	DATA link connector	—	—
93	B/R	Ignition switch	[Ignition switch: OFF]	0 V
			[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

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[MR20DE (EXCEPT FOR CALIFORNIA)]

Terminal NO.	Wire color	Item	Condition	Data (DC Voltage)		
94	L/Y	ASCD steering switch	[Ignition switch: ON] • ASCD steering switch: OFF	Approximately 4 V	EC	
			[Ignition switch: ON] • MAIN switch: Pressed	Approximately 0 V		
			[Ignition switch: ON] • CANCEL switch: Pressed	Approximately 1 V		C
			[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	Approximately 3 V		D
			[Ignition switch: ON] • SET/COAST switch: Pressed	Approximately 2 V		
95	B/Y	Sensor ground (ASCD steering switch)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	E	
99	R/G	Stop lamp switch	[Ignition switch: OFF] • Brake pedal: Fully released	Approximately 0 V	F	
			[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)	G	
100	G/B	ASCD brake switch	[Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0 V	H	
			[Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14 V)	I	
102	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	[Ignition switch: ON]	Approximately 5 V	J	
103	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V	K	
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V	L	
104	B/P	Sensor ground (Accelerator pedal position sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	M	
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)		
106	O	Sensor power supply (Accelerator pedal position sensor 1)	[Ignition switch: ON]	Approximately 5 V	N	
107 108 109	B B B	ECM ground	[Engine is running] • Idle speed	Body ground	O	
110	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V	P	
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V		

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Terminal NO.	Wire color	Item	Condition	Data (DC Voltage)
111	B/W	Sensor ground (Accelerator pedal position sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
112	B	ECM ground	[Engine is running] • Idle speed	Body ground

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

CONSULT-III Function (ENGINE)

INFOID:000000006580365

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-III unit.
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.
Active Test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function Test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
DTC & SRT Confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
Ecu Identification	ECM part number can be read.

*: 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

INSPECTION PROCEDURE

Refer to "CONSULT-III Software Operation Manual" for more information.

WORK SUPPORT MODE

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 specified 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 the coefficient of self-learning control value

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[MR20DE (EXCEPT FOR CALIFORNIA)]

Work Item	Condition	Usage
EVAP SYSTEM CLOSE	close the EVAP canister vent control valve in order to make EVAP system close under the following conditions. <ul style="list-style-type: none"> • IGN SW "ON" • Engine not running • Ambient temperature is above 0°C (32°F). • No vacuum and no high pressure in EVAP system • Fuel tank temp. 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-III will discontinue it and display appropriate instruction. NOTE: When starting engine, CONSULT-III may display "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", even in using charged battery.	When detecting EVAP vapor leak point of EVAP system
TARGET IDLE RPM ADJ*	Idle condition	When setting target idle speed
TARGET IGN TIM ADJ*	Idle condition	When adjusting target ignition timing
VIN REGISTRATION	<ul style="list-style-type: none"> • In this mode, VIN is registered in ECM. 	When registering VIN in ECM
CLSD THL POS LEARN	Ignition on and engine stopped.	When learning the throttle valve closed position

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

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC and 1st trip DTC, refer to [EC-609. "Emission-related Diagnostic Information"](#).

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.

How to Erase DTC and 1st Trip DTC

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 CVT related items (see Emission-related Diagnostic Information), skip step 1.
 1. Erase DTC in TCM. Refer to [CVT-5. "DTC No. Index"](#).
 2. Select "ENGINE" with CONSULT-III.
 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	<ul style="list-style-type: none"> • The engine control component part/control system has a trouble code, it is displayed as DTC.
FUEL SYS-B1	<ul style="list-style-type: none"> • "Fuel injection system status" at the moment a malfunction is detected is displayed. • One mode in the following is displayed. <ul style="list-style-type: none"> Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enrichment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	<ul style="list-style-type: none"> • The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> • The engine coolant temperature at the moment a malfunction is detected is displayed.

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[MR20DE (EXCEPT FOR CALIFORNIA)]

Freeze frame data item*	Description
L-FUEL TRM-B1 [%]	<ul style="list-style-type: none"> • “Long-term fuel trim” at the moment a malfunction is detected is displayed. • 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 [%]	<ul style="list-style-type: none"> • “Short-term fuel trim” at the moment a malfunction is detected is displayed. • The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> • The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	<ul style="list-style-type: none"> • The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH-P/S [%]	<ul style="list-style-type: none"> • The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> • The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> • The intake air temperature at the moment a malfunction is detected is displayed.
FUEL SYS-B2	<ul style="list-style-type: none"> • These items are displayed but are not applicable to this model.
L-FUEL TRM-B2 [%]	
S-FUEL TRM-B2 [%]	
INT MANI PRES [kPa]	
COMBUST CONDITION	

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

DATA MONITOR MODE

Monitored Item

Monitored item [Unit]	Description	Remarks
ENG SPEED [rpm]	<ul style="list-style-type: none"> • Indicates the engine speed computed from the signals of the crankshaft position sensor (POS) and camshaft position sensor (PHASE). 	<ul style="list-style-type: none"> • Accuracy becomes poor if engine speed drops below the idle rpm. • If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1 [V]	<ul style="list-style-type: none"> • The signal voltage of the mass air flow sensor is displayed. 	<ul style="list-style-type: none"> • When the engine is stopped, a certain value is indicated. • When engine is running specification range is indicated in “SPEC”.
B/FUEL SCHDL [ms]	<ul style="list-style-type: none"> • “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	<ul style="list-style-type: none"> • When engine is running specification range is indicated in “SPEC”.
A/F ALPHA-B1 [%]	<ul style="list-style-type: none"> • The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> • When the engine is stopped, a certain value is indicated. • When engine is running specification range is indicated in “SPEC”. • This data also includes the data for the air/fuel ratio learning control.
COOLAN TEMP/S [°C] or [°F]	<ul style="list-style-type: none"> • The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed. 	<ul style="list-style-type: none"> • 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) [V]	<ul style="list-style-type: none"> • The A/F signal computed from the input signal of the A/F sensor 1 is displayed. 	
HO2S2 (B1) [V]	<ul style="list-style-type: none"> • The signal voltage of the heated oxygen sensor 2 is displayed. 	
HO2S2 MNTR(B1) [RICH/LEAN]	<ul style="list-style-type: none"> • Display of heated oxygen sensor 2 signal: 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. 	<ul style="list-style-type: none"> • When the engine is stopped, a certain value is indicated.

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Monitored item [Unit]	Description	Remarks	
VHCL SPEED SE [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal is displayed. 		A
BATTERY VOLT [V]	<ul style="list-style-type: none"> The power supply voltage of ECM is displayed. 		EC
ACCEL SEN 1 [V]	<ul style="list-style-type: none"> The accelerator pedal position sensor signal voltage is displayed. 	<ul style="list-style-type: none"> ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal. 	C
ACCEL SEN 2 [V]			
TP SEN 1-B1 [V]	<ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. 	<ul style="list-style-type: none"> TP SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal. 	D
TP SEN 2-B1 [V]			
FUEL T/TMP SE [°C] or [°F]	<ul style="list-style-type: none"> The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed. 		E
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated. 		F
EVAP SYS PRES [V]	<ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. 		
FUEL LEVEL SE [V]	<ul style="list-style-type: none"> The signal voltage of the fuel level sensor is displayed. 		G
START SIGNAL [ON/OFF]	<ul style="list-style-type: none"> Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage. 	<ul style="list-style-type: none"> After starting the engine, [OFF] is displayed regardless of the starter signal. 	H
CLSD THL POS [ON/OFF]	<ul style="list-style-type: none"> Indicates idle position [ON/OFF] computed by the ECM according to the accelerator pedal position sensor signal. 		I
AIR COND SIG [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal. 		
P/N POSI SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position (PNP) signal. 		J
PW/ST SIGNAL [ON/OFF]	<ul style="list-style-type: none"> [ON/OFF] condition of the power steering system (determined by the signal sent from EPS control unit) is indicated. 		K
LOAD SIGNAL [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and lighting switch are OFF. 		L
IGNITION SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch. 		M
HEATER FAN SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the heater fan switch signal. 		N
BRAKE SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the stop lamp switch signal. 		
INJ PULSE-B1 [msec]	<ul style="list-style-type: none"> Indicates the actual fuel injection pulse width compensated by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain computed value is indicated. 	O
IGN TIMING [BTDC]	<ul style="list-style-type: none"> Indicates the ignition timing computed by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. 	P
CAL/LD VALUE [%]	<ul style="list-style-type: none"> "Calculated load value" indicates the value of the current airflow divided by peak airflow. 		
MASS AIRFLOW [g/s]	<ul style="list-style-type: none"> Indicates the mass airflow computed by ECM according to the signal voltage of the mass air flow sensor. 		

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Monitored item [Unit]	Description	Remarks
PURG VOL C/V [%]	<ul style="list-style-type: none"> Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 	
INT/V TIM(B1) [°CA]	<ul style="list-style-type: none"> Indicates [°CA] of intake camshaft advanced angle. 	
INT/V SOL(B1) [%]	<ul style="list-style-type: none"> The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signal) is indicated. The advance angle becomes larger as the value increases 	
AIR COND RLY [ON/OFF]	<ul style="list-style-type: none"> The air conditioner relay control condition (determined by ECM according to the input signals) is indicated. 	
FUEL PUMP RLY [ON/OFF]	<ul style="list-style-type: none"> Indicates the fuel pump relay control condition determined by ECM according to the input signals. 	
VENT CONT/V [ON/OFF]	<ul style="list-style-type: none"> The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON: Closed OFF: Open 	
THRTL RELAY [ON/OFF]	<ul style="list-style-type: none"> Indicates the throttle control motor relay control condition determined by the ECM according to the input signals. 	
COOLING FAN [HI/MID/LOW/OFF]	<ul style="list-style-type: none"> Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI: High speed operation MID: Middle speed operation LOW: Low speed operation OFF: Stop 	
HO2S2 HTR (B1) [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals. 	
I/P PULLY SPD [rpm]	<ul style="list-style-type: none"> Indicates the engine speed computed from the input speed sensor signal. 	
VEHICLE SPEED [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from TCM is displayed. 	
IDL A/V LEARN [YET/CMPLT]	<ul style="list-style-type: none"> Display the condition of idle air volume learning YET: Idle Air Volume Learning has not been performed yet. CMPLT: Idle Air Volume Learning has already been performed successfully. 	
TRVL AFTER MIL [km] or [mile]	<ul style="list-style-type: none"> Distance traveled while MIL is activated. 	
A/F S1 HTR(B1) [%]	<ul style="list-style-type: none"> Indicates A/F sensor 1 heater control value computed by ECM according to the input signals. The current flow to the heater becomes larger as the value increases. 	
AC PRESS SEN [V]	<ul style="list-style-type: none"> The signal voltage from the refrigerant pressure sensor is displayed. 	
VHCL SPEED SE [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from TCM is displayed. 	
SET VHCL SPD [km/h] or [mph]	<ul style="list-style-type: none"> The preset vehicle speed is displayed. 	
MAIN SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from MAIN switch signal. 	
CANCEL SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from CANCEL switch signal. 	

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[MR20DE (EXCEPT FOR CALIFORNIA)]

Monitored item [Unit]	Description	Remarks
RESUME/ACC SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from RESUME/ACCELERATE switch signal. 	
SET SW [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from SET/COAST switch signal. 	
BRAKE SW1 [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ASCD brake switch signal. 	
BRAKE SW2 [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of stop lamp switch signal. 	
VHCL SPD CUT [NON/CUT]	<ul style="list-style-type: none"> Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed increased to excessively high compared with the ASCD set speed, and ASCD operation is cut off. 	
LO SPEED CUT [NON/CUT]	<ul style="list-style-type: none"> 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. 	
AT OD MONITOR [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of CVT according to the input signal from the TCM. 	<ul style="list-style-type: none"> For M/T models always "OFF" is displayed
AT OD CANCEL [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of CVT cancel signal sent from the TCM. 	<ul style="list-style-type: none"> For M/T models always "OFF" is displayed
CRUISE LAMP [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals. 	
SET LAMP [ON/OFF]	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals. 	
A/F ADJ-B1	<ul style="list-style-type: none"> Indicates the correction factor stored in ECM. The factor is calculated from the difference between the target air/fuel ratio stored in ECM and the air/fuel ratio calculated from air fuel ratio (A/F) sensor 1 signal. 	
ENG OIL TEMP [°C] or [°F]	<ul style="list-style-type: none"> The engine oil temperature (determined by the signal voltage of the engine oil temperature sensor) is displayed. 	
HO2 S2 DIAG1 (B1) [INCMP/CMPLT]	<ul style="list-style-type: none"> Indicates DTC P0139 self-diagnosis (delayed response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
HO2 S2 DIAG2 (B1) [INCMP/CMPLT]	<ul style="list-style-type: none"> Indicates DTC P0139 self-diagnosis (slow response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
A/F SEN1 DIAG1(B1) [INCMP/CMPLT]	<ul style="list-style-type: none"> Indicates DTC P015A or P015B self-diagnosis condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
A/F SEN1 DIAG2(B1) [INCMP/CMPLT]	<ul style="list-style-type: none"> Indicates DTC P014C or P014D self-diagnosis condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
A/F SEN1 DIAG3(B1) [ABSNT/PRSNT]	<ul style="list-style-type: none"> Indicates DTC P014C, P014D, P015A or P015B self-diagnosis condition. ABSNT: The vehicle condition is not within the diagnosis range. PRSNT: The vehicle condition is within the diagnosis range. 	
THRTL STK CNT B1	<p>NOTE: The item is indicated, but not used.</p>	

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

NOTE:

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

ACTIVE TEST MODE

Test Item

Test Item	Condition	Judgment	Check Item (Remedy)
FUEL INJECTION	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Fuel injector Air fuel ratio (A/F) sensor 1
IGNITION TIMING	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Perform Idle Air Volume Learning.
POWER BALANCE	<ul style="list-style-type: none"> Engine: After warming up, idle the engine. A/C switch OFF Shift lever: P or N (CVT), Neutral (M/T) Cut off each fuel injector signal one at a time using CONSULT-III. 	Engine runs rough or dies.	<ul style="list-style-type: none"> Harness and connectors Compression Fuel injector Power transistor Spark plug Ignition coil
COOLING FAN*	<ul style="list-style-type: none"> Ignition switch: ON Turn the cooling fan "LOW", "MID", "HI" and "OFF" with CONSULT-III. 	Cooling fan moves and stops.	<ul style="list-style-type: none"> Harness and connectors Cooling fan relay Cooling fan motor
ENG COOLANT TEMP	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Engine coolant temperature sensor Fuel injector
FUEL PUMP RELAY	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT-III and listen to operating sound. 	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> Harness and connectors Fuel pump relay
PURG VOL CONT/V	<ul style="list-style-type: none"> Engine: After warming up, run engine at 1,500 rpm. Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> Harness and connectors EVAP canister purge volume control solenoid valve
FUEL/T TEMP SEN	<ul style="list-style-type: none"> Change the fuel tank temperature using CONSULT-III. 		
VENT CONTROL/V	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn solenoid valve "ON" and "OFF" with the CONSULT-III and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> Harness and connectors EVAP canister vent control valve
V/T ASSIGN ANGLE	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change intake valve timing using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Intake valve timing control solenoid valve

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

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

- For items whose SRT codes are set, "CMPLT" is displayed on the CONSULT-III 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.

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PERMANENT DTC STATUS Mode

How to display permanent DTC status

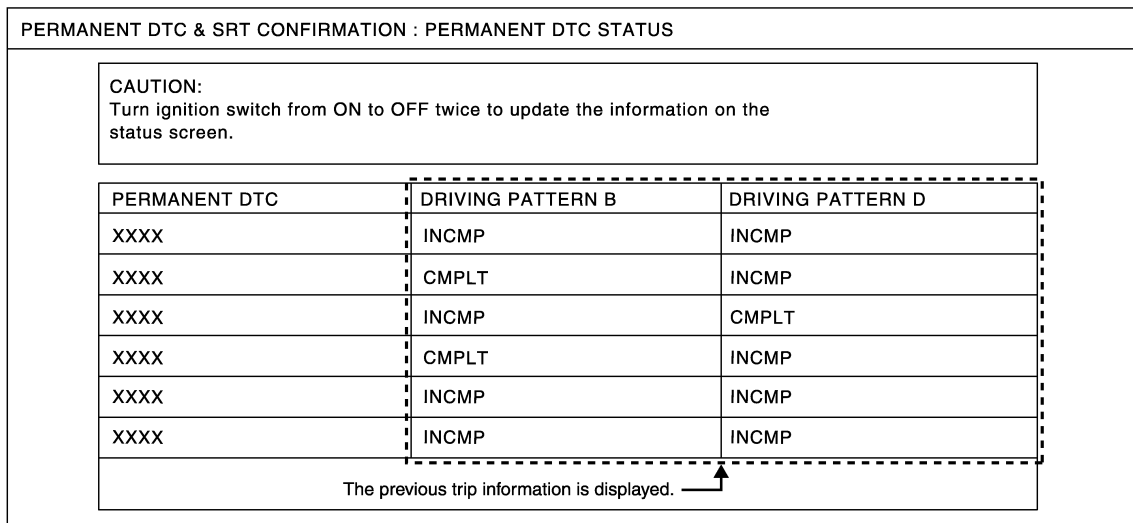
1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "PERMANENT DTC STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT-III.

NOTE:

Permanent DTCs stored in ECM memory are displayed on the CONSULT-III screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).

CAUTION:

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".



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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.

DTC WORK SUPPORT Mode

Test mode	Test item	Corresponding DTC No.	Reference page
EVAPORATIVE SYSTEM	PURG FLOW P0441	P0441	EC-878
	EVP SML LEAK P0442/P1442*	P0455	EC-934
	EVP V/S LEAK P0456/P1456*	P0442	EC-883
		P0456	EC-941
	PURG VOL CN/V P1444	P0443	EC-890
A/F SEN1	A/F SEN1 (B1) P1276	P0130	EC-773
	A/F SEN1 (B1) P1278/P1279	—	—
HO2S2	HO2S2 (B1) P0139	P0139	EC-804
	HO2S2 (B1) P1146	P0138	EC-795
	HO2S2 (B1) P1147	P0137	EC-788

*: DTC P1442 and P1456 does not apply to B16 models but appears in DTC Work Support Mode screens.

TROUBLE DIAGNOSIS

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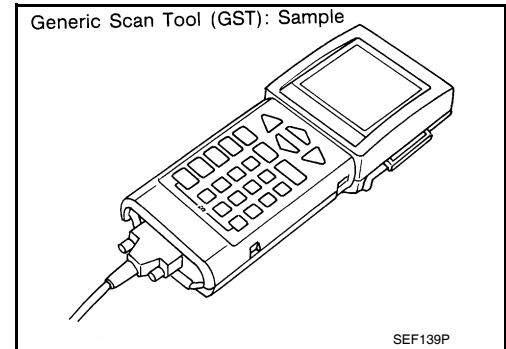
< SERVICE INFORMATION >

Generic Scan Tool (GST) Function

INFOID:00000006580366

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978/ISO 15031-4 has 8 different functions explained below. ISO15765-4 is used as the protocol. The name GST or Generic Scan Tool is used in this service manual.



FUNCTION

Diagnostic test mode		Function
Service \$01	READINESS TESTS	This diagnostic service gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
Service \$02	(FREEZE DATA)	This diagnostic service gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-680. "CONSULT-III Function (ENGINE)" .
Service \$03	DTCs	This diagnostic service gains access to emission-related power train trouble codes which were stored by ECM.
Service \$04	CLEAR DIAG INFO	This diagnostic service can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> • Clear number of diagnostic trouble codes (Service \$01) • Clear diagnostic trouble codes (Service \$03) • Clear trouble code for freeze frame data (Service \$01) • Clear freeze frame data (Service \$02) • Reset status of system monitoring test (Service \$01) • Clear on board monitoring test results (Service \$06 and \$07)
Service \$06	(ON BOARD TESTS)	This diagnostic service accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
Service \$07	(ON BOARD TESTS)	This diagnostic service enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
Service \$08	—	This diagnostic service can close EVAP system in ignition switch ON position (Engine stopped). When this diagnostic service is performed, EVAP canister vent control valve can be closed. In the following conditions, this diagnostic service cannot function. <ul style="list-style-type: none"> • Low ambient temperature • Low battery voltage • Engine running • Ignition switch OFF • Low fuel temperature • Too much pressure is applied to EVAP system
Service \$09	(CALIBRATION ID)	This diagnostic service enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.
Service \$0A*	PERMANENT DTCs	This diagnostic service gains access to permanent DTCs which were stored by ECM.

NOTE:

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

INSPECTION PROCEDURE

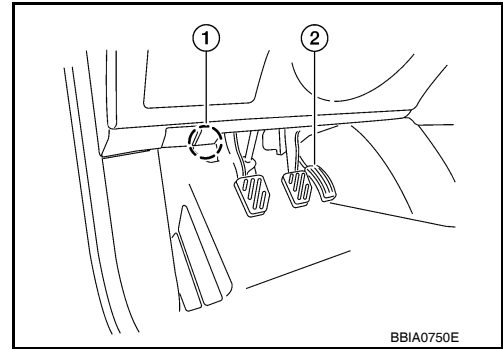
1. Turn ignition switch OFF.

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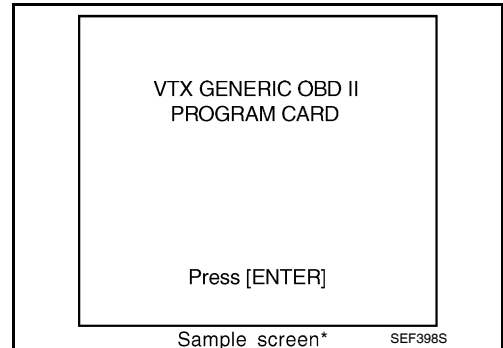
< SERVICE INFORMATION >

2. Connect GST to data link connector (1).
 - Accelerator pedal (2)



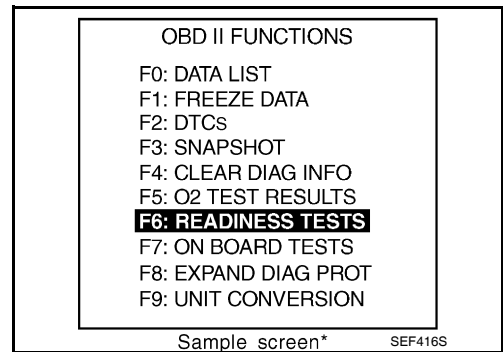
3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.

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



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

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



CONSULT-III Reference Value in Data Monitor

INFOID:000000006580367

Remarks:

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

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

i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition	Specification
ENG SPEED	• Run engine and compare CONSULT-III value with the tachometer indication.	Almost the same speed as the tachometer indication.
MAS A/F SE-B1	See EC-693 .	
B/FUEL SCHDL	See EC-693 .	
A/F ALPHA-B1	See EC-693 .	
COOLAN 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

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Monitor Item	Condition		Specification
HO2S2 (B1)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR(B1)			LEAN ↔ RICH
VHCL SPEED SE	<ul style="list-style-type: none"> • Turn drive wheels and compare CONSULT-III value with the speedometer indication. 		Almost the same speed as the speedometer indication.
BATTERY VOLT	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) 		11 - 14 V
ACCEL SEN 1	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) 	Accelerator pedal: Fully released	0.6 - 0.9 V
ACCEL SEN 2*		Accelerator pedal: Fully depressed	4.0 - 4.8 V
EVAP SYS PRES	<ul style="list-style-type: none"> • Ignition switch: ON 		Approx. 1.8 - 4.8 V
TP SEN 1-B1	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T) 	Accelerator pedal: Fully released	More than 0.36 V
TP SEN 2-B1*		Accelerator pedal: Fully depressed	Less than 4.75 V
START SIGNAL	<ul style="list-style-type: none"> • Ignition switch: ON → START → ON 		OFF → ON → OFF
CLSD THL POS	<ul style="list-style-type: none"> • Ignition switch: ON 	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF
AIR COND SIG	<ul style="list-style-type: none"> • Engine: After warming up, idle the engine 	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	<ul style="list-style-type: none"> • Ignition switch: ON 	Shift lever: P or N (CVT), Neutral (M/T)	ON
		Shift lever: Except above	OFF
PW/ST SIGNAL	<ul style="list-style-type: none"> • Engine: After warming up, idle the engine 	Steering wheel: Not being turned	OFF
		Steering wheel: Being turned	ON
LOAD SIGNAL	<ul style="list-style-type: none"> • Ignition switch: ON 	Rear window defogger switch: ON and/or Lighting switch: 2nd	ON
		Rear window defogger switch and lighting switch: OFF	OFF
IGNITION SW	<ul style="list-style-type: none"> • Ignition switch: ON → OFF → ON 		ON → OFF → ON
HEATER FAN SW	<ul style="list-style-type: none"> • Ignition switch: ON 	Heater fan: Operating	ON
		Heater fan: Not operating	OFF
BRAKE SW	<ul style="list-style-type: none"> • Ignition switch: ON 	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	<ul style="list-style-type: none"> • Engine: After warming up • Air conditioner switch: OFF • Shift lever: P or N (CVT), Neutral (M/T) • No load 	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	<ul style="list-style-type: none"> • Engine: After warming up • Air conditioner switch: OFF • Shift lever: P or N (CVT), Neutral (M/T) • No load 	Idle	1° - 11° BTDC
		2,000 rpm	25° - 45° BTDC
CAL/LD VALUE	<ul style="list-style-type: none"> • Engine: After warming up • Air conditioner switch: OFF • Shift lever: P or N (CVT), Neutral (M/T) • No load 	Idle	10% - 35%
		2,500 rpm	10% - 35%

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Monitor Item	Condition		Specification	
MASS AIRFLOW	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: P or N (CVT), Neutral (M/T) No load 	Idle	1.0 - 4.0 g/s	A
		2,500 rpm	2.0 - 10.0 g/s	EC
PURG VOL C/V	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: P or N (CVT), Neutral (M/T) No load 	Idle (Accelerator pedal is not depressed even slightly, after engine starting)	0%	C
		2,000 rpm	0 - 50%	
INT/V TIM(B1)	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: P or N (CVT), Neutral (M/T) No load 	Idle	-5° - 5°C	D
		When revving engine up to 2,000 rpm quickly	Approx. 0° - 40°C	E
INT/V SOL(B1)	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: P or N (CVT), Neutral (M/T) No load 	Idle	0% - 2%	
		When revving engine up to 2,000 rpm quickly	Approx. 0% - 90%	F
AIR COND RLY	<ul style="list-style-type: none"> Engine: After warming up, idle the engine 	Air conditioner switch: OFF	OFF	G
		Air conditioner switch: ON (Compressor operates)	ON	
FUEL PUMP RLY	<ul style="list-style-type: none"> For 1 second after turning ignition switch ON Engine running or cranking 		ON	H
		Except above conditions	OFF	
VENT CONT/V	<ul style="list-style-type: none"> Ignition switch: ON 		OFF	I
THRTL RELAY	<ul style="list-style-type: none"> Ignition switch: ON 		ON	
COOLING FAN	<ul style="list-style-type: none"> Engine: After warming up, idle the engine Air conditioner switch: OFF 	Engine coolant temperature: 97°C (207°F) or less	OFF	J
		Engine coolant temperature: Between 98°C (208°F) and 99°C (210°F)	LOW	
		Engine coolant temperature: Between 100°C (212°F) and 104°C (219°F)	MIDDLE	K
		Engine coolant temperature: 105°C (221°F) or more	HIGH	
HO2S2 HTR (B1)	<ul style="list-style-type: none"> Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 		ON	L
		<ul style="list-style-type: none"> Engine speed: Above 3,600 rpm 	OFF	M
I/P PULLY SPD	<ul style="list-style-type: none"> Vehicle speed: More than 20 km/h (12 MPH) 		Almost the same speed as the tachometer indication	N
VEHICLE SPEED	<ul style="list-style-type: none"> Turn drive wheels and compare CONSULT-III value with the speedometer indication. 		Almost the same speed as the speedometer indication	O
TRVL AFTER MIL	<ul style="list-style-type: none"> Ignition switch: ON 	Vehicle has traveled after MIL has turned ON.	0 - 65,535 km (0 - 40,723 mile)	
A/V S1 HTR(B1)	<ul style="list-style-type: none"> Engine: After warming up, idle the engine (More than 140 seconds after starting engine) 		4 - 100%	P
AC PRESS SEN	<ul style="list-style-type: none"> Engine: Idle Air conditioner switch: ON (Compressor operates) 		1.0 - 4.0 V	
VHCL SPEED SE	<ul style="list-style-type: none"> Turn drive wheels and compare speedometer indication with the CONSULT-III value. 		Almost the same speed as the speedometer indication	

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Monitor Item	Condition		Specification
SET VHCL SPD	• Engine: Running	ASCD: Operating	The preset vehicle speed is displayed.
MAIN SW	• Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	• Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	• Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF
BRAKE SW1	• Ignition switch: ON	• Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	ON
		• Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	OFF
BRAKE SW2	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at the 1st time → at the 2nd time	ON → OFF
SET LAMP	• MAIN switch: ON • Vehicle speed: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF
A/F ADJ-B1	• Engine: Running		-0.330 – 0.330
ENG OIL TEMP	• Engine: After warming up		More than 70°C (158°F)
HO2 S2 DIAG1 (B1)		DTC P0139 self-diagnosis (delayed response) is incomplete.	INCMP
		DTC P0139 self-diagnosis (delayed response) is complete.	CMPLT
HO2 S2 DIAG2 (B1)		DTC P0139 self-diagnosis (slow response) is incomplete.	INCMP
		DTC P0139 self-diagnosis (slow response) is complete.	CMPLT
A/F SEN1 DIAG1 (B1)		DTC P015A and P015B self-diagnosis is incomplete.	INCMP
		DTC P015A and P015B self-diagnosis is complete.	CMPLT
A/F SEN1 DIAG2 (B1)		DTC P014C and P014D self-diagnosis is incomplete.	INCMP
		DTC P014C and P014D self-diagnosis is complete.	CMPLT
A/F SEN1 DIAG3 (B1)		The vehicle condition is not within the diagnosis range of DTC P014C, P014D, P015A or P015B.	ABSNT
		The vehicle condition is within the diagnosis range of DTC P014C, P014D, P015A or P015B.	PRSNT
THRTL STK CNT B1	NOTE: The item is indicated, but not used.		—

*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

INFOID:000000006580368

The specification (SP) value indicates the tolerance of the value that is displayed in "SPEC" of "DATA MONITOR" mode with CONSULT-III during normal operation of the Engine Control System. When the value in "SPEC" of "DATA MONITOR" mode is within the SP value, the Engine Control System is confirmed OK. When the value in "SPEC" of "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 light the MIL.

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

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

Testing Condition

INFOID:000000006580369

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm², 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
 - CVT models: After the engine is warmed up to normal operating temperature, drive vehicle until "ATF TEMP SEN" (fluid temperature sensor signal) indicates less than 0.9 V.
 - M/T models: After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
- Electrical load: Not applied
 - Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.
- Engine speed: Idle

Inspection Procedure

INFOID:000000006580370

NOTE:

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

1. Perform [EC-642, "Basic Inspection"](#).
2. Confirm that the testing conditions indicated above are met.
3. Select "B/FUEL SCHDL", "A/F ALPHA-B1" and "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode with CONSULT-III.
4. Make sure that monitor items are within the SP value.
5. If NG, go to [EC-693, "Diagnosis Procedure"](#).

Diagnosis Procedure

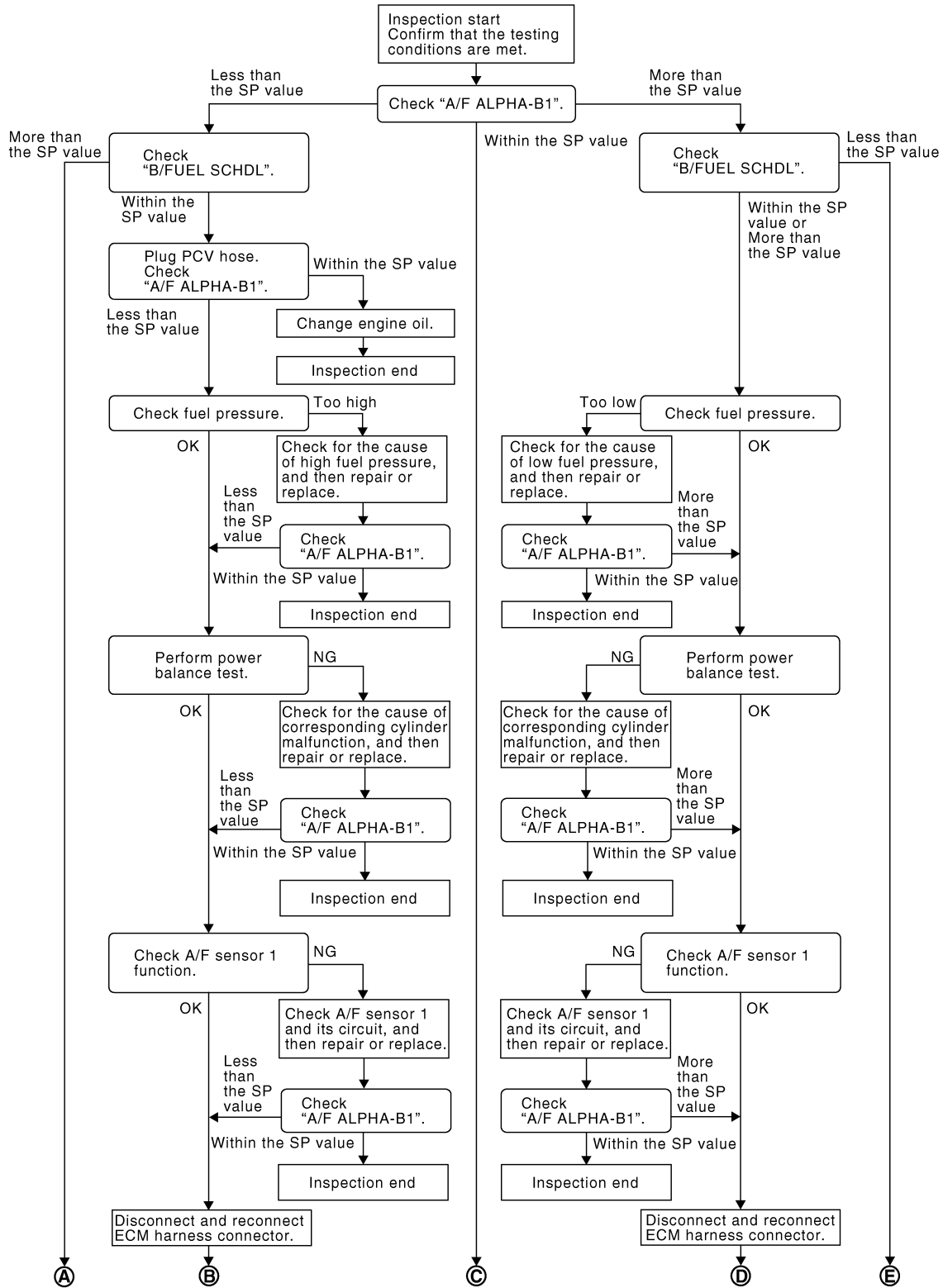
INFOID:000000006580371

OVERALL SEQUENCE

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

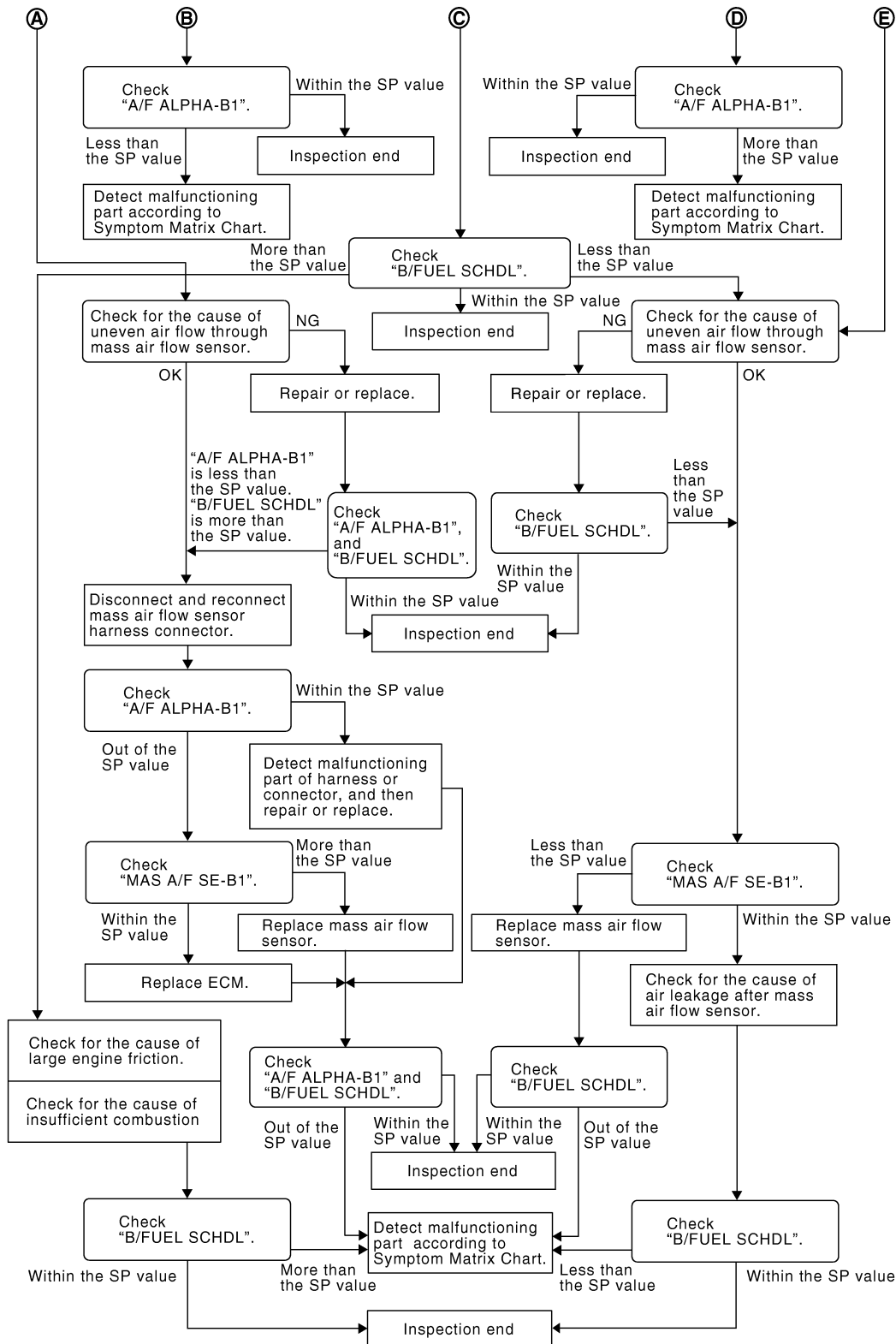


PBIB2318E

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]



PBIB3213E

DETAILED PROCEDURE

1. CHECK "A/F ALPHA-B1"

1. Start engine.
2. Confirm that the testing conditions are met. Refer to [EC-693. "Testing Condition"](#).
3. Select "A/F ALPHA-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

NOTE:

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

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[MR20DE (EXCEPT FOR CALIFORNIA)]

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

OK or NG

OK >> GO TO 17.

NG (Less than the SP value)>>GO TO 2.

NG (More than the SP value)>>GO TO 3.

2.CHECK "B/FUEL SCHDL"

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

OK or NG

OK >> GO TO 4.

NG (More than the SP value)>>GO TO 19.

3.CHECK "B/FUEL SCHDL"

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

OK or NG

OK >> GO TO 6.

NG (More than the SP value)>>GO TO 6.

NG (Less than the SP value)>>GO TO 25.

4.CHECK "A/F ALPHA-B1"

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

OK or NG

OK >> GO TO 5.

NG >> GO TO 6.

5.CHANGE ENGINE OIL

1. Stop the engine.
2. Change engine oil. Refer to [LU-7, "Changing 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 condition.

>> **INSPECTION END**

6.CHECK FUEL PRESSURE

Check fuel pressure. (Refer to [EC-650, "Fuel Pressure Check"](#).)

OK or NG

OK >> GO TO 9.

NG (Fuel pressure is too high)>>Replace fuel pressure regulator, refer to [EC-650, "Fuel Pressure Check"](#).
GO TO 8.

NG (Fuel pressure is too low)>>GO TO 7.

7.DETECT MALFUNCTIONING PART

1. Check the following.
 - Clogged and bent fuel hose and fuel tube
 - Clogged fuel filter
 - Fuel pump and its circuit (Refer to [EC-1083](#).)
2. If NG, repair or replace the malfunctioning part. (Refer to [EC-650, "Fuel Pressure Check"](#).)
If OK, replace fuel pressure regulator.

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>> GO TO 8.

8. CHECK "A/F ALPHA-B1"

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

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 9.

9. PERFORM POWER BALANCE TEST

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Make sure that the each cylinder produces a momentary engine speed drop.

OK or NG

- OK >> GO TO 12.
NG >> GO TO 10.

10. DETECT MALFUNCTIONING PART

1. Check the following.
 - Ignition coil and its circuit (Refer to [EC-1088](#).)
 - Fuel injector and its circuit (Refer to [EC-1078](#).)
 - Intake air leakage
 - Low compression pressure (Refer to [EM-65, "On-Vehicle Service"](#).)
2. If NG, repair or replace the malfunctioning part.
If OK, replace fuel injector. (It may be caused by leakage from fuel injector or clogging.)

>> GO TO 11.

11. CHECK "A/F ALPHA-B1"

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

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 12.

12. CHECK A/F SENSOR 1 FUNCTION

Perform all DTC Confirmation Procedure related with A/F sensor 1.

- For DTC P0130, refer to [EC-773, "DTC Confirmation Procedure"](#).
- For DTC P0131, refer to [EC-778, "DTC Confirmation Procedure"](#).
- For DTC P0132, refer to [EC-783, "DTC Confirmation Procedure"](#).
- For DTC P014C, P014D, P015A, P015B refer to [EC-813, "DTC Confirmation Procedure"](#).
- For DTC P2A00, refer to [EC-1058, "DTC Confirmation Procedure"](#).

OK or NG

- OK >> GO TO 15.
NG >> GO TO 13.

13. CHECK A/F SENSOR 1 CIRCUIT

Perform Diagnostic Procedure according to corresponding DTC.

>> GO TO 14.

14. CHECK "A/F ALPHA-B1"

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

OK or NG

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OK >> **INSPECTION END**

NG >> GO TO 15.

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"

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

OK or NG

OK >> **INSPECTION END**

NG >> Detect malfunctioning part according to [EC-660. "Symptom Matrix Chart"](#).

17. CHECK "B/FUEL SCHDL"

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

OK or NG

OK >> **INSPECTION END**

NG (More than the SP value) >> GO TO 18.

NG (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 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

OK or NG

OK >> GO TO 21.

NG >> Repair or replace malfunctioning part, and then GO TO 20.

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

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

OK or NG

OK >> **INSPECTION END**

NG ("B/FUEL SCHDL" is more, "A/F ALPHA-B1" is less than the SP value) >> GO TO 21.

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

2. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for damage and then reconnect it again.

>> GO TO 22.

22.CHECK "A/F ALPHA-B1"

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

OK or NG

OK >> 1. Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to [EC-734](#).
2. GO TO 29.

NG >> GO TO 23.

23.CHECK "MAS A/F SE-B1"

Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

OK or NG

OK >> GO TO 24.

NG (More than the SP value)>>Replace mass air flow sensor, and then GO TO 29.

24.REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS(NATS) system and registration of all NVIS(NATS) ignition key IDs. Refer to [BL-171, "ECM Re-communicating Function"](#).
3. Perform [EC-648, "VIN Registration"](#).
4. Perform [EC-648, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-648, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-649, "Idle Air Volume Learning"](#).

>> GO TO 29.

25.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

OK or NG

OK >> GO TO 27.

NG >> Repair or replace malfunctioning part, and then GO TO 26.

26.CHECK "B/FUEL SCHDL"

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

OK or NG

OK >> **INSPECTION END**

NG (Less than the SP value)>>GO TO 27.

27.CHECK "MAS A/F SE-B1"

Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and make sure that the indication is within the SP value.

OK or NG

OK >> GO TO 28.

NG (Less than the SP value)>>Replace mass air flow sensor, and then GO TO 30.

28.CHECK INTAKE SYSTEM

Check for the cause of air leak after the mass air flow sensor. Refer to the following.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

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[MR20DE (EXCEPT FOR CALIFORNIA)]

- Disconnection, looseness, and cracks in air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open stuck, breakage, hose disconnection, or cracks of PCV valve
- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve
- Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts
- Malfunctioning seal of intake air system, etc.

>> GO TO 30.

29. CHECK "A/F ALPHA-B1" AND "B/FUEL SCHDL"

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

OK or NG

OK >> **INSPECTION END**

NG >> Detect malfunctioning part according to [EC-660. "Symptom Matrix Chart"](#).

30. CHECK "B/FUEL SCHDL"

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

OK or NG

OK >> **INSPECTION END**

NG >> Detect malfunctioning part according to [EC-660. "Symptom Matrix Chart"](#).

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

Description

INFOID:000000006580372

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

Common Intermittent Incidents Report Situations

STEP in Work Flow	Situation
2	The CONSULT-III is used. The SELF-DIAG RESULTS screen shows time data other than 0 or [1t].
3 or 4	The symptom described by the customer does not recur.
5	(1st trip) DTC does not appear during the DTC Confirmation Procedure.
10	The Diagnostic Procedure for PXXXX does not indicate the malfunctioning area.

Diagnosis Procedure

INFOID:000000006580373

1.INSPECTION START

Erase (1st trip) DTCs.

Refer to [EC-609, "Emission-related Diagnostic Information"](#).

>> GO TO 2.

2.CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.

Refer to [EC-706, "Ground Inspection"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3.SEARCH FOR ELECTRICAL INCIDENT

Perform [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "INCIDENT SIMULATION TESTS".

OK or NG

OK >> GO TO 4.

NG >> Repair or replace.

4.CHECK CONNECTOR TERMINALS

Refer to [GI-23, "How to Check Terminal"](#), "HOW TO PROBE CONNECTORS", "How to Check Enlarged Contact Spring of Terminal".

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace connector.

POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

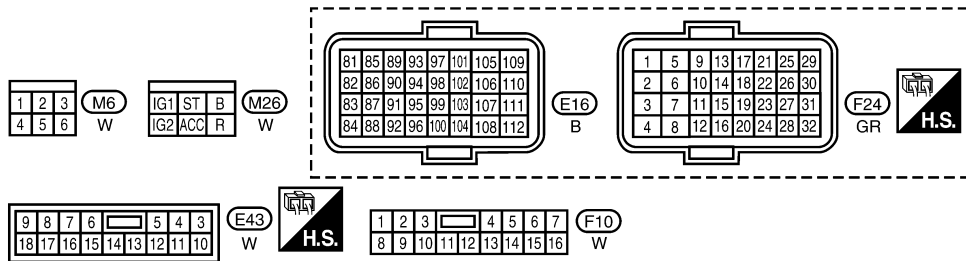
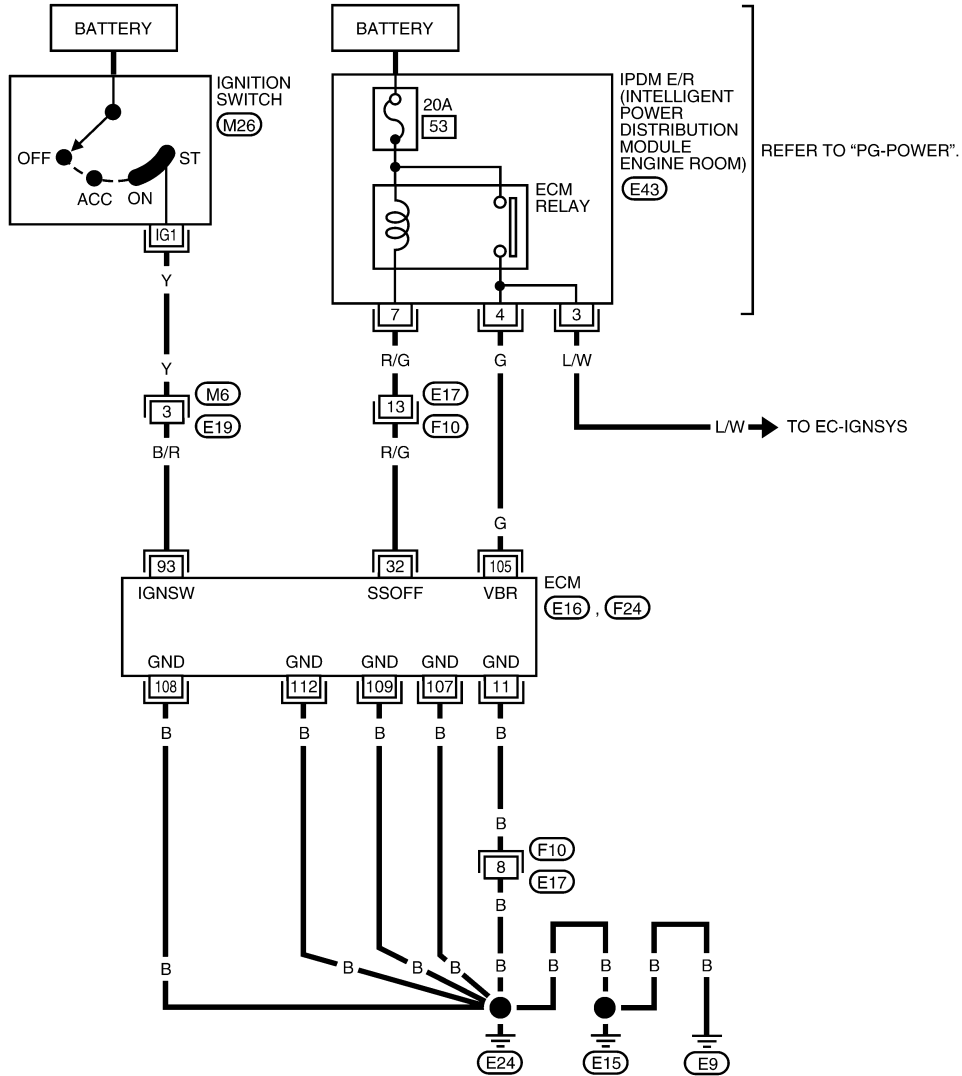
POWER SUPPLY AND GROUND CIRCUIT

Wiring Diagram

INFOID:000000006580374

EC-MAIN-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0644GB

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

CAUTION:

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

POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
10 11	B B	ECM ground	[Engine is running] • Idle speed	Body ground
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
93	B/R	Ignition switch	[Ignition switch: OFF]	0 V
			[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
107 108 109 112	B B B B	ECM ground	[Engine is running] • Idle speed	Body ground

Diagnosis Procedure

INFOID:000000006580375

1. INSPECTION START

Start engine.

Is engine running?

Yes or No

Yes >> GO TO 8.

No >> GO TO 2.

2. CHECK ECM POWER SUPPLY CIRCUIT-I

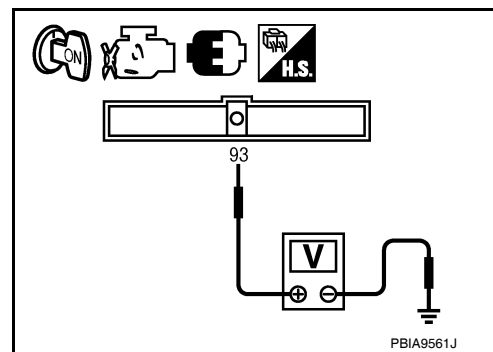
- Turn ignition switch OFF and then ON.
- Check voltage between ECM terminal 93 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 4.

NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M6, E19
- Harness for open or short between ECM and ignition switch

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

4. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.

POWER SUPPLY AND GROUND CIRCUIT

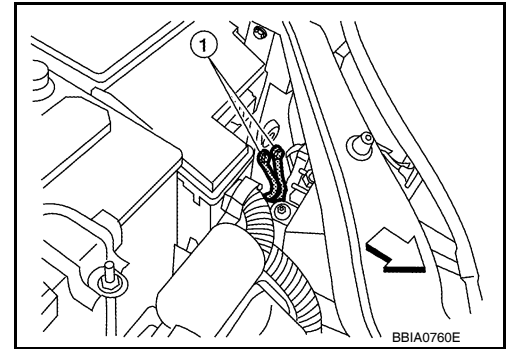
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace ground connections.



5. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

- Disconnect ECM harness connector.
- Check harness continuity between ECM terminals 10, 11, 107, 108, 109, 112 and ground.
Refer to Wiring Diagram.

Continuity should exist.

- Also check harness for short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between ECM and ground

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

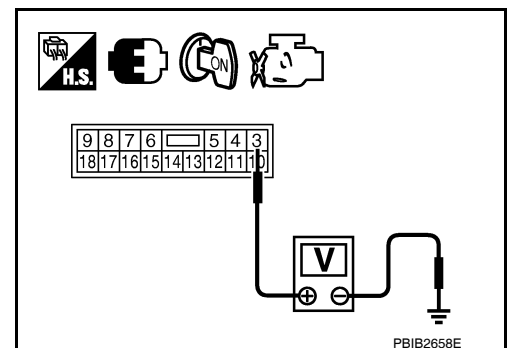
7. CHECK ECM POWER SUPPLY CIRCUIT-II

- Reconnect ECM harness connector.
- Turn ignition switch ON.
- Check voltage between IPDM E/R terminal 3 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> Go to [EC-1088](#).
- NG >> GO TO 8.



8. CHECK ECM POWER SUPPLY CIRCUIT-III

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

POWER SUPPLY AND GROUND CIRCUIT

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Check voltage between ECM terminal 105 and ground with CONSULT-III or tester.

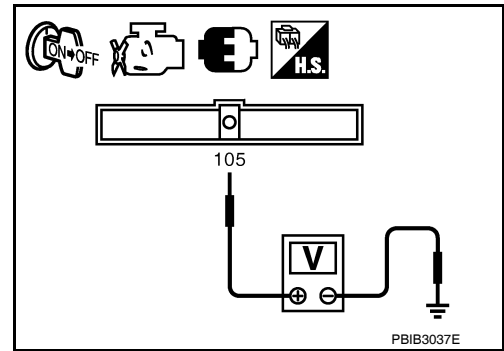
Voltage: After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0 V.

OK or NG

OK >> GO TO 14.

NG (Battery voltage does not exist.)>>GO TO 9.

NG (Battery voltage exists for more than a few seconds.)>>GO TO 11.



9. CHECK ECM POWER SUPPLY CIRCUIT-IV

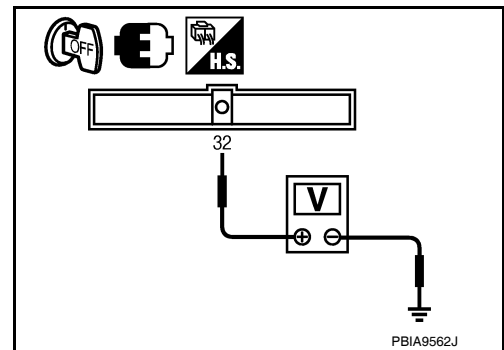
1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check voltage between ECM terminal 32 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 10.

NG >> GO TO 11.



10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between ECM terminal 105 and IPDM E/R terminal 4. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 17.

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

11. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between ECM terminal 32 and IPDM E/R terminal 7. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between ECM and IPDM E/R

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

POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

13. CHECK 20 A FUSE

1. Disconnect 20 A fuse from IPDM E/R.
2. Check 20 A fuse.

OK or NG

- OK >> GO TO 17.
NG >> Replace 20 A fuse.

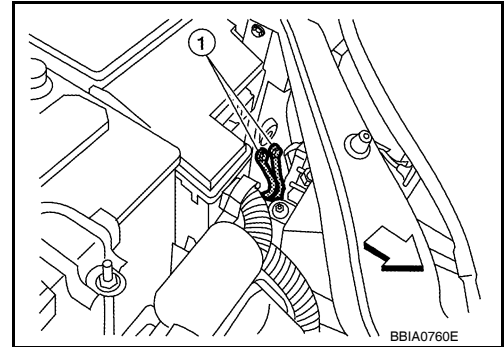
14. CHECK GROUND CONNECTIONS

Loosen and retighten ground screws on the body.
Refer to [EC-706. "Ground Inspection"](#).

- ↶ : Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 15.
NG >> Repair or replace ground connections.



15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 10, 11, 107, 108, 109, 112 and ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 17.
NG >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between ECM and ground

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

17. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-28](#).
NG >> Repair open circuit or short to power in harness or connectors.

Ground Inspection

INFOID:000000006580376

Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.

Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.

When inspecting a ground connection follow these rules:

- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.
- Clean as required to assure good contact.

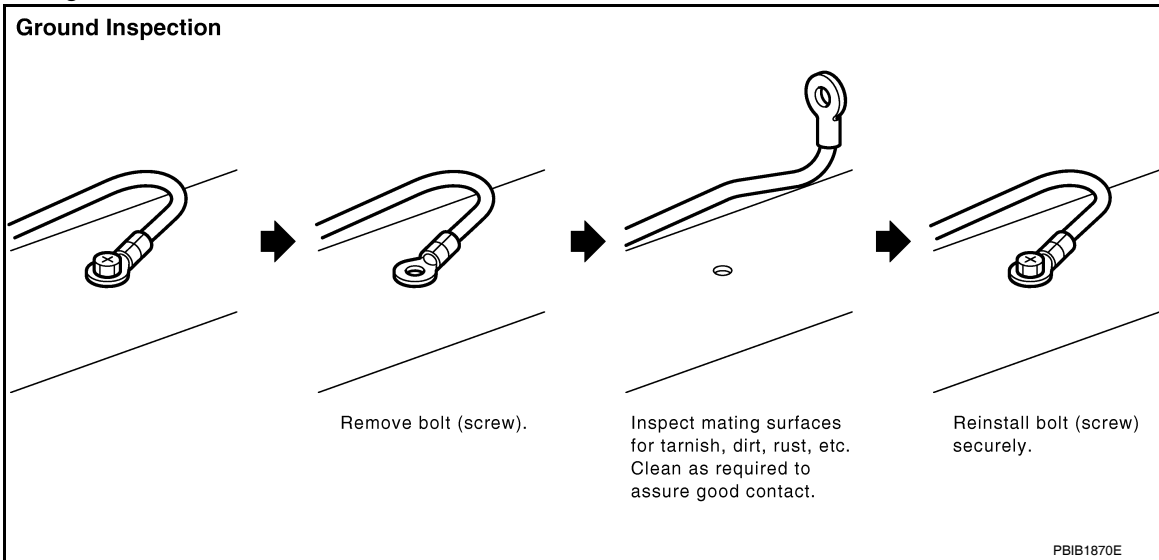
POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

- Reinstall bolt or screw securely.
- Inspect for “add-on” accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Make sure all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet make sure no ground wires have excess wire insulation.

For detailed ground distribution information, refer to [PG-30. "Ground Distribution"](#).



A

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DTC U0101 CAN COMMUNICATION LINE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC U0101 CAN COMMUNICATION LINE

Description

INFOID:000000006580377

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.

On Board Diagnosis Logic

INFOID:000000006580378

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0101 0101	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 style="list-style-type: none">• CAN communication line between TCM and ECM• CAN communication line is open or shorted.

DTC Confirmation Procedure

INFOID:000000006580379

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-709. "Diagnosis Procedure"](#).

DTC U0101 CAN COMMUNICATION LINE




< SERVICE INFORMATION >

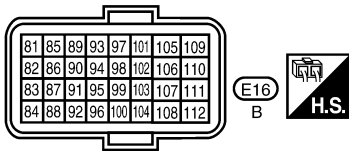
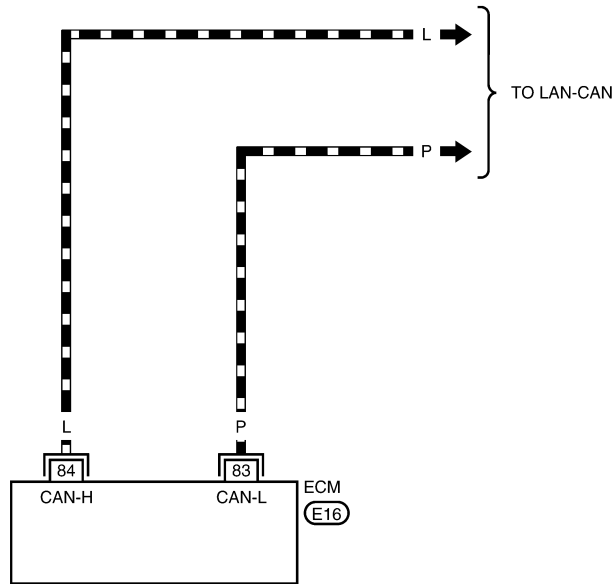
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580380

EC-CAN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BBWA2870E

Diagnosis Procedure

INFOID:000000006580381

Go to [LAN-16, "Trouble Diagnosis Flow Chart"](#).

DTC U0140 CAN COMMUNICATION LINE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC U0140 CAN COMMUNICATION LINE

Description

INFOID:000000006580382

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.

On Board Diagnosis Logic

INFOID:000000006580383

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0140 0140	Lost communication with BCM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) with BCM for 2 seconds or more.	<ul style="list-style-type: none">• CAN communication line between BCM and ECM• CAN communication line is open or shorted.

DTC Confirmation Procedure

INFOID:000000006580384

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-711. "Diagnosis Procedure"](#).

DTC U0140 CAN COMMUNICATION LINE




< SERVICE INFORMATION >

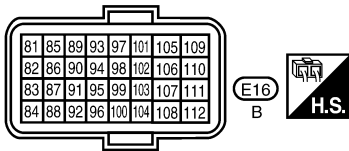
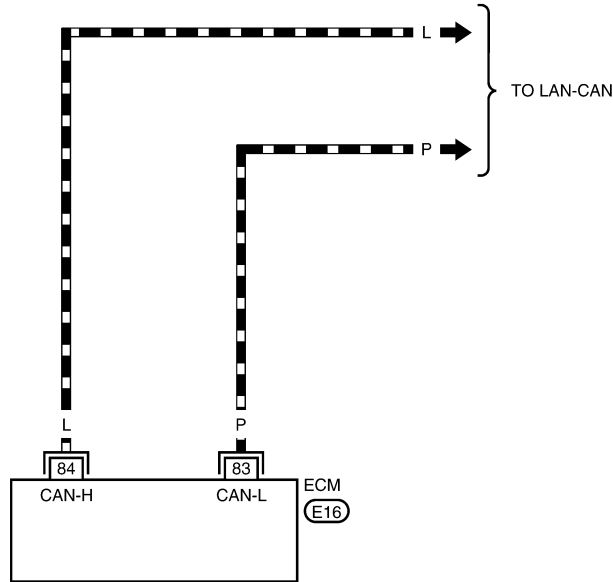
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580385

EC-CAN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BBWA2870E

Diagnosis Procedure

INFOID:000000006580386

Go to [LAN-16, "Trouble Diagnosis Flow Chart"](#).

DTC U1001 CAN COMMUNICATION LINE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC U1001 CAN COMMUNICATION LINE

Description

INFOID:000000006580387

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.

On Board Diagnosis Logic

INFOID:000000006580388

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1001 1001	CAN communication line	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission-related diagnosis) for 2 seconds or more.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted.)

DTC Confirmation Procedure

INFOID:000000006580389

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-713. "Diagnosis Procedure"](#).

DTC U1001 CAN COMMUNICATION LINE




< SERVICE INFORMATION >

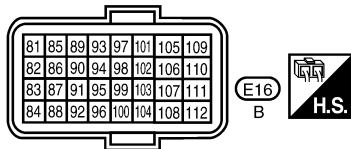
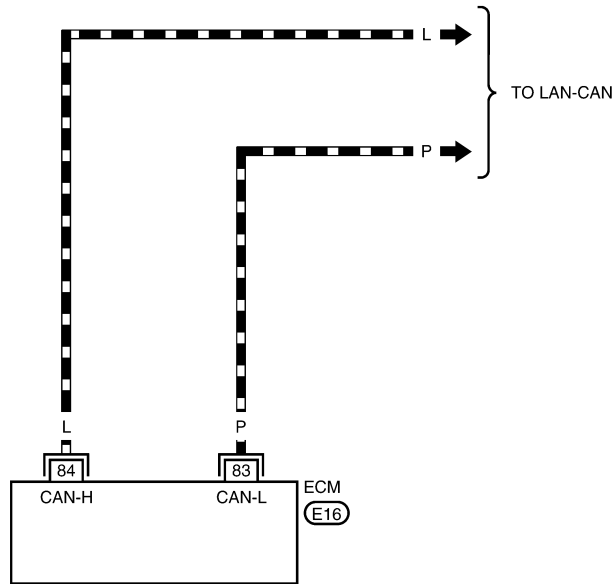
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580390

EC-CAN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BBWA2870E

Diagnosis Procedure

INFOID:000000006580391

Go to [LAN-16, "Trouble Diagnosis Flow Chart"](#).

DTC P0011 IVT CONTROL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0011 IVT CONTROL

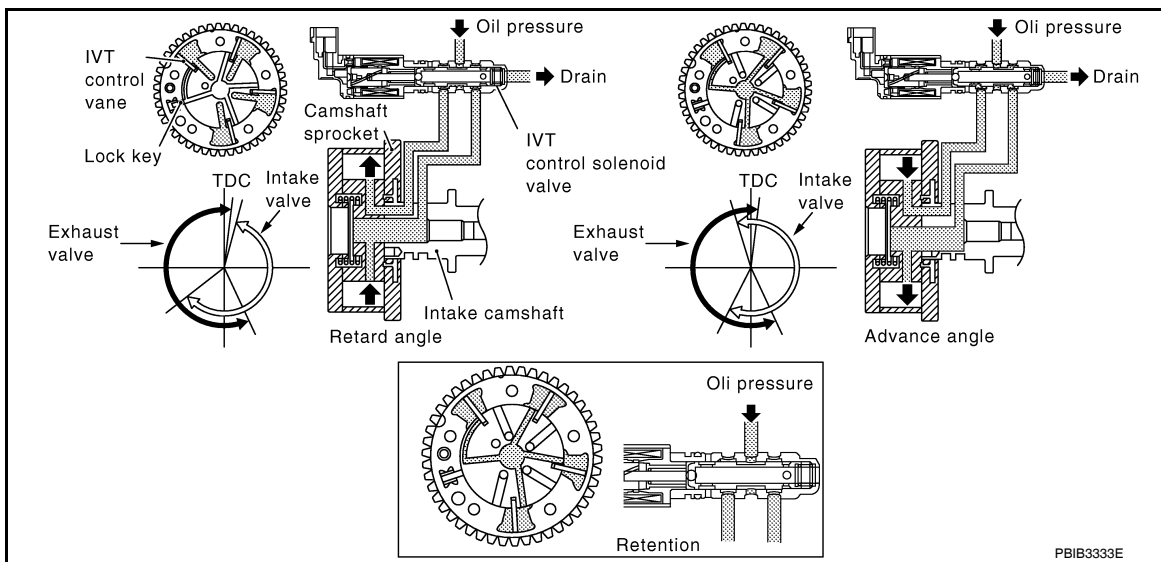
Description

INFOID:000000006580392

SYSTEM DESCRIPTION

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

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



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 control solenoid 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.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580393

Specification data are reference values.

Monitor item	Condition	Specification
INT/V TIM (B1)	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: P or N (CVT), Neutral (M/T) No load Idle	-5° - 5°CA
	When revving engine up to 2,000 rpm quickly	Approx. 0° - 40°CA
INT/V SOL (B1)	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: P or N (CVT), Neutral (M/T) No load Idle	0% - 2%
	When revving engine up to 2,000 rpm quickly	Approx. 0% - 90%

DTC P0011 IVT CONTROL

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

On Board Diagnosis Logic

INFOID:000000006580394

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011 0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	<ul style="list-style-type: none"> • Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Intake valve timing control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control

FAIL-SAFE MODE

ECM enters in fail-safe mode when the malfunction is detected.

Detected items	Engine operating condition in fail-safe mode
Intake valve timing control	The signal is not energized to the solenoid valve and the valve control does not function

DTC Confirmation Procedure

INFOID:000000006580395

CAUTION:

Always drive at a safe speed.

NOTE:

- If DTC P0011 is displayed with DTC P0075, first perform trouble diagnosis for DTC P0075. See [EC-729](#).
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10 V and 16 V at idle.

Ⓟ WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 10 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 4.25 msec
Shift lever	P or N position (CVT) Neutral position (M/T)

4. Let engine idle for 10 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-716. "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to next step.
7. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	1,200 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 65°C (149°F)
Shift lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

8. Check 1st trip DTC.

DTC P0011 IVT CONTROL

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

9. If 1st trip DTC is detected, go to [EC-716. "Diagnosis Procedure"](#).

 WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

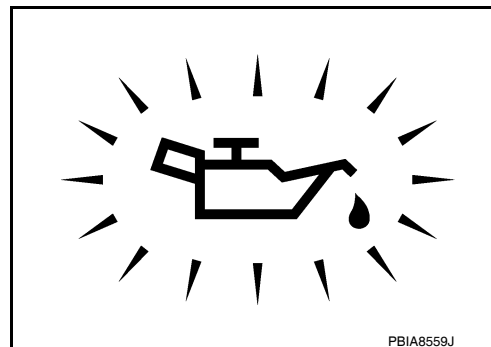
INFOID:000000006580396

1. CHECK OIL PRESSURE WARNING LAMP

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

OK or NG

- OK >> GO TO 2.
NG >> Go to [LU-6. "Inspection"](#).



2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-717. "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
NG >> Replace intake valve timing control solenoid valve. Refer to [EM-40](#).

3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-866. "Component Inspection"](#).

OK or NG

- OK >> GO TO 4.
NG >> Replace crankshaft position sensor (POS). Refer to [EM-80](#).

4. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-872. "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace camshaft position sensor (PHASE). Refer to [EM-50](#).

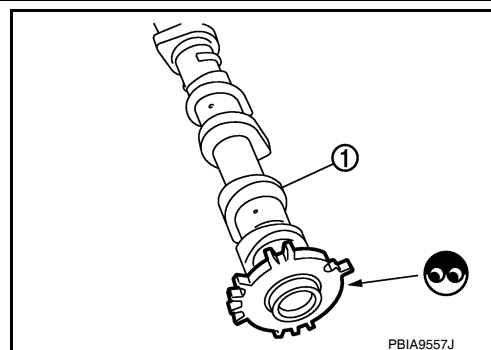
5. CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

OK or NG

- OK >> GO TO 6.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to [EM-50](#).



6. CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misaligned.

Are there any service records that may cause timing chain misaligned?

Yes or No

- Yes >> Check timing chain installation. Refer to [EM-40](#).
No >> GO TO 7.

DTC P0011 IVT CONTROL

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

7. CHECK LUBRICATION CIRCUIT

Refer to [LU-5. "Lubrication Circuit"](#).

OK or NG

OK >> GO TO 8.

NG >> Clean lubrication line.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

For Wiring Diagram, refer to [EC-863. "Wiring Diagram"](#) for CKP sensor (POS) and [EC-869. "Wiring Diagram"](#) for CMP sensor (PHASE).

>> INSPECTION END

Component Inspection

INFOID:000000006580397

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve as follows.

Terminal	Resistance
1 and 2	6.7 - 7.7 Ω [at 20°C (68°F)]
1 or 2 and ground	$\infty\Omega$ (Continuity should not exist.)

If NG, replace intake valve timing control solenoid valve. Refer to [EM-40](#).

If OK, go to next step.

3. Remove intake valve timing control solenoid valve.
4. Provide 12 V DC between intake valve timing control solenoid valve terminals and then interrupt it. Make sure that the plunger moves as shown in the figure.

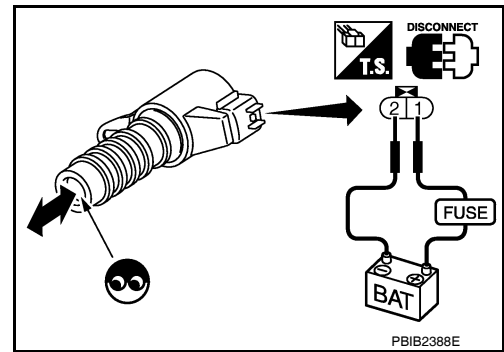
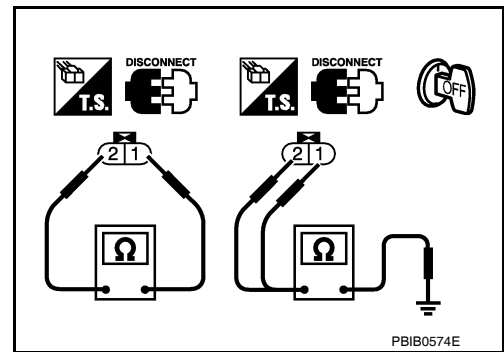
CAUTION:

Do not 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.

If NG, replace intake valve timing control solenoid valve. Refer to [EM-40](#).

NOTE:

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



DTC P0031, P0032 A/F SENSOR 1 HEATER

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0031, P0032 A/F SENSOR 1 HEATER

Description

INFOID:000000006580399

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Air fuel ratio (A/F) sensor 1 heater control	Air fuel ratio (A/F) sensor 1 heater
Mass air flow sensor	Amount of intake air		

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 at the specified range.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580400

Specification data are reference values.

Monitor item	Condition	Specification
A/F S1 HTR (B1)	• Engine: After warming up, idle the engine (More than 140 seconds after starting engine)	4 - 100%

On Board Diagnosis Logic

INFOID:000000006580401

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031 0031	Air fuel ratio (A/F) sensor 1 heater control circuit low	The current amperage in the air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. [An excessively low voltage signal is sent to ECM through the air fuel ratio (A/F) sensor 1 heater.]	• Harness or connectors [Air fuel ratio (A/F) sensor 1 heater circuit is open or shorted.] • Air fuel ratio (A/F) sensor 1 heater
P0032 0032	Air fuel ratio (A/F) sensor 1 heater control circuit high	The current amperage in the air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. [An excessively high voltage signal is sent to ECM through the air fuel ratio (A/F) sensor 1 heater.]	• Harness or connectors [Air fuel ratio (A/F) sensor 1 heater circuit is shorted.] • Air fuel ratio (A/F) sensor 1 heater

DTC Confirmation Procedure

INFOID:000000006580402

NOTE:

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

TESTING CONDITION:

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

1. Start engine and run it for at least 10 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-720, "Diagnosis Procedure"](#).

DTC P0031, P0032 A/F SENSOR 1 HEATER

< SERVICE INFORMATION >

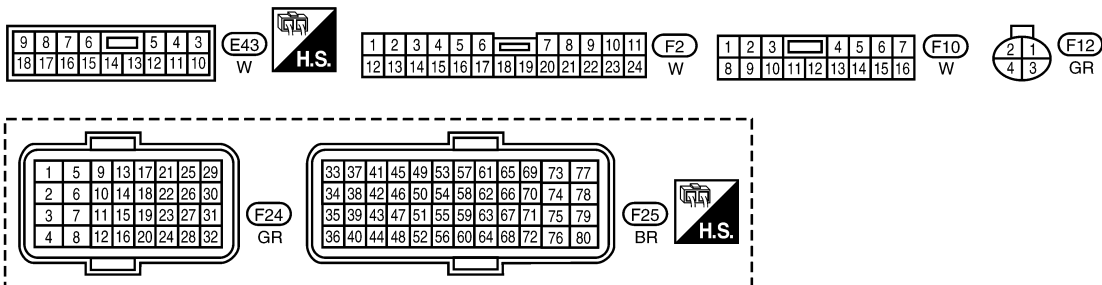
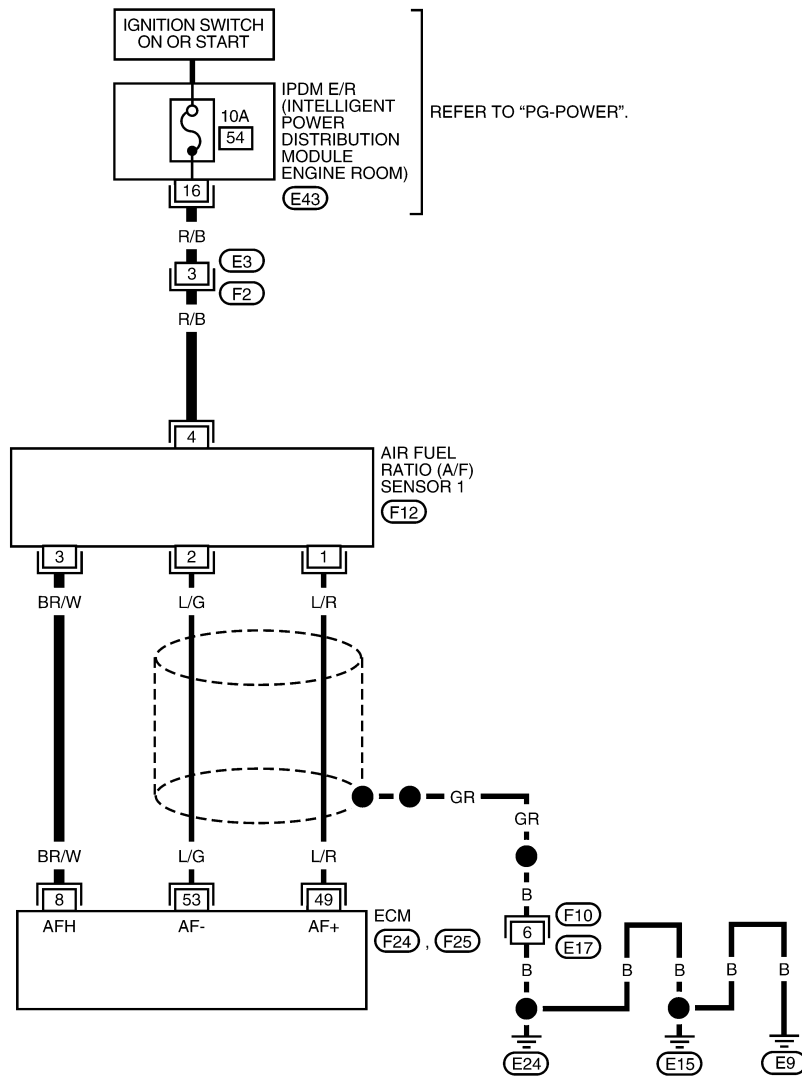
[MR20DE (EXCEPT FOR CALIFORNIA)]

INFOID:000000006580403

Wiring Diagram

EC-A/FH-01

— : DETECTABLE LINE FOR DTC
 - - : NON-DETECTABLE LINE FOR DTC



ABBWA0159GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

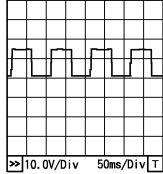
CAUTION:

DTC P0031, P0032 A/F SENSOR 1 HEATER

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBI A8148J
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

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

Diagnosis Procedure

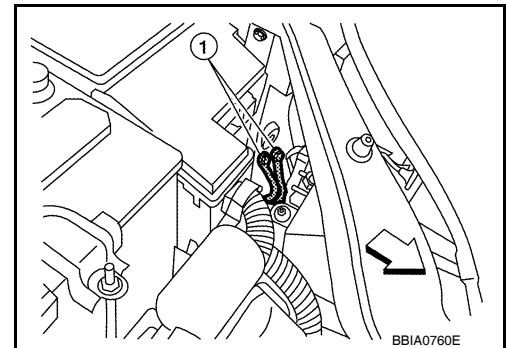
INFOID:000000006580404

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-706. "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

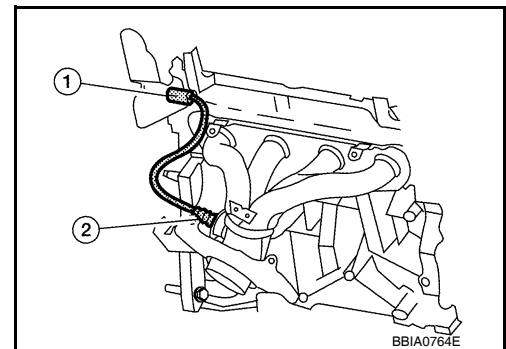
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



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

- Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).
 - Turn ignition switch ON.
- Air fuel ratio (A/F) sensor 1 (2)



DTC P0031, P0032 A/F SENSOR 1 HEATER

[MR20DE (EXCEPT FOR CALIFORNIA)]

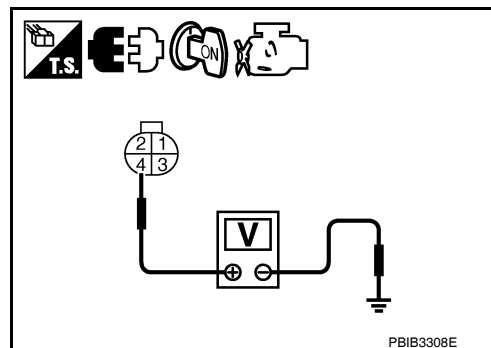
< SERVICE INFORMATION >

3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 HEATER OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 8 and A/F sensor 1 terminal 3. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK A/F SENSOR 1 HEATER

Refer to [EC-721](#), "Component Inspection".

OK or NG

- OK >> GO TO 6.
- NG >> Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

6. CHECK INTERMITTENT INCIDENT

Perform [EC-701](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580405

AIR FUEL RATIO (A/F) SENSOR 1 HEATER

DTC P0031, P0032 A/F SENSOR 1 HEATER

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

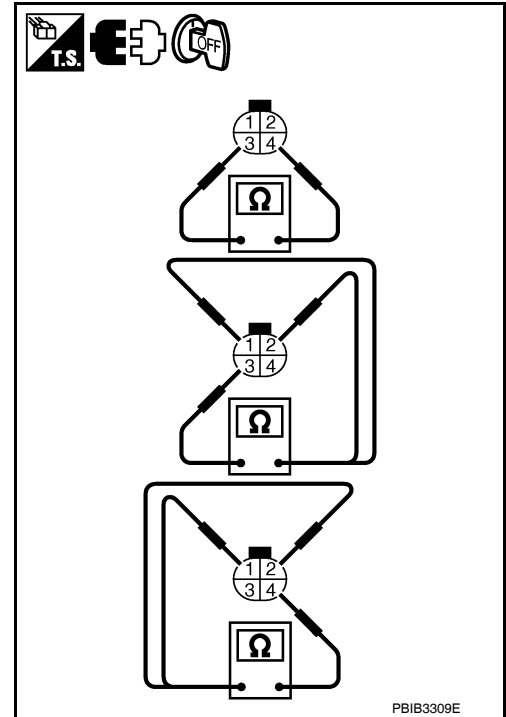
1. Check resistance between A/F sensor 1 terminals as follows.

Terminal No.	Resistance
3 and 4	1.8 - 2.44 Ω [at 25°C (77°F)]
3 and 1, 2	$\infty \Omega$
4 and 1, 2	(Continuity should not exist)

2. If NG, replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

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 Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



DTC P0037, P0038 HO2S2 HEATER

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0037, P0038 HO2S2 HEATER

Description

INFOID:000000006580407

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Crankshaft position sensor (POS)			
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

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.

OPERATION

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600 rpm	OFF
<ul style="list-style-type: none"> Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	ON

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580408

Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 HTR (B1)	<ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	ON
	<ul style="list-style-type: none"> Engine speed: Above 3,600 rpm 	OFF

On Board Diagnosis Logic

INFOID:000000006580409

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0037 0037	Heated oxygen sensor 2 heater 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 style="list-style-type: none"> Harness or connectors (Heated oxygen sensor 2 heater circuit is open or shorted.) Heated oxygen sensor 2 heater
P0038 0038	Heated oxygen sensor 2 heater 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 style="list-style-type: none"> Harness or connectors (Heated oxygen sensor 2 heater circuit is shorted.) Heated oxygen sensor 2 heater

DTC Confirmation Procedure

INFOID:000000006580410

NOTE:

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

TESTING CONDITION:

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

① WITH CONSULT-III

DTC P0037, P0038 HO2S2 HEATER

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-726. "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "WITH CONSULT-III" above.

DTC P0037, P0038 HO2S2 HEATER

< SERVICE INFORMATION >

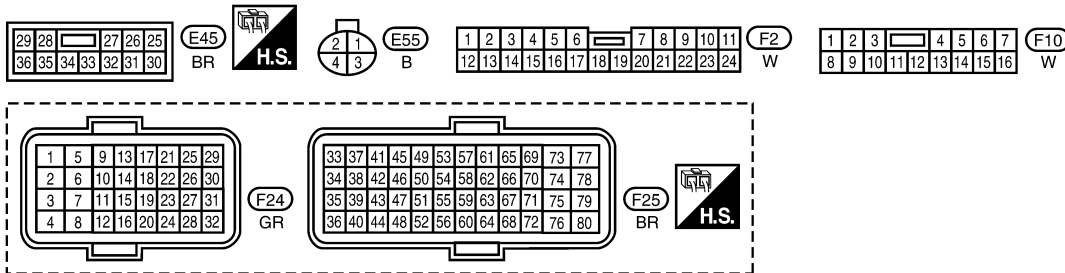
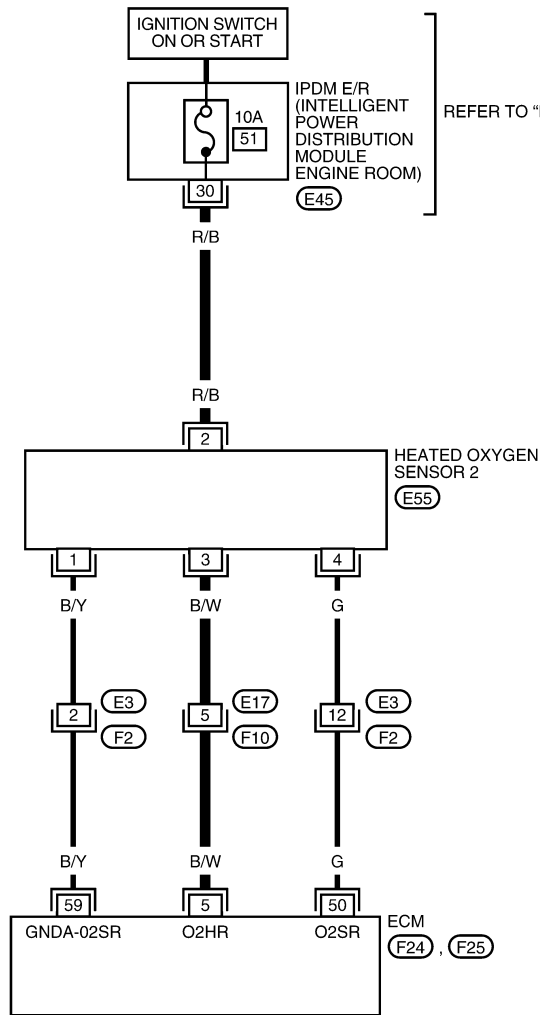
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580411

EC-HO2S2H-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0235GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

DTC P0037, P0038 HO2S2 HEATER

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

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

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
5	B/W	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★ <small>PBIA8148J</small>
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
50	G	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> Revsing engine from idle to 3,000 rpm quickly after the following conditions are met. Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
59	B/Y	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed 	Approximately 0 V

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

Diagnosis Procedure

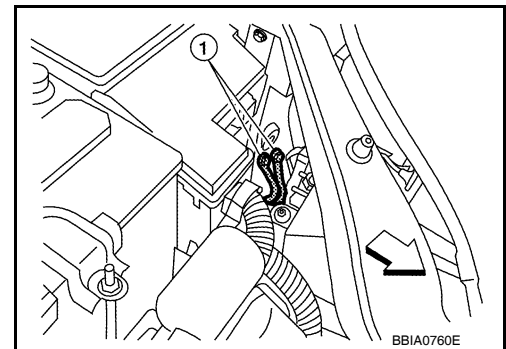
INFOID:000000006580412

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screw on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

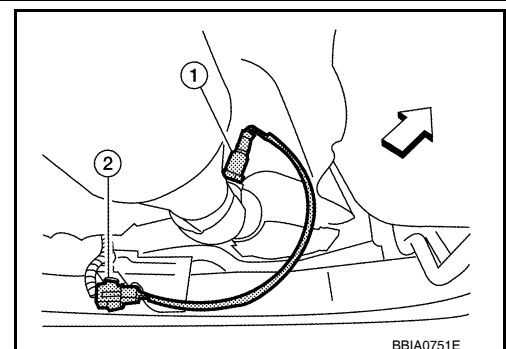
OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace ground connections.



2. CHECK HO2S2 POWER SUPPLY CIRCUIT

- Disconnect heated oxygen sensor 2 harness connector (2).
- ↔ : Vehicle front
 - Heated oxygen sensor 2 (1)
- Turn ignition switch ON.



DTC P0037, P0038 HO2S2 HEATER

[MR20DE (EXCEPT FOR CALIFORNIA)]

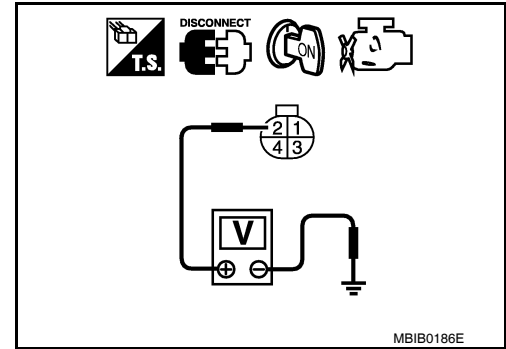
< SERVICE INFORMATION >

3. Check voltage between HO2S2 terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

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

4. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 5 and HO2S2 terminal 3.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between heated oxygen sensor 2 and ECM

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

6. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to [EC-727, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
NG >> Replace heated oxygen sensor 2. Refer to [EX-5](#).

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

HEATED OXYGEN SENSOR 2 HEATER

INFOID:000000006580413

DTC P0037, P0038 HO2S2 HEATER

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

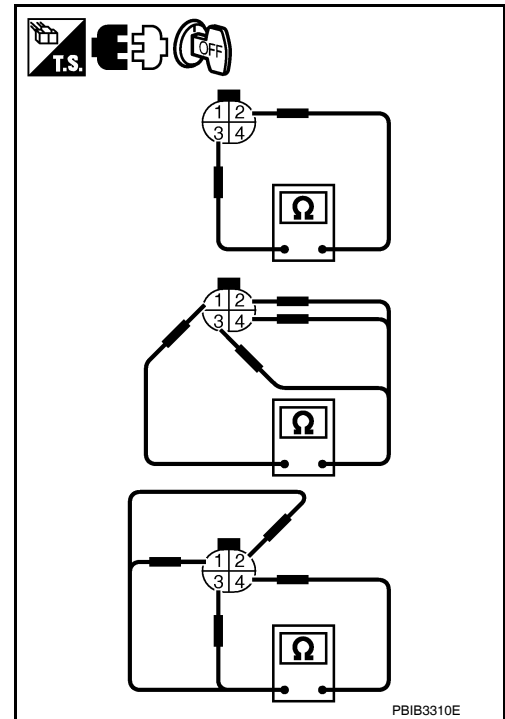
1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
2 and 3	3.4 - 4.4 Ω [at 25°C (77°F)]
1 and 2, 3, 4	$\infty \Omega$
4 and 1, 2, 3	(Continuity should not exist)

2. If NG, replace heated oxygen sensor 2. Refer to [EX-5](#).

CAUTION:

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



DTC P0075 IVT CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0075 IVT CONTROL SOLENOID VALVE

Component Description

INFOID:000000006580415

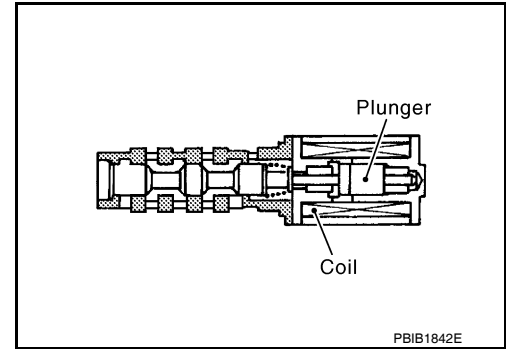
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580416

Specification data are reference values.

Monitor item	Condition	Specification
INT/V SOL (B1)	• Engine: After warming up • Air conditioner switch: OFF • Shift lever: P or N (CVT), Neutral (M/T) • No load	Idle
	When revving engine up to 2,000 rpm quickly	Approx. 0% - 90%

On Board Diagnosis Logic

INFOID:000000006580417

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0075 0075	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	• Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) • Intake valve timing control solenoid valve

DTC Confirmation Procedure

INFOID:000000006580418

NOTE:

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

1. Start engine and let it idle for 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-731, "Diagnosis Procedure"](#).

DTC P0075 IVT CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

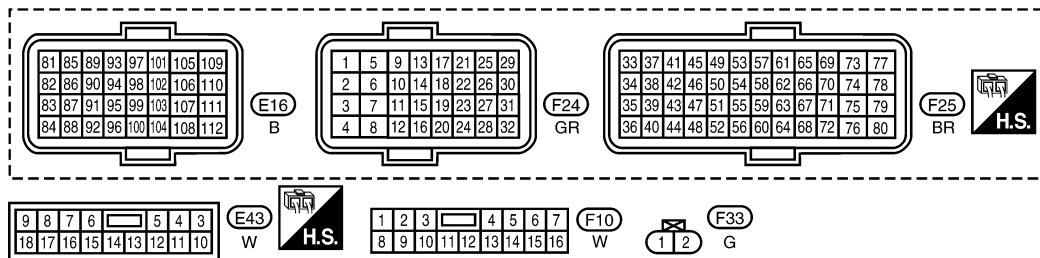
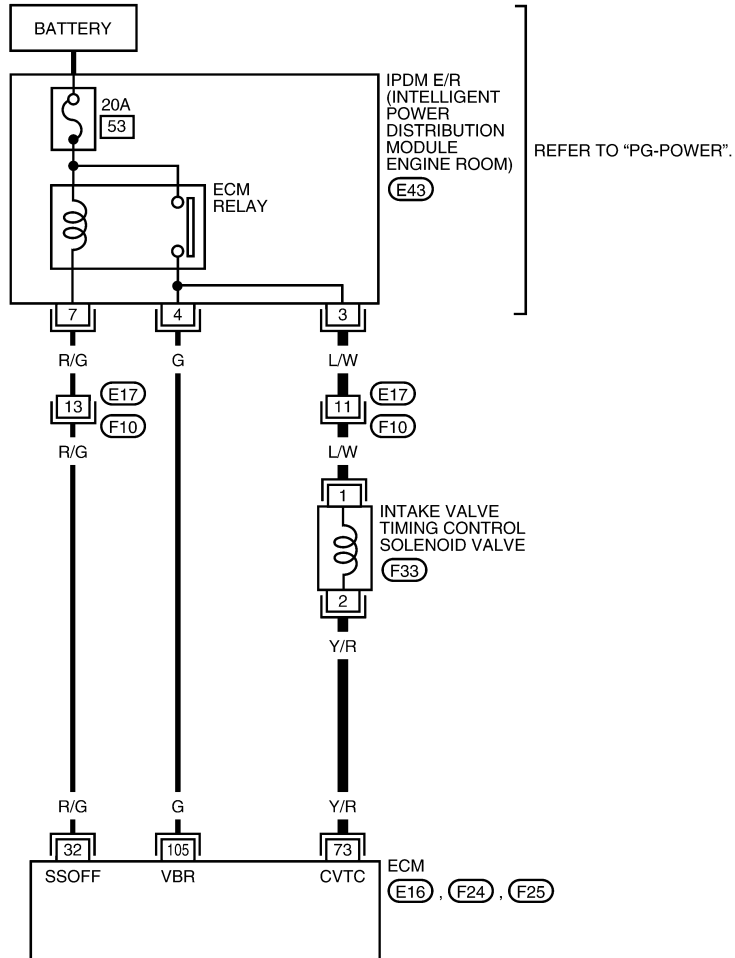
[MR20DE (EXCEPT FOR CALIFORNIA)]

INFOID:000000006580419

Wiring Diagram

EC-IVC-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0645GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

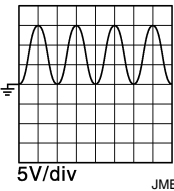
CAUTION:

DTC P0075 IVT CONTROL SOLENOID VALVE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
73	Y/R	Intake valve timing control solenoid valve	[Engine is running] • Warm-up condition • Idle speed	BATTERY VOLTAGE (11 - 14 V)
			[Engine is running] • Warm-up condition • When revving engine up to 2,000 rpm quickly	7 - 10 V★ 
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

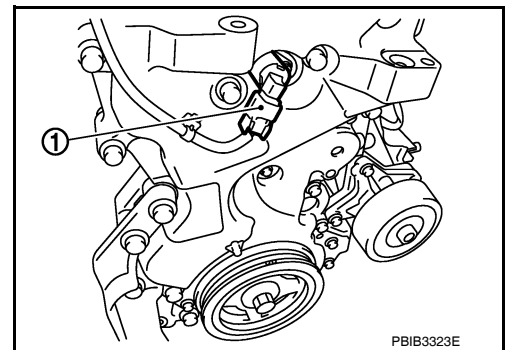
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006580420

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect intake valve timing control solenoid valve (1) harness connector.
- Turn ignition switch ON.

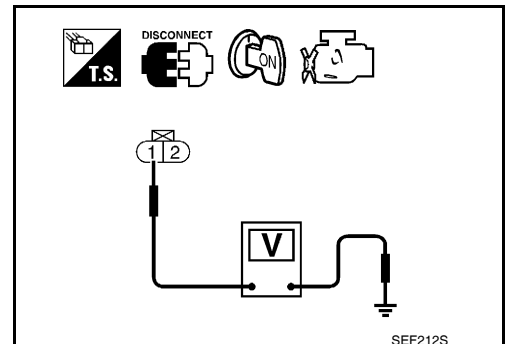


- Check voltage between intake valve timing control solenoid valve terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTION PART

Check the following.

DTC P0075 IVT CONTROL SOLENOID VALVE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Harness connectors E17, F10
- Harness for open or short between intake valve timing control solenoid valve and IPDM E/R

>> Repair or replace harness or connectors.

3. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 73 and intake valve timing control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

OK >> GO TO 4.

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

4. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-732, "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace intake valve timing control solenoid valve. Refer to [EM-40](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580421

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

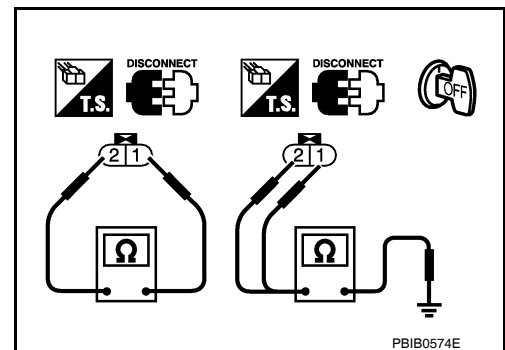
1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve as follows.

Terminal	Resistance
1 and 2	6.7 - 7.7 Ω [at 20°C (68°F)]
1 or 2 and ground	$\infty\Omega$ (Continuity should not exist.)

If NG, replace intake valve timing control solenoid valve. Refer to [EM-40](#).

If OK, go to next step.

3. Remove intake valve timing control solenoid valve. Refer to [EM-40](#).



DTC P0075 IVT CONTROL SOLENOID VALVE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

4. Provide 12 V DC between intake valve timing control solenoid valve terminals and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:

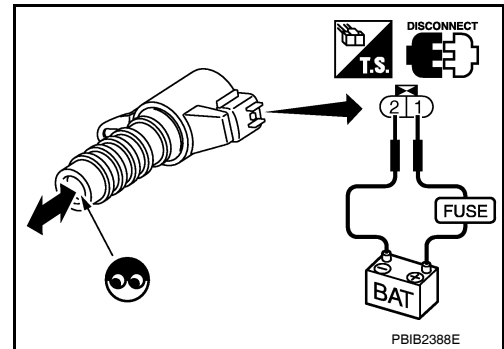
Do not apply 12 V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.

If NG, replace intake valve timing control solenoid valve. Refer to

[EM-40](#).

NOTE:

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



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DTC P0101 MAF SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

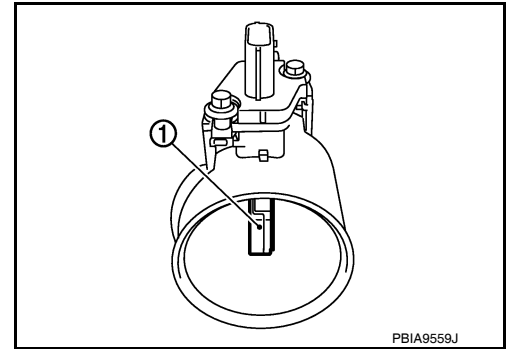
DTC P0101 MAF SENSOR

Component Description

INFOID:000000006580423

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580424

Specification data are reference values.

Monitor item	Condition	Specification
MAS A/F SE-B1	<ul style="list-style-type: none">See EC-693.	
CAL/LD VALUE	<ul style="list-style-type: none">Engine: After warming upShift lever: P or N (CVT), Neutral (M/T)Air conditioner switch: OFFNo load Idle	10% - 35%
	2,500 rpm	10% - 35%
MASS AIRFLOW	<ul style="list-style-type: none">Engine: After warming upShift lever: P or N (CVT), Neutral (M/T)Air conditioner switch: OFFNo load Idle	1.0 - 4.0 g/s
	2,500 rpm	4.0 - 10.0 g/s

On Board Diagnosis Logic

INFOID:000000006609099

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0101 0101	Mass air flow sensor circuit range/performance	<ul style="list-style-type: none">A high voltage from the sensor is sent to ECM under light load driving condition.A low voltage from the sensor is sent to ECM under heavy load driving condition.	<ul style="list-style-type: none">Harness or connectors (Mass air flow sensor circuit is open or shorted.)Intake air leaksMass air flow sensorEVAP control system pressure sensorIntake air temperature sensor

DTC Confirmation Procedure

INFOID:000000006609100

1. 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.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Start the engine and warm it up to normal operating temperature.
- Drive the vehicle for at least 5 seconds under the following conditions:

CAUTION:

Always drive vehicle at safe speed.

DTC P0101 MAF SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Selector lever	Suitable position
Vehicle speed	40 km/h (25 MPH) or more

3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-737, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

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DTC P0101 MAF SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

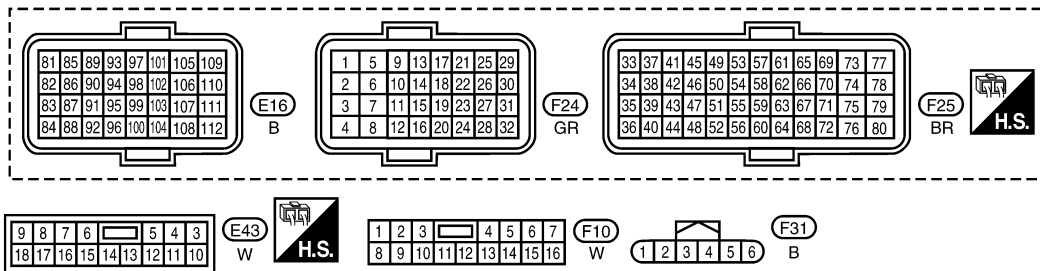
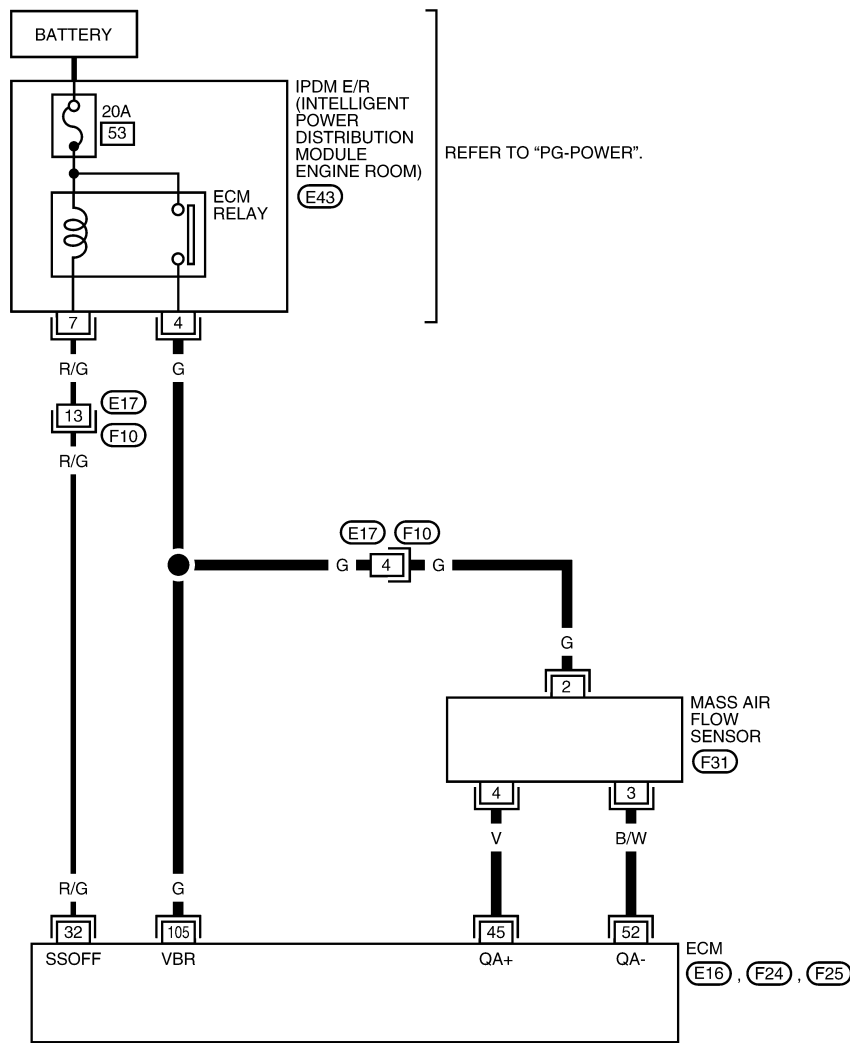
< SERVICE INFORMATION >

INFOID:000000006580428

Wiring Diagram

EC-MAFS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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

CAUTION:

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

DTC P0101 MAF SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
45	V	Mass air flow sensor	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.2 V
			[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	1.5 - 1.8 V
52	B/W	Sensor ground (Mass air flow sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580429

1. CHECK INTAKE AIR LEAK

Check the following for connections.

- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

OK or NG

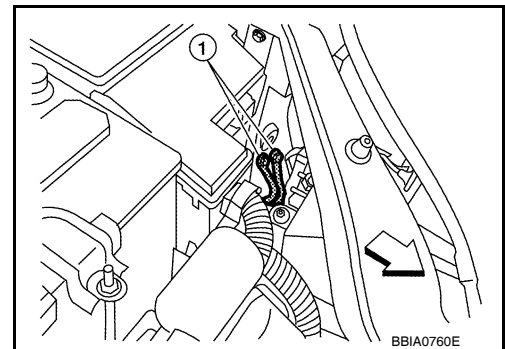
- OK >> GO TO 2.
- NG >> Reconnect the parts.

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screw on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↶ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace ground connections.



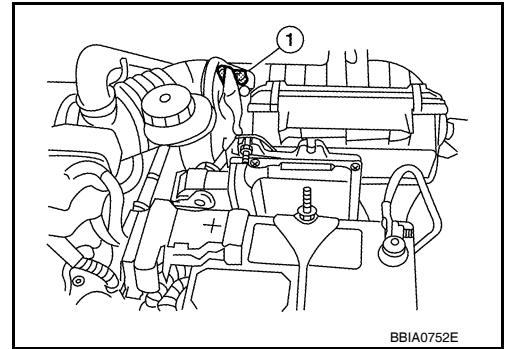
3. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

DTC P0101 MAF SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect mass air flow (MAF) sensor (1) harness connector.
2. Turn ignition switch ON.

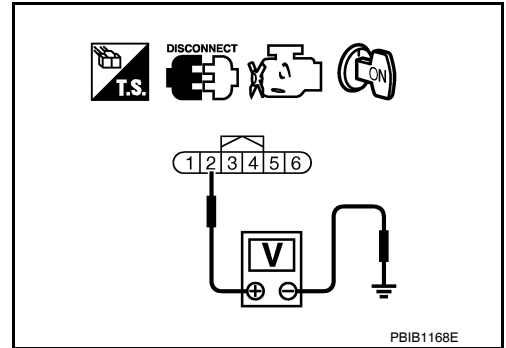


3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between mass air flow sensor and IPDM E/R
- Harness for open or short between mass air flow sensor and ECM

>> 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 harness continuity between MAF sensor terminal 3 and ECM terminal 52.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 45.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short or short to power in harness or connectors.

7. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-769, "Component Inspection"](#).

OK or NG

DTC P0101 MAF SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK >> GO TO 8.

NG >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-16](#).

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-918](#). "Component Inspection".

OK or NG

OK >> GO TO 9.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

9. CHECK MASS AIR FLOW SENSOR

Refer to [EC-739](#). "Component Inspection".

OK or NG

OK >> GO TO 10.

NG >> Replace mass air flow sensor. Refer to [EM-16](#).

10. CHECK INTERMITTENT INCIDENT

Perform [EC-701](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580430

MASS AIR FLOW SENSOR

Ⓜ WITH CONSULT-III

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

Condition	MAS A/F SE-B1 (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

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

5. If the voltage is out of specification, proceed the following.
 - a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
 - b. If NG, repair or replace malfunctioning part and perform step 2 to 4 again. If OK, go to next step.
6. Turn ignition switch OFF.
7. Disconnect mass air flow sensor harness connector and reconnect it again.
8. Perform step 2 to 4 again.
9. If NG, clean or replace mass air flow sensor. Refer to [EM-16](#).

Ⓧ WITHOUT CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.

DTC P0101 MAF SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

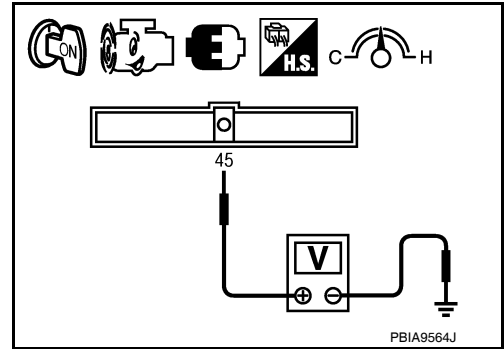
< SERVICE INFORMATION >

3. Check voltage between ECM terminal 45 (Mass air flow sensor signal) and ground.

Condition	Voltage (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

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

4. If the voltage is out of specification, proceed the following.
- a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
- Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
- b. If NG, repair or replace malfunctioning part and perform step 2 and 3 again. If OK, go to next step.
5. Turn ignition switch OFF.
6. Disconnect mass air flow sensor harness connector and reconnect it again.
7. Perform step 2 and 3 again.
8. If NG, clean or replace mass air flow sensor. Refer to [EM-16](#).



DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

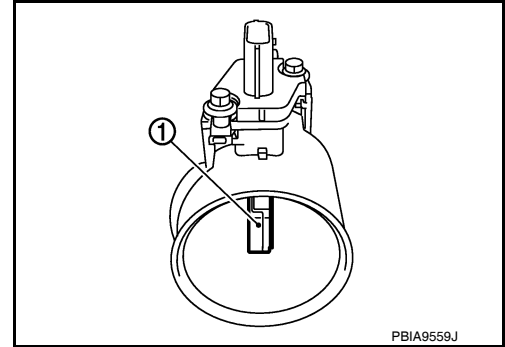
DTC P0102, P0103 MAF SENSOR

Component Description

INFOID:000000006580432

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580433

Specification data are reference values.

Monitor item	Condition	Specification
MAS A/F SE-B1	See EC-693 .	
CAL/LD VALUE	<ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load Idle	10% - 35%
	2,500 rpm	10% - 35%
MASS AIRFLOW	<ul style="list-style-type: none"> Engine: After warming up Shift lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load Idle	1.0 - 4.0 g·m/s
	2,500 rpm	4.0 - 10.0 g·m/s

On Board Diagnosis Logic

INFOID:000000006580434

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102 0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (Mass air flow sensor circuit is open or shorted.) Intake air leaks Mass air flow sensor
P0103 0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (Mass air flow sensor circuit is open or shorted.) Mass air flow sensor

FAIL-SAFE MODE

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

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

DTC Confirmation Procedure

INFOID:000000006580435

NOTE:

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

DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

PROCEDURE FOR DTC P0102

1. Start engine and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-744, "Diagnosis Procedure"](#).

PROCEDURE FOR DTC P0103

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-744, "Diagnosis Procedure"](#).
If DTC is not detected, go to next step.
4. Start engine and wait at least 5 seconds
5. Check DTC.
6. If DTC is detected, go to [EC-744, "Diagnosis Procedure"](#).

DTC P0102, P0103 MAF SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

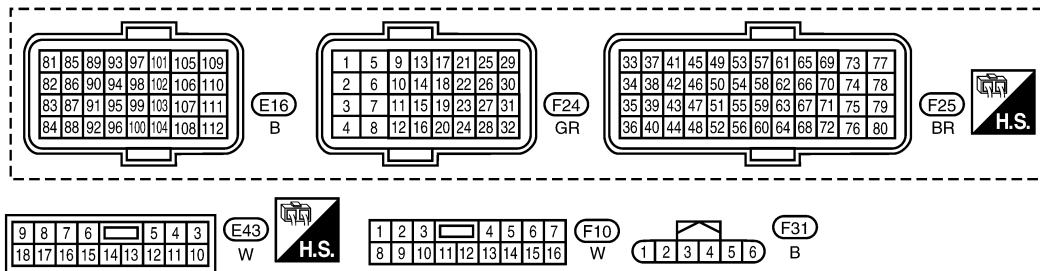
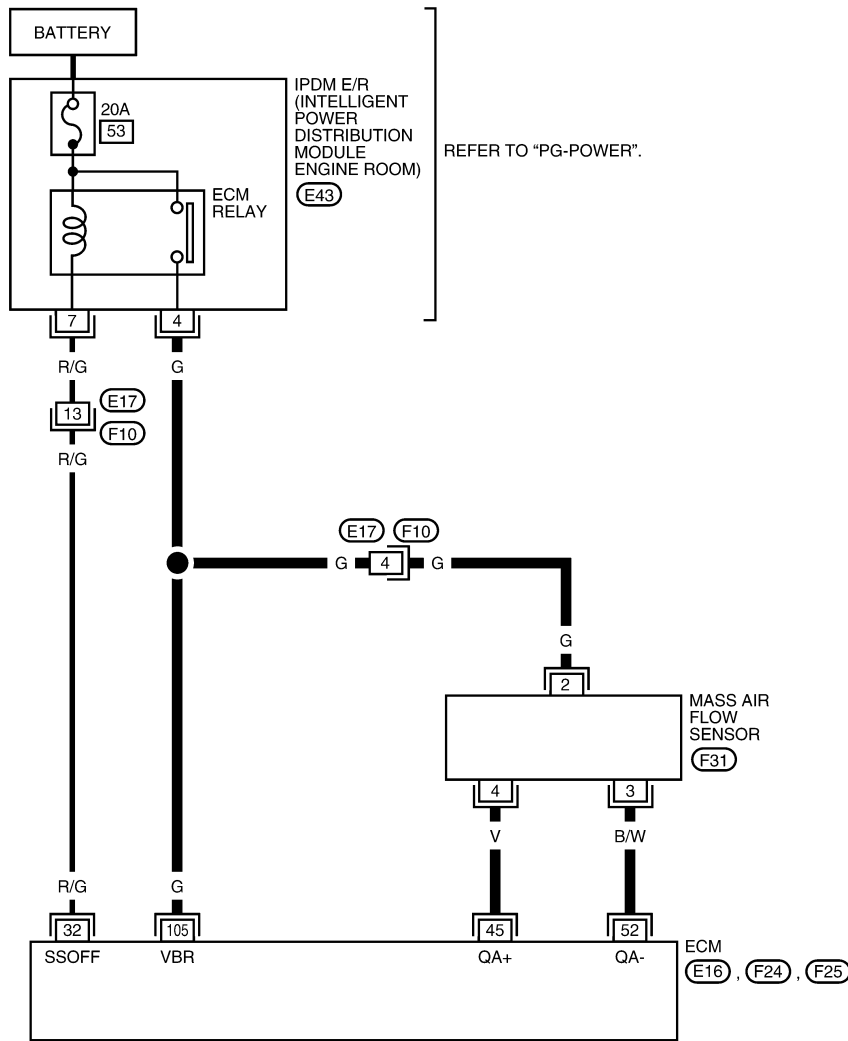
< SERVICE INFORMATION >

INFOID:000000006580436

Wiring Diagram

EC-MAFS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0239GB

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

CAUTION:

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

DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
45	V	Mass air flow sensor	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.2 V
			[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	1.5 - 1.8 V
52	B/W	Sensor ground (Mass air flow sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580437

1. INSPECTION START

Which malfunction (P0102 or P0103) is duplicated?

P0102 or P0103

P0102 >> GO TO 2.

P0103 >> GO TO 3.

2. CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

OK or NG

OK >> GO TO 3.

NG >> Reconnect the parts.

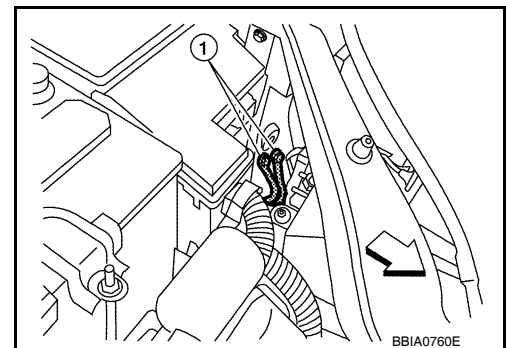
3. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ⇐ : Vehicle front
 - Body ground (1)

OK or NG

OK >> GO TO 4.

NG >> Repair or replace ground connections.



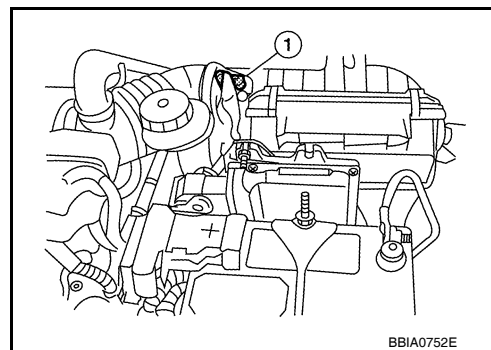
4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

DTC P0102, P0103 MAF SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect mass air flow (MAF) sensor (1) harness connector.
2. Turn ignition switch ON.

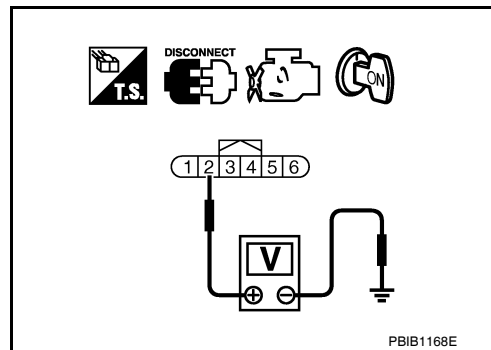


3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- 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.

6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 52.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 7.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 45.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 8.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to [EC-746, "Component Inspection"](#).

OK or NG

DTC P0102, P0103 MAF SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- OK >> GO TO 9.
- NG >> Replace mass air flow sensor. Refer to [EM-16](#).

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580438

MASS AIR FLOW SENSOR

Ⓟ WITH CONSULT-III

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

Condition	MAS A/F SE-B1 (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

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

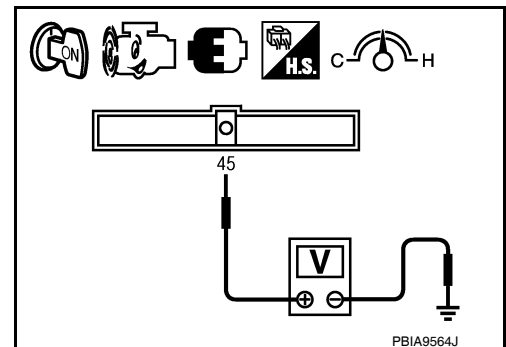
5. If the voltage is out of specification, proceed the following.
 - a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
 - b. If NG, repair or replace malfunctioning part and perform step 2 to 4 again. If OK, go to next step.
6. Turn ignition switch OFF.
7. Disconnect mass air flow sensor harness connector and reconnect it again.
8. Perform step 2 to 4 again.
9. If NG, clean or replace mass air flow sensor. Refer to [EM-16](#).

ⓧ WITHOUT CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 45 (Mass air flow sensor signal) and ground.

Condition	Voltage (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.2
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 1.8
Idle to about 4,000 rpm	0.9 - 1.2 to 2.4*

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



DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

4. If the voltage is out of specification, proceed the following.
 - a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
 - b. If NG, repair or replace malfunctioning part and perform step 2 and 3 again.
If OK, go to next step.
5. Turn ignition switch OFF.
6. Disconnect mass air flow sensor harness connector and reconnect it again.
7. Perform step 2 and 3 again.
8. If NG, clean or replace mass air flow sensor. Refer to [EM-16](#).

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DTC P0112, P0113 IAT SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

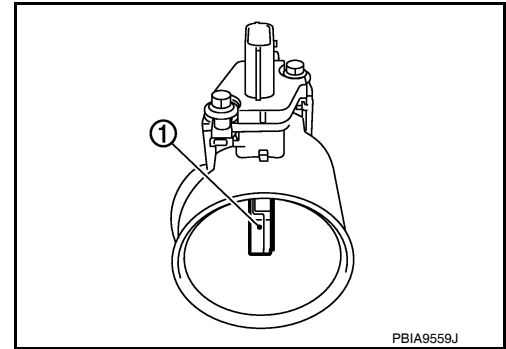
DTC P0112, P0113 IAT SENSOR

Component Description

INFOID:000000006580440

The intake air temperature sensor is built-into mass air flow sensor (1). 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.



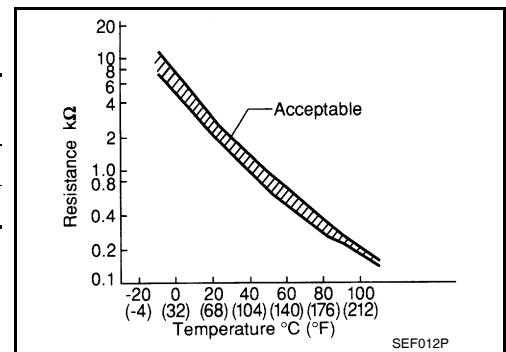
<Reference data>

Intake air temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: This data is reference value and is measured between ECM terminal 46 (Intake air temperature sensor) and ground.

CAUTION:

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



On Board Diagnosis Logic

INFOID:000000006580441

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Intake air temperature sensor circuit is open or shorted.) • Intake air temperature sensor
P0113 0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006580442

NOTE:

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

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-749. "Diagnosis Procedure"](#).

DTC P0112, P0113 IAT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

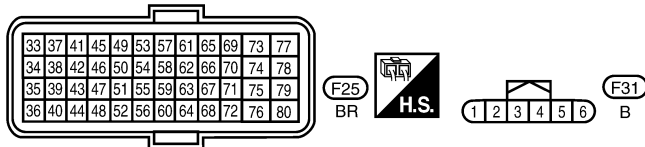
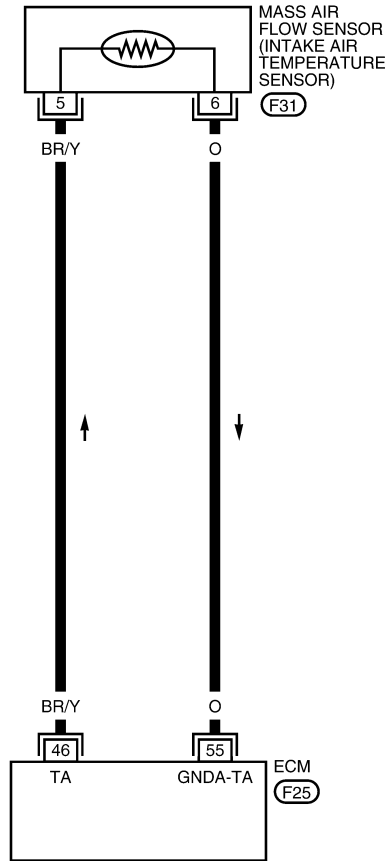
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006580443

EC-IATS-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA2875E

Diagnosis Procedure

INFOID:000000006580444

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0112, P0113 IAT SENSOR

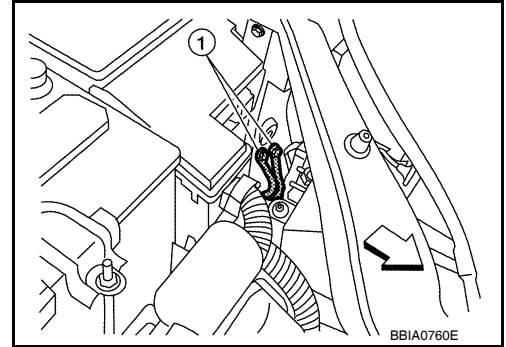
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

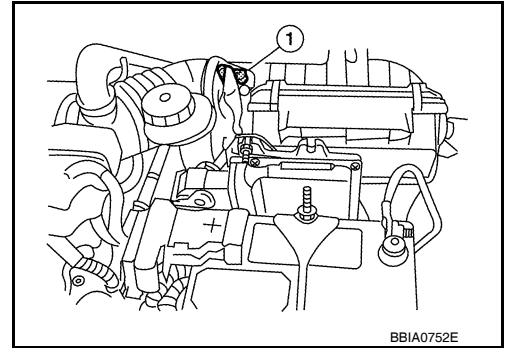
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- Disconnect mass air flow sensor (with intake air temperature sensor) (1) harness connector.
- Turn ignition switch ON.

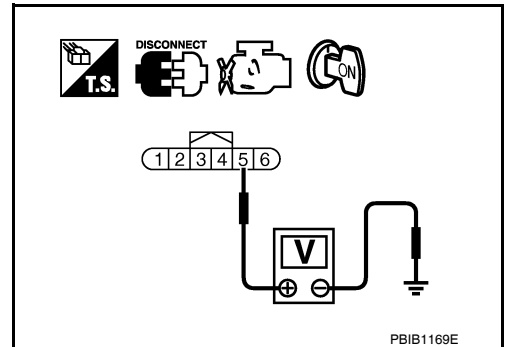


- Check voltage between mass air flow sensor terminal 5 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check harness continuity between mass air flow sensor terminal 6 and ECM terminal 55.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-751, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-16](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

DTC P0112, P0113 IAT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

>> INSPECTION END

Component Inspection

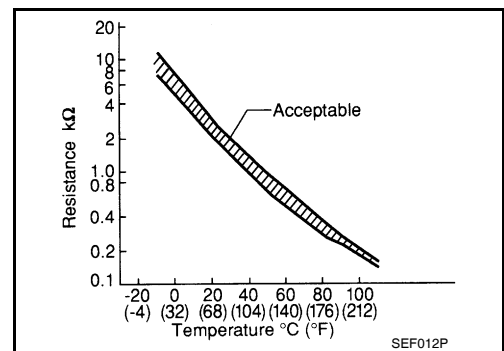
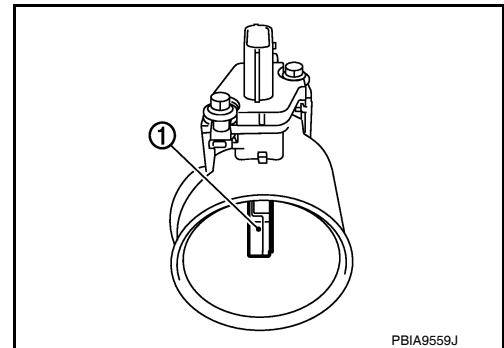
INFOID:000000006580445

INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between mass air flow sensor (1) terminals 5 and 6 under the following conditions.

Intake air temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200

2. If NG, replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-16](#).



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DTC P0116 ECT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

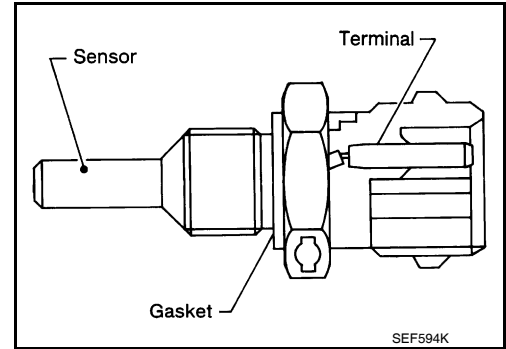
< SERVICE INFORMATION >

DTC P0116 ECT SENSOR

Component Description

INFOID:000000006580447

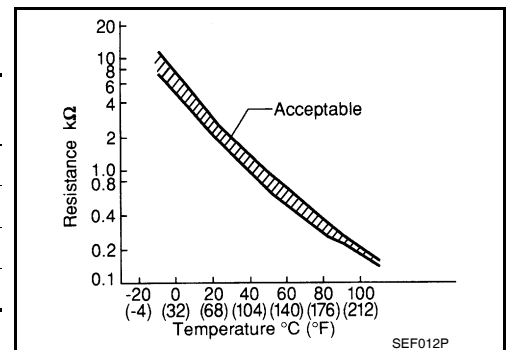
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The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



<Reference data>

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

*: This data is reference value and is measured between ECM terminal 38 (Engine coolant temperature sensor) and ground.



CAUTION:

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

On Board Diagnosis Logic

INFOID:000000006580448

NOTE:

If DTC P0116 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117, P0118. Refer to [EC-755](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0116 0116	Engine coolant temperature sensor circuit range/performance	Engine coolant temperature signal from engine coolant temperature sensor does not fluctuate, even when some time has passed after starting the engine with pre-warming up condition.	<ul style="list-style-type: none"> • Harness or connectors (High or low resistance in the circuit) • Engine coolant temperature sensor

DTC Confirmation Procedure

INFOID:000000006580449

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, do not add fuel.

1. Start engine and warm it up to normal operating temperature.
2. Rev engine up to 2,000 rpm for more than 10 minutes.
3. Move the vehicle to a cool place, then stop engine and turn ignition switch OFF.
4. Check resistance between "fuel level sensor unit and fuel pump" terminals 4 and 5.
5. Soak the vehicle until the resistance between "fuel level sensor unit and fuel pump" terminals 4 and 5 becomes 0.5 kΩ higher than the value measured before soaking.

CAUTION:

Never turn ignition switch ON during soaking time.

DTC P0116 ECT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

NOTE:

Soak time changes depending on ambient air temperature. It may take several hours.

6. Start engine and let it idle for 20 minutes.
7. Check 1st trip DTC.
8. If 1st trip DTC is detected, go to [EC-753, "Diagnosis Procedure"](#).

Diagnosis Procedure

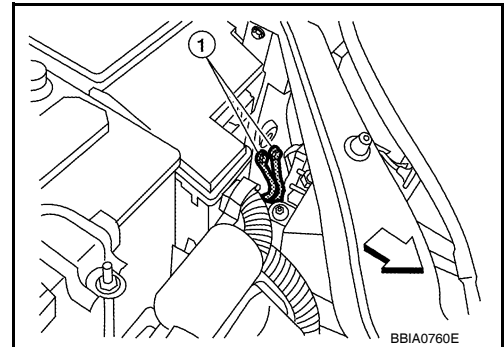
INFOID:000000006580450

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↵ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-753, "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace engine coolant temperature sensor. Refer to [CO-24](#).

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

Refer to [EC-757, "Wiring Diagram"](#).

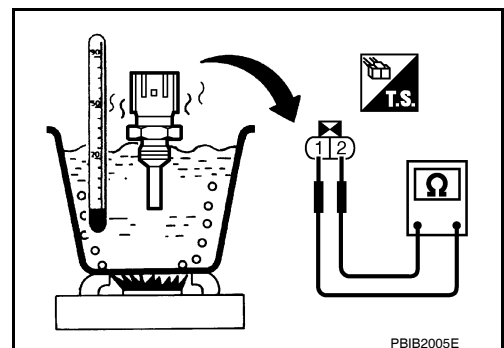
>> **INSPECTION END**

Component Inspection

INFOID:000000006580451

ENGINE COOLANT TEMPERATURE SENSOR

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



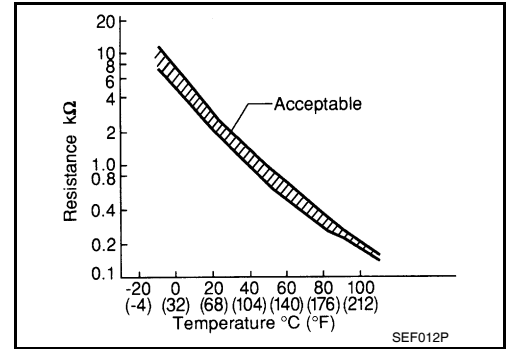
DTC P0116 ECT SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

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

2. If NG, replace engine coolant temperature sensor. Refer to [CO-24](#).



DTC P0117, P0118 ECT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

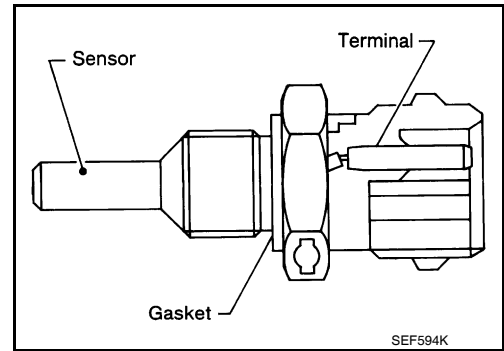
< SERVICE INFORMATION >

DTC P0117, P0118 ECT SENSOR

Component Description

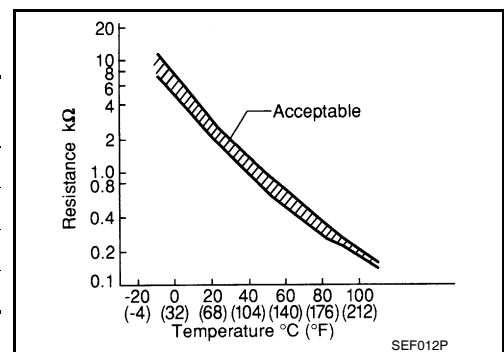
INFOID:000000006580453

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)]	Voltage* (V)	Resistance (kΩ)
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260



*: This data is reference value and is measured between ECM terminal 38 (Engine coolant temperature sensor) and ground.

CAUTION:

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

On Board Diagnosis Logic

INFOID:000000006580454

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Engine coolant temperature sensor circuit is open or shorted.) • Engine coolant temperature sensor
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

FAIL-SAFE MODE

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

DTC P0117, P0118 ECT SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the following condition. CONSULT-III displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-III display)
	Just as ignition switch is turned ON or START	40°C (104°F)
	Approx 4 minutes or more after engine 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.		

DTC Confirmation Procedure

INFOID:000000006580455

NOTE:

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

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-757, "Diagnosis Procedure"](#).

DTC P0117, P0118 ECT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

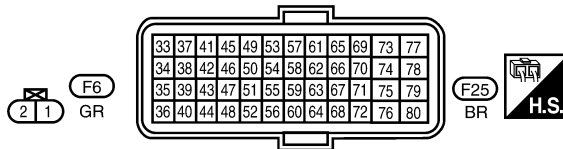
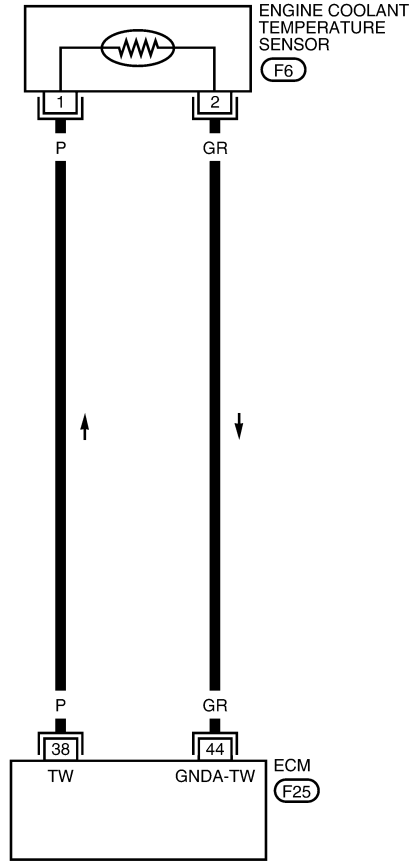
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006580456

EC-ECTS-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA2876E

Diagnosis Procedure

INFOID:000000006580457

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0117, P0118 ECT SENSOR

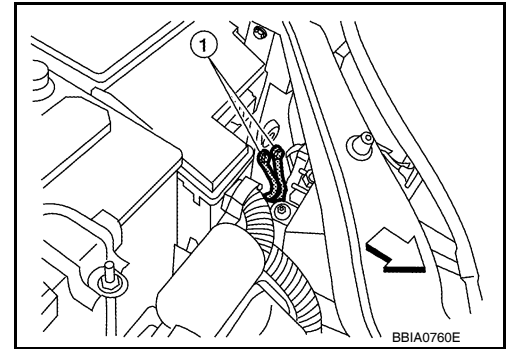
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

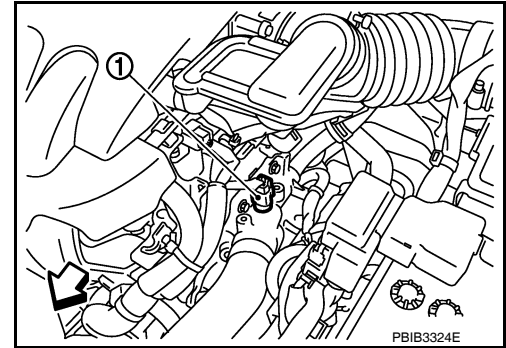
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

- Disconnect engine coolant temperature (ECT) sensor (1) harness connector.
- ↔ : Vehicle front
- Turn ignition switch ON.

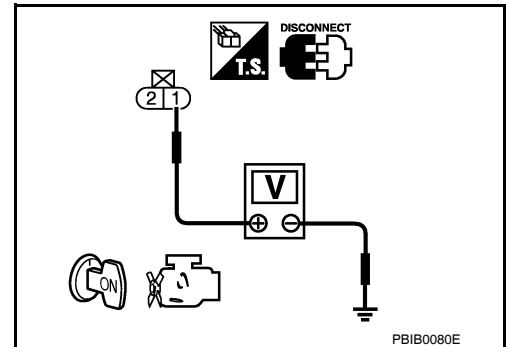


- Check voltage between ECT sensor terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check harness continuity between ECM terminal 44 and ECT sensor terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-759, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace engine coolant temperature sensor. Refer to [CO-24](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

DTC P0117, P0118 ECT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

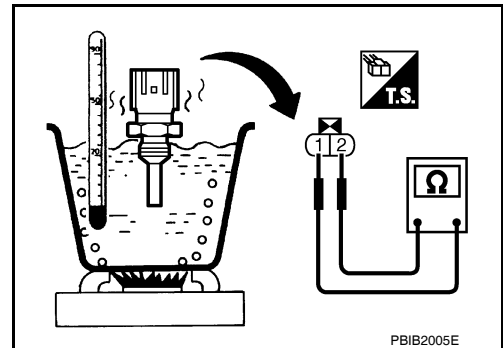
>> INSPECTION END

Component Inspection

INFOID:000000006580458

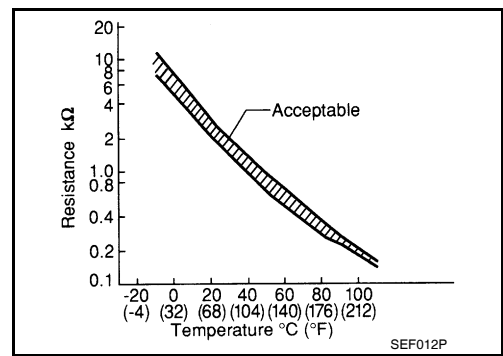
ENGINE COOLANT TEMPERATURE SENSOR

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



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

2. If NG, replace engine coolant temperature sensor. Refer to [CO-24](#).



DTC P0122, P0123 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

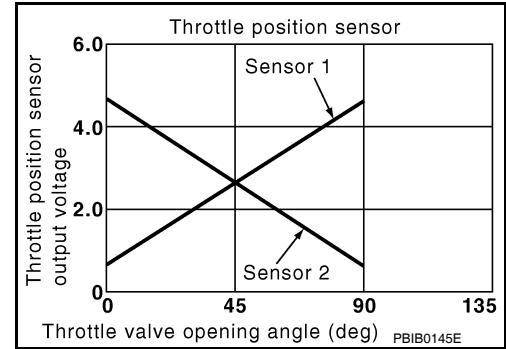
DTC P0122, P0123 TP SENSOR

Component Description

INFOID:000000006580460

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580461

Specification data are reference values.

Monitor item	Condition	Specification
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) • Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully released	More than 0.36 V
	Accelerator pedal: Fully depressed	Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:000000006580462

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P0122 or P0123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-969](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	• Harness or connectors (TP sensor 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 2)
P0123 0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

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

Engine operation condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006580463

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-762, "Diagnosis Procedure"](#).

DTC P0122, P0123 TP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

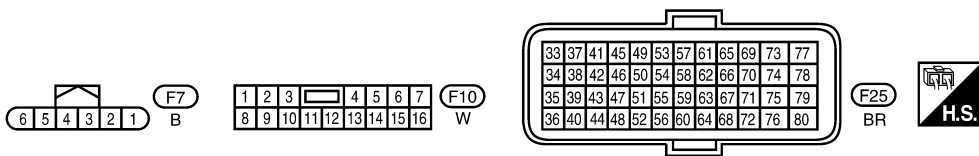
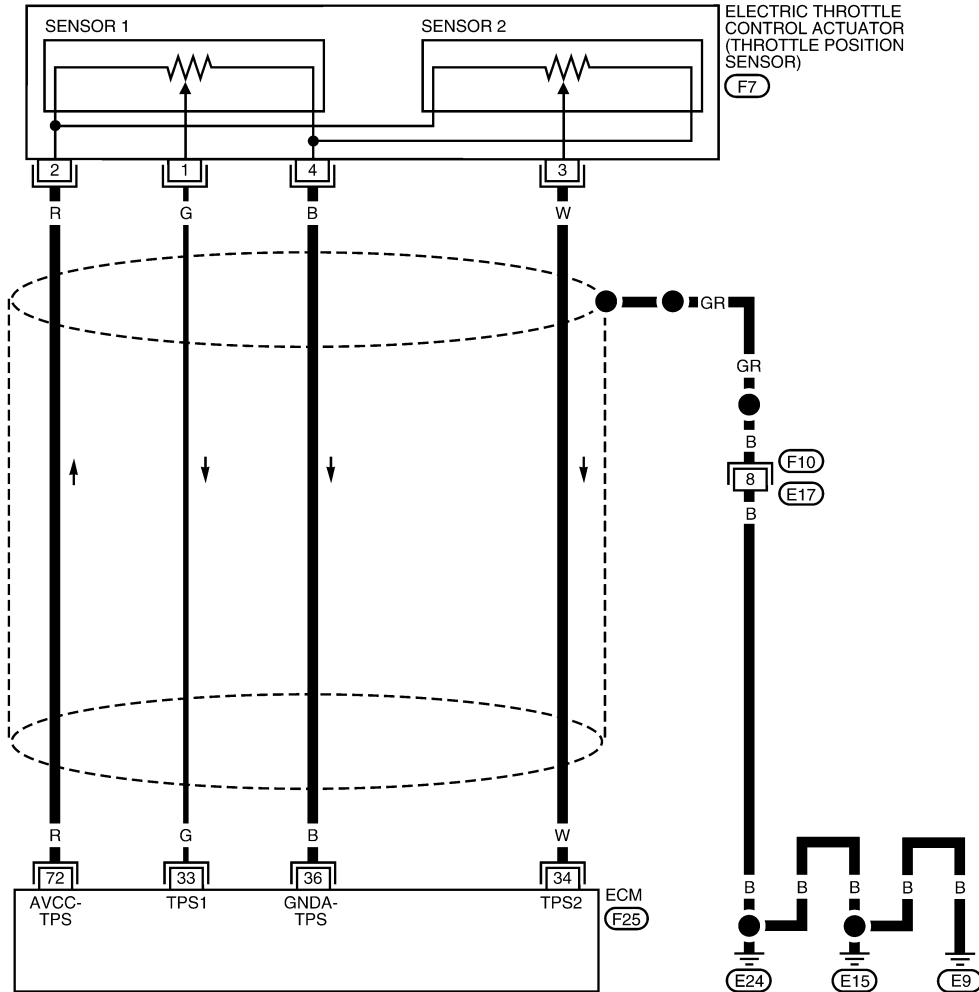
< SERVICE INFORMATION >

INFOID:000000006580464

Wiring Diagram

EC-TPS2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0184GB

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

CAUTION:

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

DTC P0122, P0123 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COL-OR	ITEM	CONDITION	DATA (DC Voltage)
33	G	Throttle position sensor 1	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34	W	Throttle position sensor 2	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
36	B	Sensor ground (Throttle position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
72	R	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

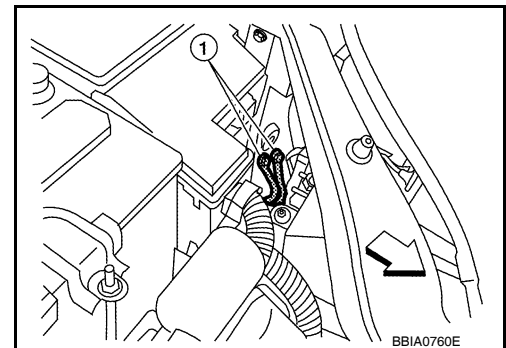
INFOID:000000006580465

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-706. "Ground Inspection"](#).
- ↶ : Vehicle front
 - Body ground (1)

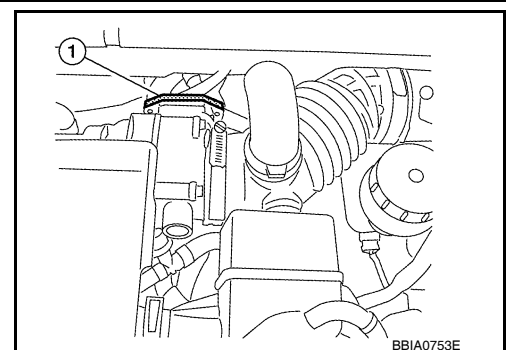
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

- Disconnect electric throttle control actuator (1) harness connector.
- Turn ignition switch ON.



DTC P0122, P0123 TP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

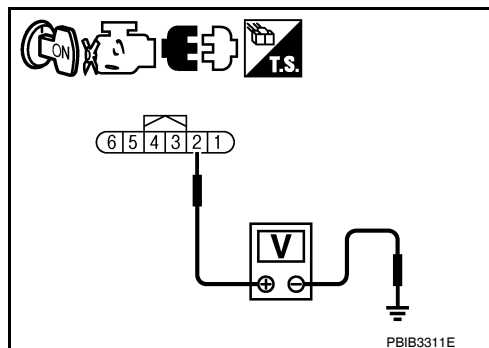
< SERVICE INFORMATION >

3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



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

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 4 and ECM terminal 36. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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

1. Check harness continuity between ECM terminal 34 and electric throttle control actuator terminal 3. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-763. "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18](#).

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> INSPECTION END

Component Inspection

INFOID:000000006580466

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform [EC-648. "Throttle Valve Closed Position Learning"](#).
3. Turn ignition switch ON.

DTC P0122, P0123 TP SENSOR

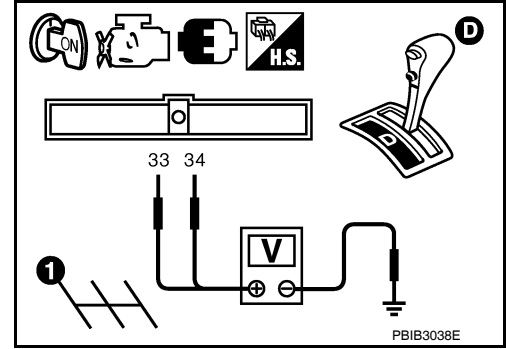
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Set shift lever to D position (CVT) or 1st position (M/T).
- Check voltage between ECM terminals 33 (TP sensor 1 signal), 34 (TP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
33 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
34 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V

- If NG, replace electric throttle control actuator and go to the next step. Refer to [EM-18](#).



DTC P0125 ECT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

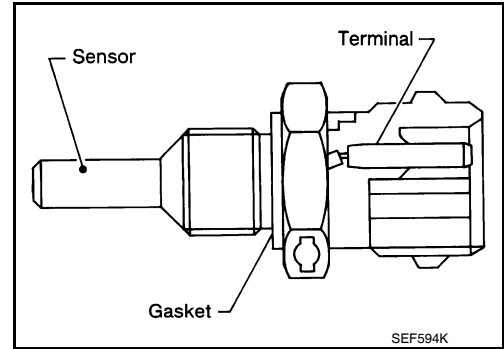
< SERVICE INFORMATION >

DTC P0125 ECT SENSOR

Component Description

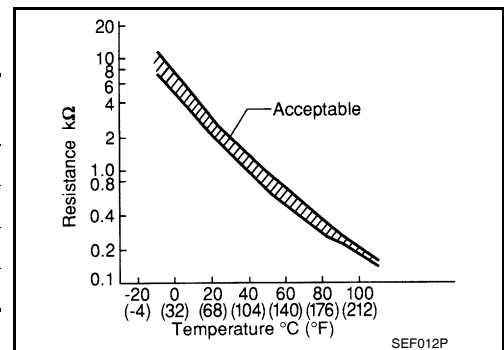
INFOID:000000006580468

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)]	Voltage* (V)	Resistance (kΩ)
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260



*: This data is reference value and is measured between ECM terminal 38 (Engine coolant temperature sensor) and ground.

CAUTION:

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

On Board Diagnosis Logic

INFOID:000000006580469

NOTE:

- If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-755](#).
- If DTC P0125 is displayed with P0116, first perform the trouble diagnosis for DTC P0116. Refer to [EC-752](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0125 0125	Insufficient engine coolant temperature for closed loop fuel control	<ul style="list-style-type: none"> • Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. • Engine coolant temperature is insufficient for closed loop fuel control. 	<ul style="list-style-type: none"> • Harness or connectors (High resistance in the circuit) • Engine coolant temperature sensor • Thermostat

DTC Confirmation Procedure

INFOID:000000006580470

CAUTION:

Be careful not to overheat engine.

NOTE:

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

Ⓟ WITH CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Check that "COOLAN TEMP/S" is above -°C (25°F).
If it is above -°C (25°F), the test result will be OK.

DTC P0125 ECT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

If it is below $-^{\circ}\text{C}$ (25 $^{\circ}\text{F}$), go to following step.

4. Start engine and run it for 65 minutes at idle speed.
If "COOLAN TEMP/S" increases to more than $-^{\circ}\text{C}$ (25 $^{\circ}\text{F}$) within 65 minutes, stop engine because the test result will be OK.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-766. "Diagnosis Procedure"](#).


WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

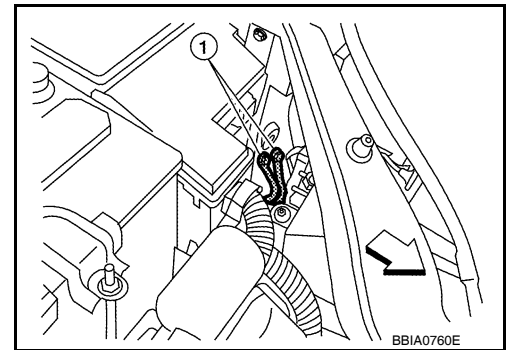
INFOID:000000006580471

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-706. "Ground Inspection"](#).
-  : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-766. "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace engine coolant temperature sensor. Refer to [CO-24](#).

3. CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70 $^{\circ}\text{C}$ (158 $^{\circ}\text{F}$)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace thermostat. Refer to [CO-22](#).

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

Refer to [EC-757. "Wiring Diagram"](#).

>> INSPECTION END

Component Inspection

INFOID:000000006580472

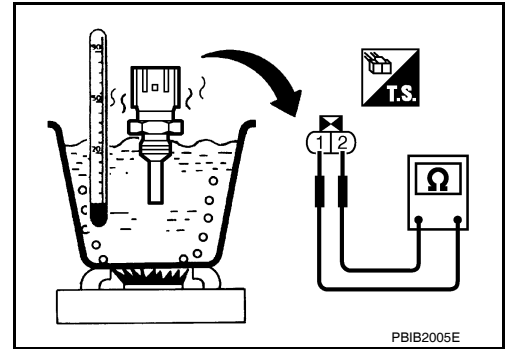
ENGINE COOLANT TEMPERATURE SENSOR

DTC P0125 ECT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

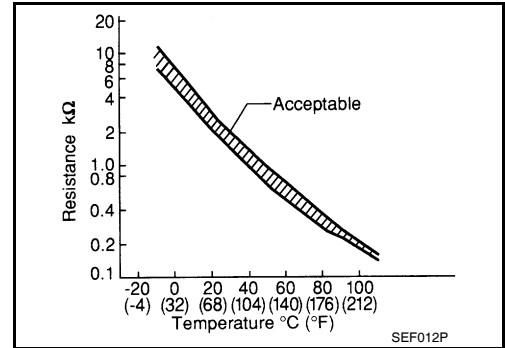
< SERVICE INFORMATION >

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



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

2. If NG, replace engine coolant temperature sensor. Refer to [CO-24](#).



DTC P0127 IAT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

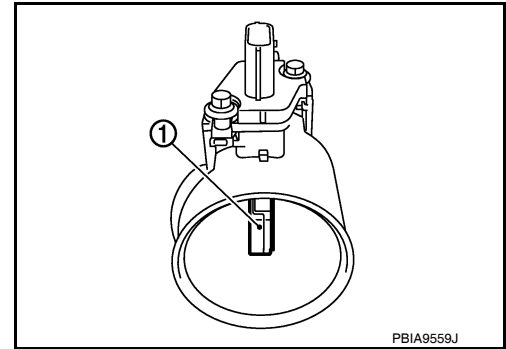
DTC P0127 IAT SENSOR

Component Description

INFOID:000000006580474

The intake air temperature sensor is built into mass air flow sensor (1). 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.



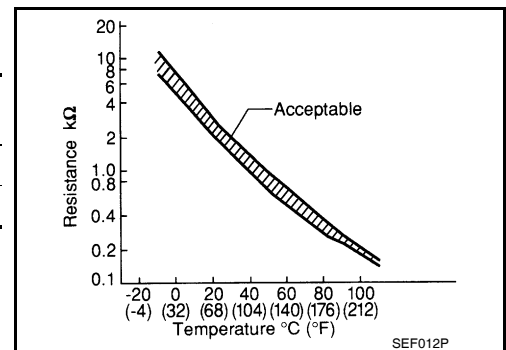
<Reference data>

Intake air temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: This data is reference value and is measured between ECM terminal 46 (Intake air temperature sensor) and ground.

CAUTION:

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



On Board Diagnosis Logic

INFOID:000000006580475

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0127 0127	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 style="list-style-type: none">• Harness or connectors (Intake temperature sensor circuit is open or shorted)• Intake air temperature sensor

DTC Confirmation Procedure

INFOID:000000006580476

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

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

Ⓟ WITH CONSULT-III

1. Wait until engine coolant temperature is less than 96°C (205°F)
 - a. Turn ignition switch ON.
 - b. Select "DATA MONITOR" mode with CONSULT-III.
 - c. Check the engine coolant temperature.
 - d. If the engine coolant temperature is not less than 96°C (205°F), turn ignition switch OFF and cool down engine.
 - Perform the following steps before engine coolant temperature is above 96°C (205°F).

DTC P0127 IAT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Turn ignition switch ON.
3. Select "DATA MONITOR" mode with CONSULT-III.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-769. "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "With CONSULT-III" above.

Diagnosis Procedure

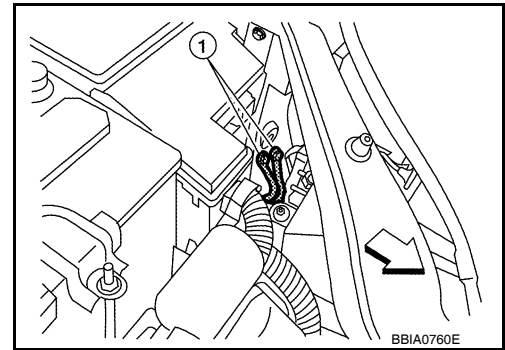
INFOID:000000006580477

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-706. "Ground Inspection"](#).
- ⇐ : Vehicle front
 - ○ : Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-769. "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-16](#).

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

Refer to [EC-749. "Wiring Diagram"](#).

>> **INSPECTION END**

Component Inspection

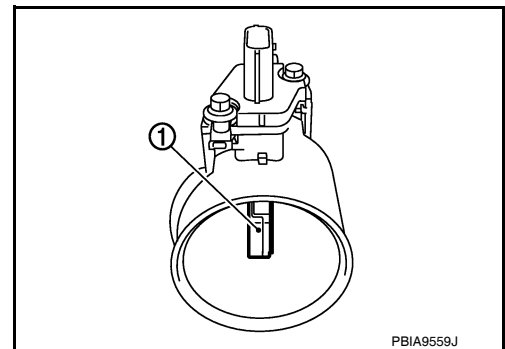
INFOID:000000006580478

INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between intake air temperature sensor (1) terminals 5 and 6 under the following conditions.

Intake air temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200

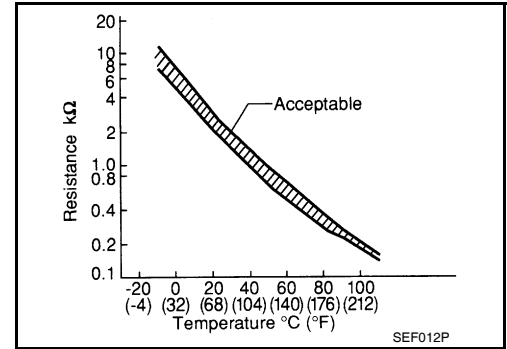
2. If NG, replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-16](#).



DTC P0127 IAT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >



DTC P0128 THERMOSTAT FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0128 THERMOSTAT FUNCTION

On Board Diagnosis Logic

INFOID:000000006580480

NOTE:

If DTC P0128 is displayed with DTC P0300, P0301, P0302, P0303 or P0304, first perform the trouble diagnosis for DTC P0300, P0301, P0302, P0303, P0304. Refer to [EC-852, "DTC Confirmation Procedure"](#).

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 stuck open.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0128 0128	Thermostat function	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	<ul style="list-style-type: none">• Thermostat• Leakage from sealing portion of thermostat• Engine coolant temperature sensor

DTC Confirmation Procedure

INFOID:000000006580481

Ⓜ WITH CONSULT-III

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

TESTING CONDITION:

- For best results, perform at ambient temperature of -10°C (14°F) or higher.
- For best results, perform at engine coolant temperature of -10°C (14°F) to 52°C (126°F).
- Before performing the following procedure, do not fill with the fuel.

1. Turn A/C switch OFF.
2. Turn blower fan switch OFF.
3. Turn ignition switch ON.
4. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-III.
5. Check the indication of "COOLAN TEMP/S".
If it is below 52°C (126°F), go to following step.
If it is above 52°C (126°F), cool down the engine to less than 52°C (126°F). Then go to next steps.
6. Start engine.
7. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	More than 56 km/h (35 MPH)
---------------	----------------------------

If "COOLAN TEMP/S" increases to more than 71°C (160°F) within 10 minutes, turn ignition switch OFF because the test result will be OK.

8. Check 1st trip DTC.
9. If 1st trip DTC is detected, go to [EC-771, "Diagnosis Procedure"](#).

Ⓜ WITH GST

Follow the procedure "With CONSULT-III" above.

Diagnosis Procedure

INFOID:000000006580482

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-759, "Component Inspection"](#).

OK or NG

- OK >> GO TO 2.
- NG >> Replace engine coolant temperature sensor. Refer to [EM-16](#).

2. CHECK THERMOSTAT

DTC P0128 THERMOSTAT FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Refer to [CO-22. "Removal and Installation"](#).

OK or NG

OK >> **INSPECTION END**

NG >> Replace thermostat. Refer to [CO-22](#).

DTC P0130 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

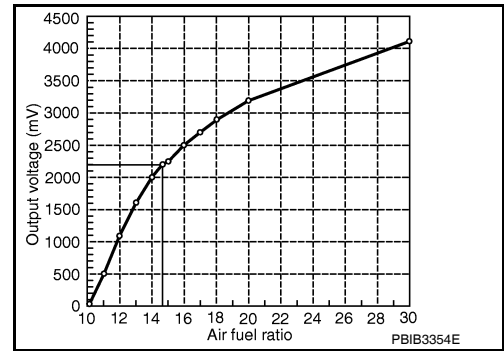
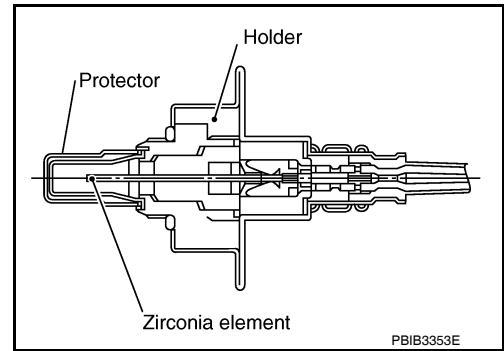
< SERVICE INFORMATION >

DTC P0130 A/F SENSOR 1

Component Description

INFOID:000000006580484

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 λ 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 about 800°C (1,472°F).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580485

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1)	<ul style="list-style-type: none"> Engine: After warming up Maintaining engine speed at 2,000 rpm 	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006580486

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal fluctuates according to fuel feedback control.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0130 0130	Air fuel ratio (A/F) sensor 1 circuit	A) The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in the range other than approx. 2.2 V.	<ul style="list-style-type: none"> Harness or connectors [Air fuel ratio (A/F) sensor 1 circuit is open or shorted.] Air fuel ratio (A/F) sensor 1
		B) The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.	

DTC Confirmation Procedure

INFOID:000000006580487

Perform PROCEDURE FOR MALFUNCTION A first.

If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.

NOTE:

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

TESTING CONDITION:

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

PROCEDURE FOR MALFUNCTION A

WITH CONSULT-III

DTC P0130 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Start engine and warm it up to normal operating temperature.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Let engine idle for 2 minutes.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-776, "Diagnosis Procedure"](#).

 With GST

Follow the procedure "With CONSULT-III" above.

PROCEDURE FOR MALFUNCTION B

CAUTION:

Always drive vehicle at a safe speed.

 WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
3. Check "A/F SEN1 (B1)" indication.
If the indication is constantly approx. 2.2 V and does not fluctuates, go to [EC-776, "Diagnosis Procedure"](#).
If the indication fluctuates around 2.2 V, go to next step.
4. Select "A/F SEN1 (B1) P1276" (for P0130) of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. Touch "START".
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-III screen.

ENG SPEED	1,000 - 3,200 rpm
VHCL SPEED SE	More than 64 km/h (40 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Shift lever	D position (CVT) 5th position (M/T)

If "TESTING" is not displayed after 20 seconds, retry from step 2.

7. Release accelerator pedal fully.

NOTE:

Never apply brake during releasing the accelerator pedal.

8. Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", retry from step 6.
9. Make sure that "OK" is displayed after touching "ON-BOARD DIAGNOSIS".
If "NG" is displayed, go to [EC-776, "Diagnosis Procedure"](#).

Overall Function Check

INFOID:000000006580488

PROCEDURE MALFUNCTION B

Use this procedure to check the overall function of the A/F sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

 WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in the suitable gear position.
3. Set shift lever to D position (CVT) or 5th position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (31 MPH).
NOTE:
Never apply brake during releasing the accelerator pedal.
4. Repeat steps 2 and 3 for five times.
5. Stop the vehicle and turn ignition switch OFF.
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 and 3 for five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no 1st trip DTC is displayed.
If 1st trip DTC is displayed, go to [EC-776, "Diagnosis Procedure"](#).

DTC P0130 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

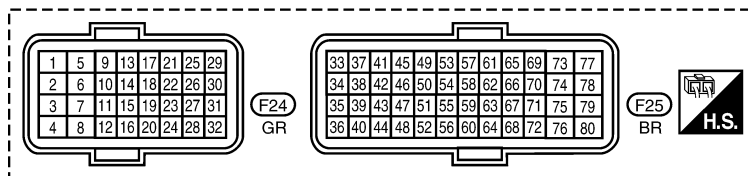
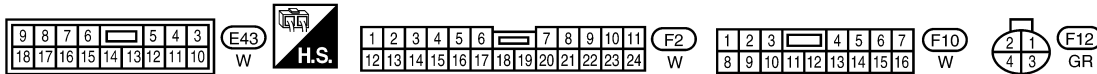
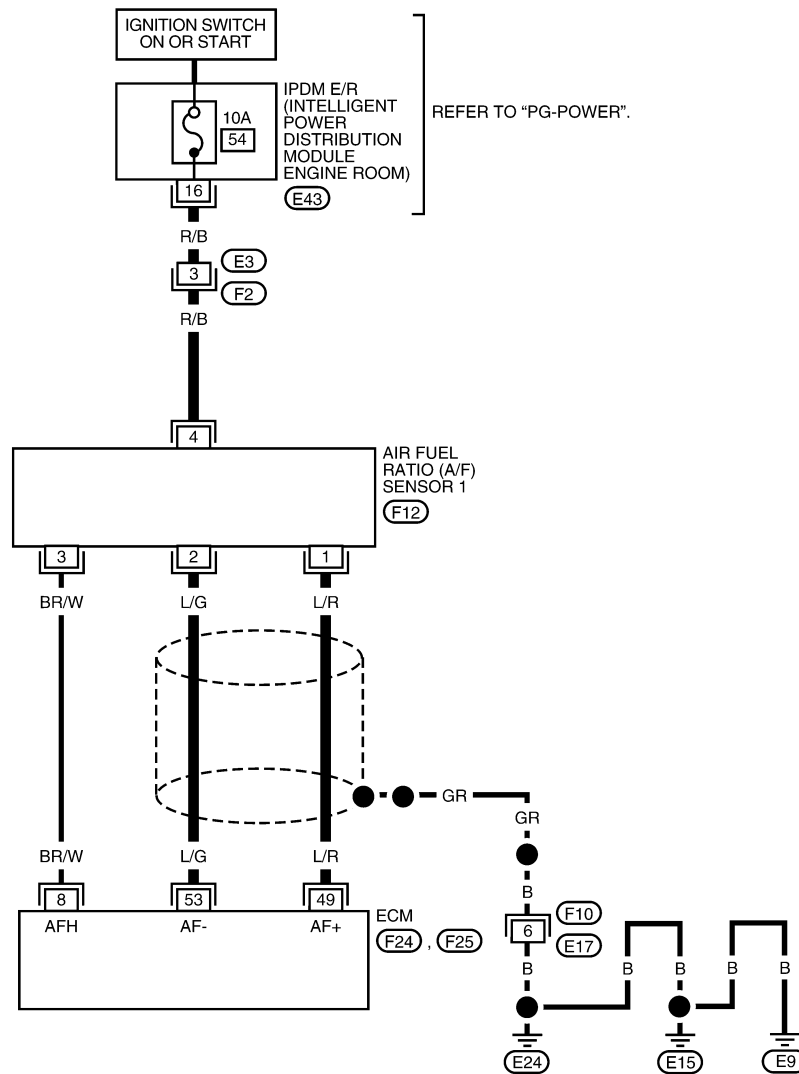
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006580489

EC-A/F-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0160GB

Specification data are reference values and are measured between each terminal and ground.
 Pulse signal is measured by CONSULT-III.

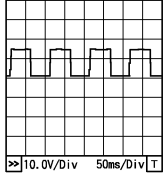
CAUTION:

DTC P0130 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TERMI- NAL NO.	WIRE COL- OR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed (More than 140 seconds after starting engine) 	Approximately 2.9 - 8.8 V★ 
49	L/R	A/F sensor 1	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

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

Diagnosis Procedure

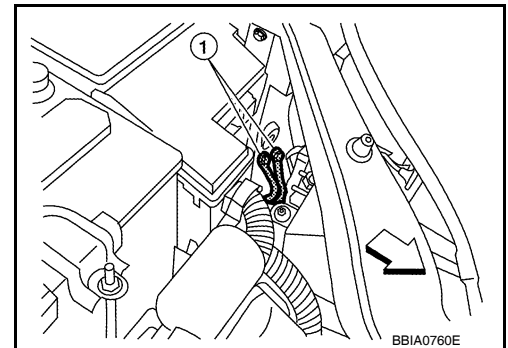
INFOID:000000006580490

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-706. "Ground Inspection"](#).
- ⇐: Vehicle front
 - Body ground (1)

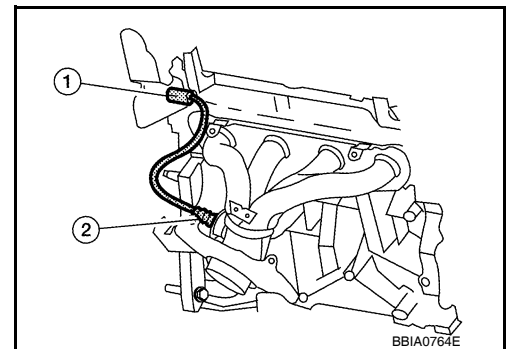
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



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

1. Disconnect A/F sensor 1 harness connector (1).
2. Turn ignition switch ON.



DTC P0130 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

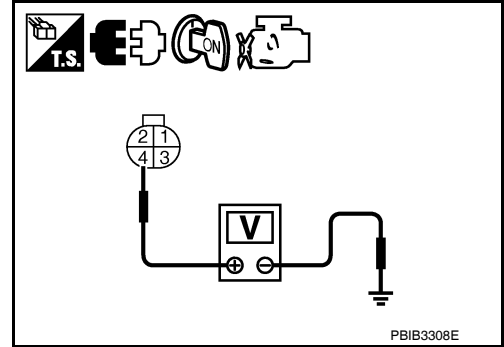
< SERVICE INFORMATION >

3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-701](#).

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

DTC P0131 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

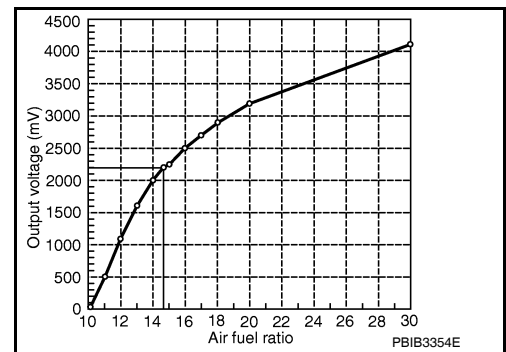
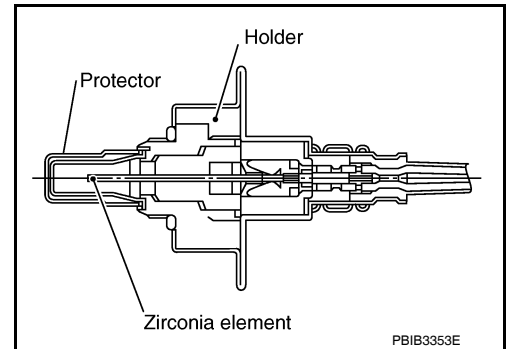
< SERVICE INFORMATION >

DTC P0131 A/F SENSOR 1

Component Description

INFOID:000000006580492

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 λ 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 about 800°C (1,472°F).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580493

Specification data are reference values.

Monitor item	Condition		Specification
A/F SEN1 (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006580494

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately low.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0131 0131	Air fuel ratio (A/F) sensor 1 circuit low voltage	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 0 V.	<ul style="list-style-type: none"> • Harness or connectors [Air fuel ratio (A/F) sensor circuit is open or shorted.] • Air fuel ratio (A/F) sensor 1

DTC Confirmation Procedure

INFOID:000000006580495

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
3. Check "A/F SEN1 (B1)" indication.
If the indication is constantly approx. 0 V, go to [EC-781. "Diagnosis Procedure"](#).

DTC P0131 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

If the indication is not constantly approx. 0 V, go to next step.

4. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
5. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.
6. Maintain the following conditions for about 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
Shift lever	Suitable position

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 4, return to step 4.

7. Check 1st trip DTC.
8. If 1st trip DTC is displayed, go to [EC-781. "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "WITH CONSULT-III" above.

A

EC

C

D

E

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DTC P0131 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

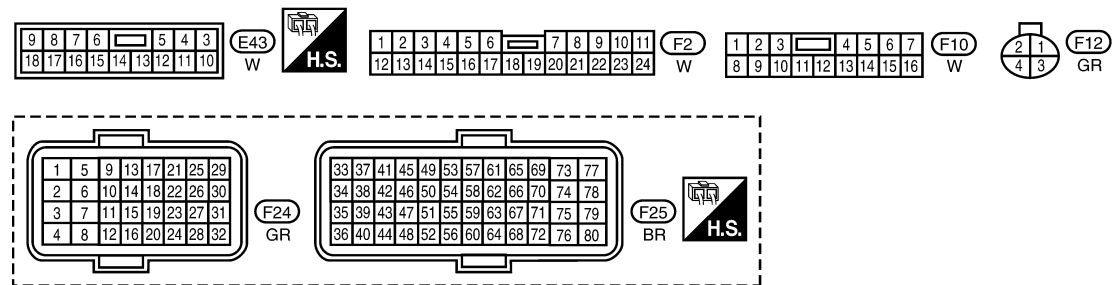
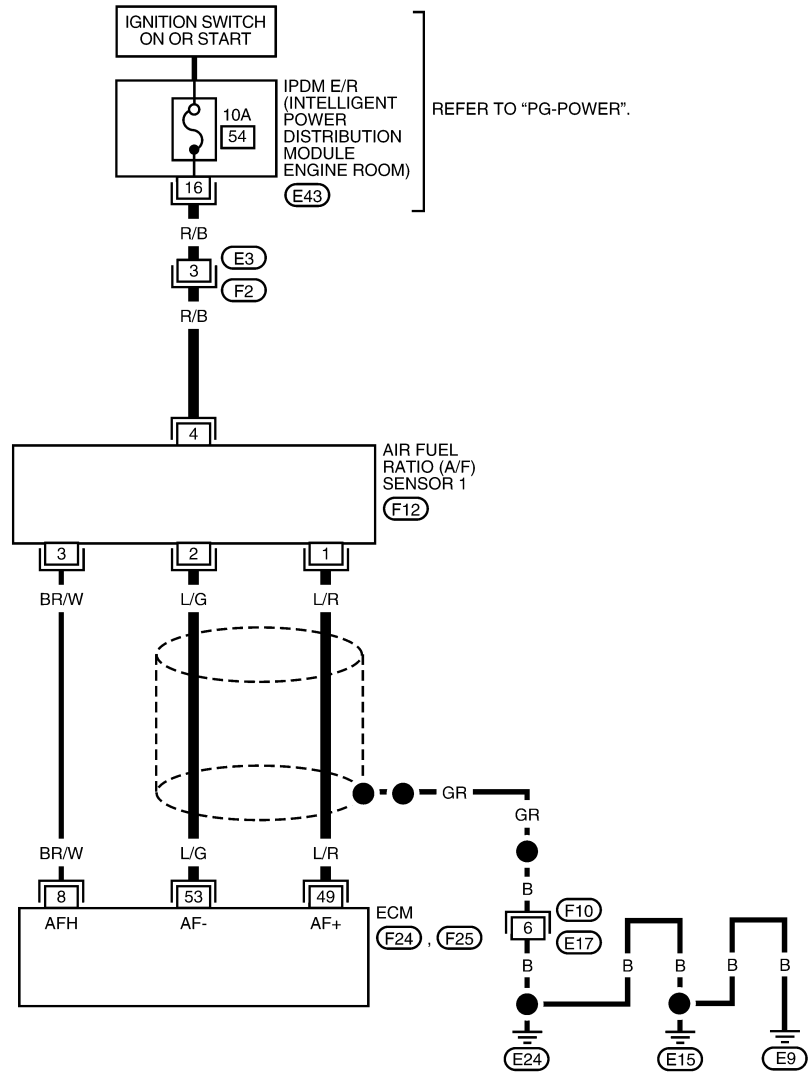
< SERVICE INFORMATION >

INFOID:000000006580496

Wiring Diagram

EC-A/F-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0160GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

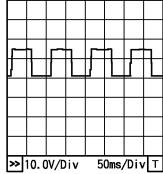
CAUTION:

DTC P0131 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TERMI- NAL NO.	WIRE COL- OR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBI/A8148J
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

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

Diagnosis Procedure

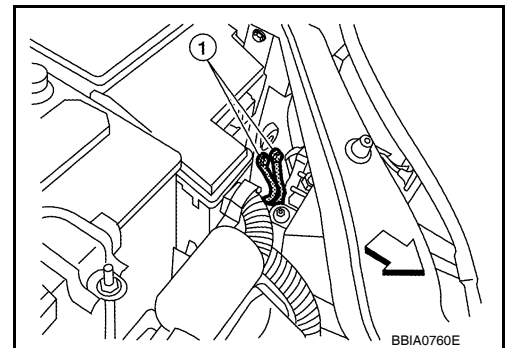
INFOID:000000006580497

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

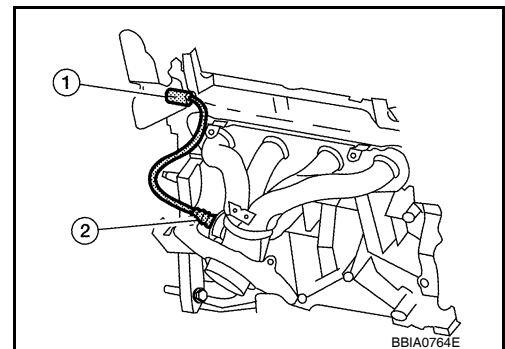
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



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

- Disconnect A/F sensor 1 harness connector (1).
- Turn ignition switch ON.



DTC P0131 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

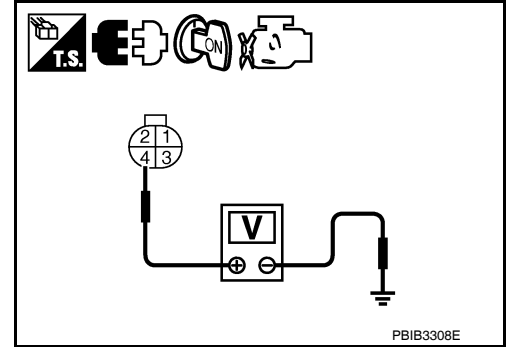
< SERVICE INFORMATION >

3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-701](#).

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

DTC P0132 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

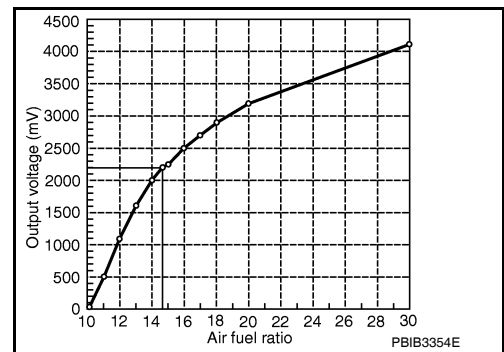
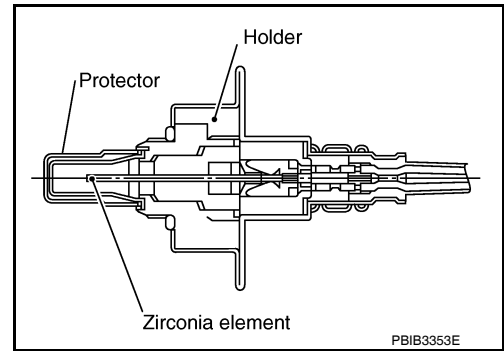
< SERVICE INFORMATION >

DTC P0132 A/F SENSOR 1

Component Description

INFOID:000000006580499

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 λ 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 about 800°C (1,472°F).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580500

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1)	<ul style="list-style-type: none"> Engine: After warming up Maintaining engine speed at 2,000 rpm 	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006580501

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately high.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0132 0132	Air fuel ratio (A/F) sensor 1 circuit high voltage	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 5 V.	<ul style="list-style-type: none"> Harness or connectors [Air fuel ratio (A/F) sensor circuit is open or shorted.] Air fuel ratio (A/F) sensor 1

DTC Confirmation Procedure

INFOID:000000006580502

NOTE:

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

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

WITH CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-III.
- Check "A/F SEN1 (B1)" indication.
If the indication is constantly approx. 5 V, go to [EC-786. "Diagnosis Procedure"](#).

DTC P0132 A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

If the indication is not constantly approx. 5 V, go to next step.

4. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
5. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.
6. Maintain the following conditions for about 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
Shift lever	Suitable position

NOTE:

- Keep the accelerator pedal as steady as possible during the cruising.
- If this procedure is not completed within 1 minute after restarting engine at step 4, return to step 4.

7. Check 1st trip DTC.
8. If 1st trip DTC is displayed, go to [EC-786. "Diagnosis Procedure"](#).

 WITH GST

Follow the procedure "WITH CONSULT-III" above.

DTC P0132 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

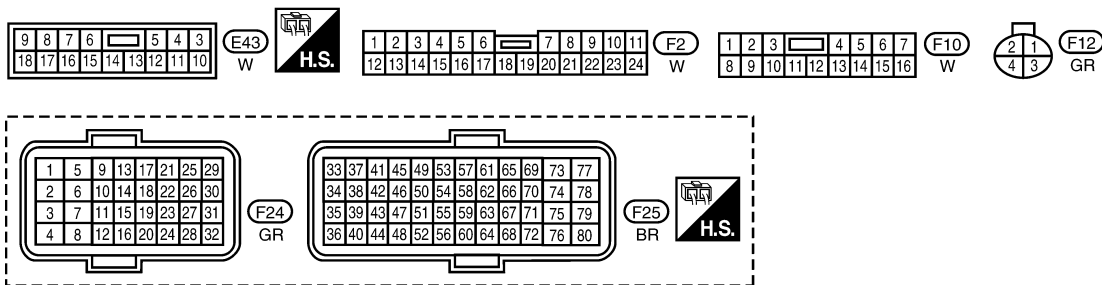
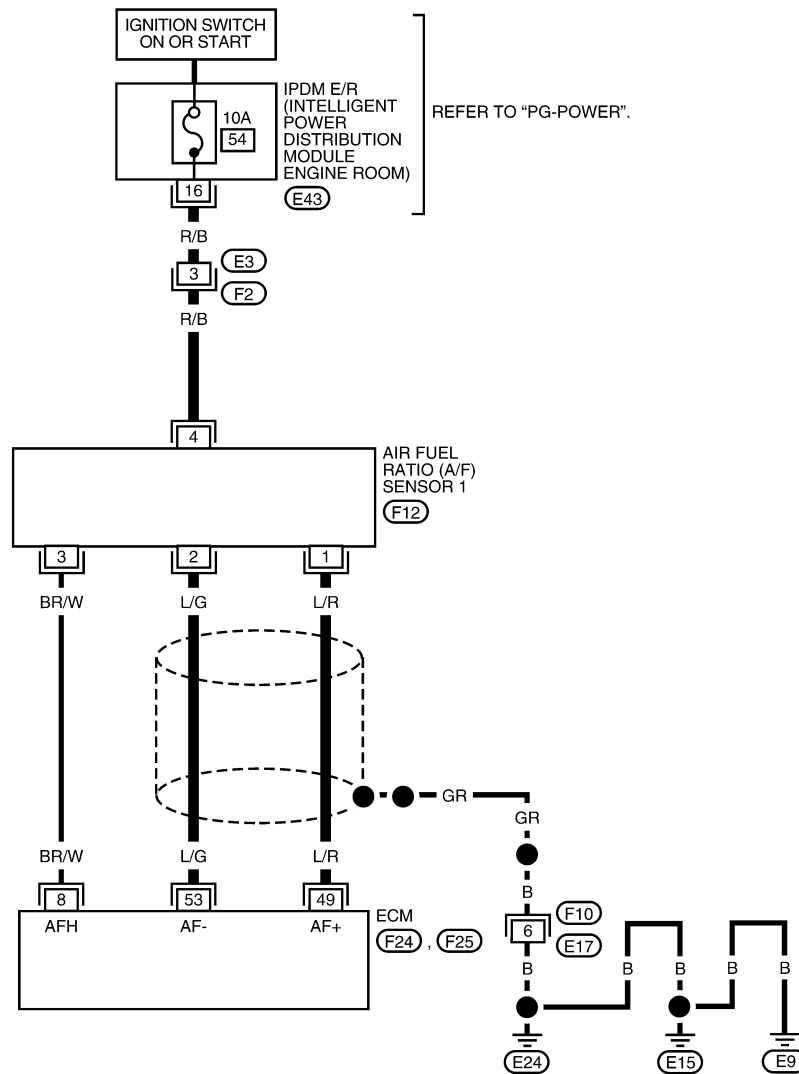
< SERVICE INFORMATION >

INFOID:000000006580503

Wiring Diagram

EC-A/F-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0160GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

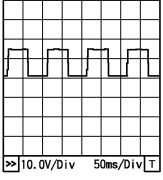
CAUTION:

DTC P0132 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

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

TERMI- NAL NO.	WIRE COL- OR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ 
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

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

Diagnosis Procedure

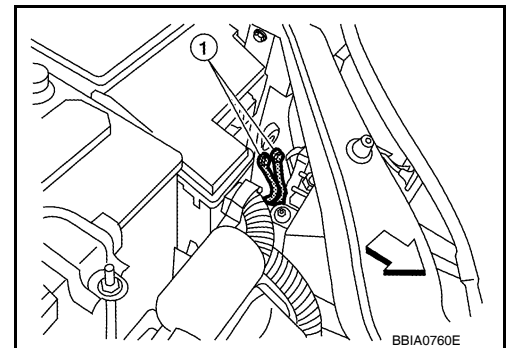
INFOID:000000006580504

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten three ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

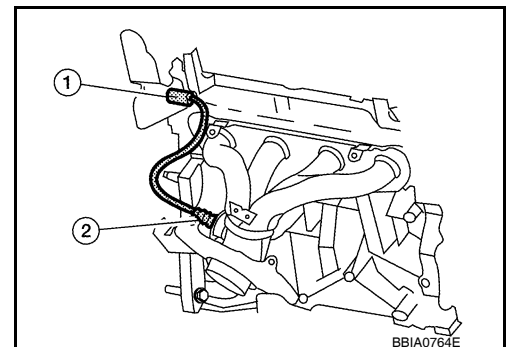
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



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

- Disconnect A/F sensor 1 harness connector (1).
- Turn ignition switch ON.



DTC P0132 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

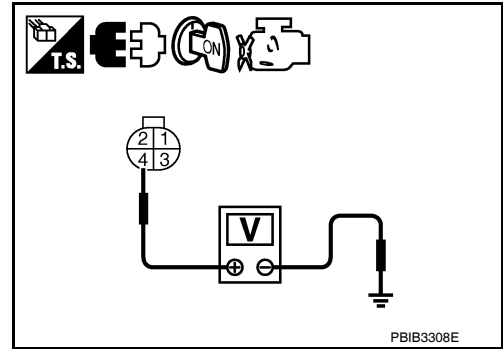
< SERVICE INFORMATION >

3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-701](#).

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

DTC P0137 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

DTC P0137 HO2S2

Component Description

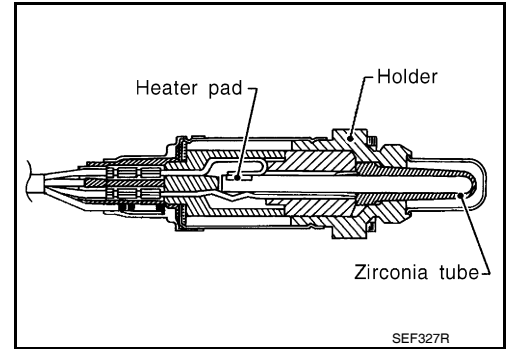
INFOID:000000006580513

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580514

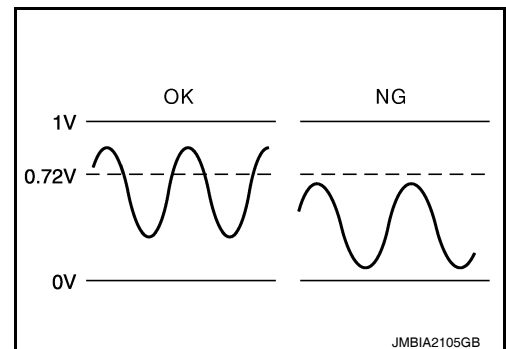
Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 (B1)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 0.3 V ←→ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)		LEAN ←→ RICH

On Board Diagnosis Logic

INFOID:000000006580515

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 before 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 the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0137 0137	Heated oxygen sensor 2 circuit low voltage	The maximum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> • Harness or connectors (Heated oxygen sensor 2 circuit open or shorted.) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks

DTC Confirmation Procedure

INFOID:000000006580516

NOTE:

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

Ⓜ WITH CONSULT-III

TESTING CONDITION:

For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).

DTC P0137 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1147" (for DTC P0137) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
9. Following the instruction of CONSULT-III.
NOTE:
It will take at most 10 minutes until "COMPLETED" is displayed.
10. Make sure that "OK" is displayed after touching "ON-BOARD DIAGNOSIS".
If "NG" is displayed, refer to [EC-791, "Diagnosis Procedure"](#).
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
 - b. Return to step 1.

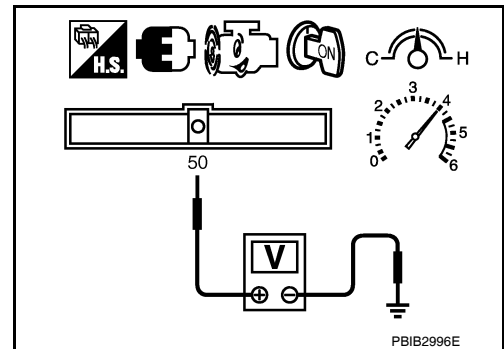
Overall Function Check

INFOID:000000006580517

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

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 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.72 V at least once during this procedure.
If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be above 0.72 V at least once during this procedure.
8. If NG, go to [EC-791, "Diagnosis Procedure"](#).



DTC P0137 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

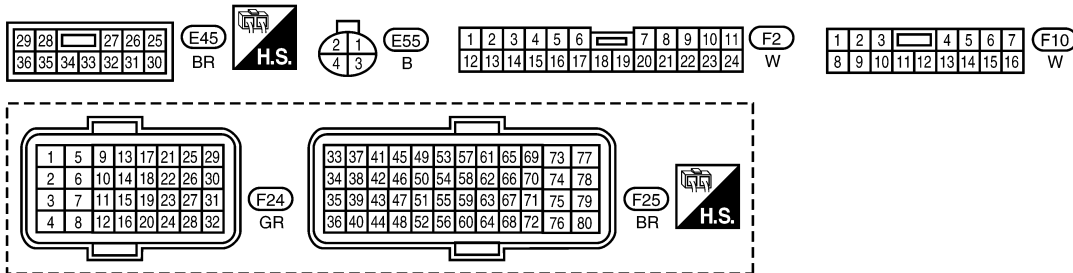
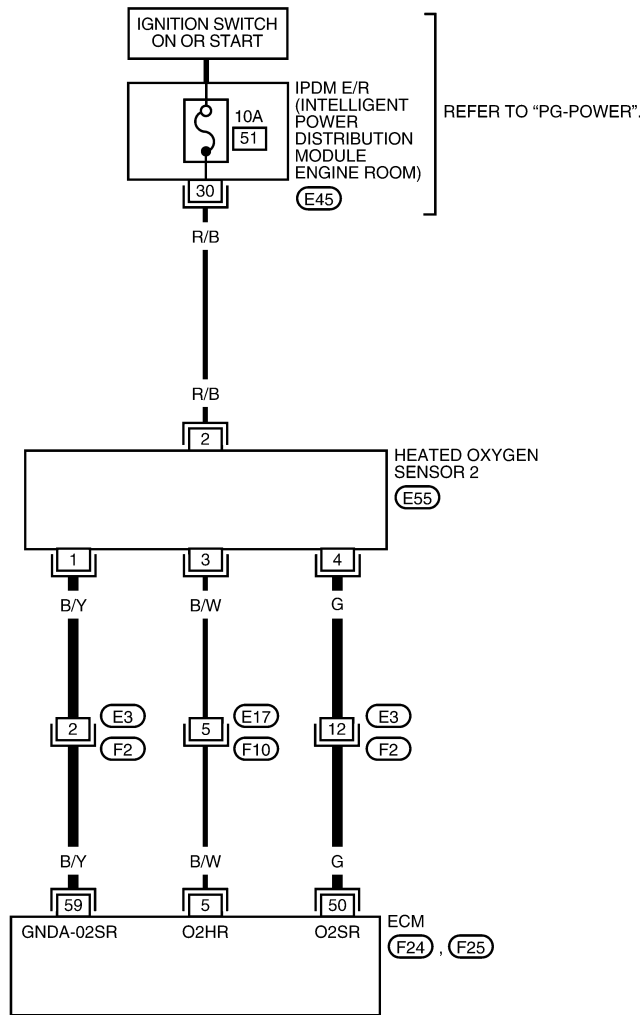
< SERVICE INFORMATION >

INFOID:000000006580518

Wiring Diagram

EC-HO2S2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0236GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

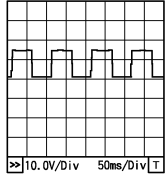
CAUTION:

DTC P0137 HO2S2

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
5	B/W	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★ 
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
50	G	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> Revvng engine from idle to 3,000 rpm quickly after the following conditions are met. <ul style="list-style-type: none"> - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
59	B/Y	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed 	Approximately 0 V

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

Diagnosis Procedure

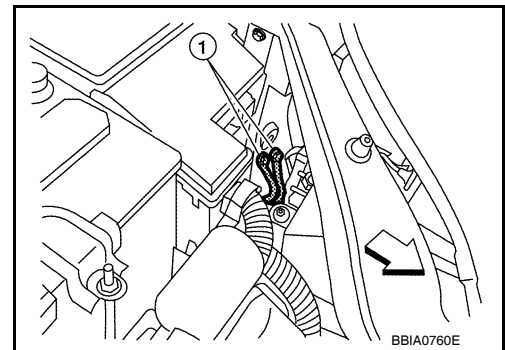
INFOID:000000006580519

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screw on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↶: Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CLEAR THE SELF-LEARNING DATA

☐ With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
- Clear the self-learning control coefficient by touching "CLEAR".
- Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 detected?

Is it difficult to start engine?

☒ Without CONSULT-III

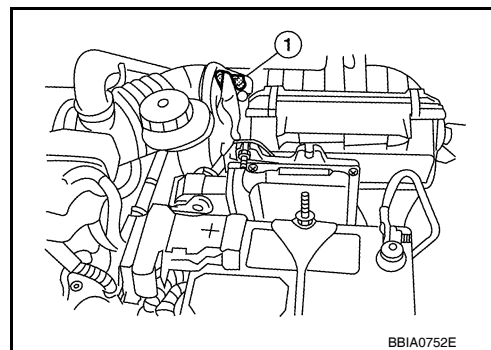
- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF.

DTC P0137 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-59, "Emission-related Diagnostic Information"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 detected?
Is it difficult to start engine?



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171. Refer to [EC-272](#).
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector (2).
 - ↖ : Vehicle front
 - Heated oxygen sensor 2 (1)
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 59 and HO2S2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

5. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and HO2S2 terminal 4. Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground. Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

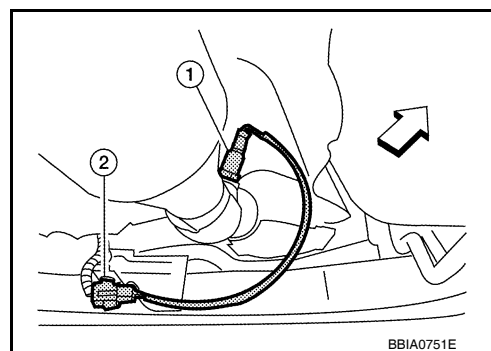
- OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

>> Repair open circuit or short to ground or short between heated oxygen sensor 2 and ECM.



< SERVICE INFORMATION >

7. CHECK HEATED OXYGEN SENSOR 2Refer to [EC-793](#). "Component Inspection".

OK or NG

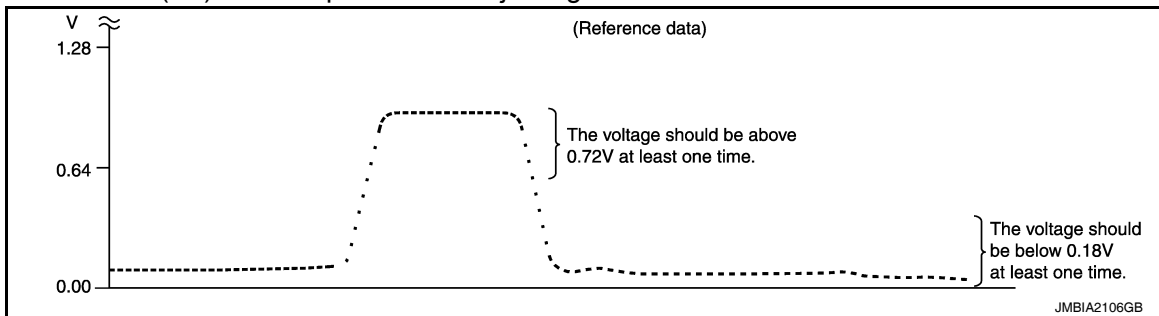
OK >> GO TO 6.

NG >> Replace heated oxygen sensor 2. Refer to [EX-5](#).**8. CHECK INTERMITTENT INCIDENT**Refer to [EC-153](#).>> **INSPECTION END****Component Inspection**

INFOID:000000006580520

HEATED OXYGEN SENSOR 2**Ⓟ WITH CONSULT-III**

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. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-III.
6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.72 V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

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

Ⓧ WITHOUT CONSULT-III

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. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.

DTC P0137 HO2S2

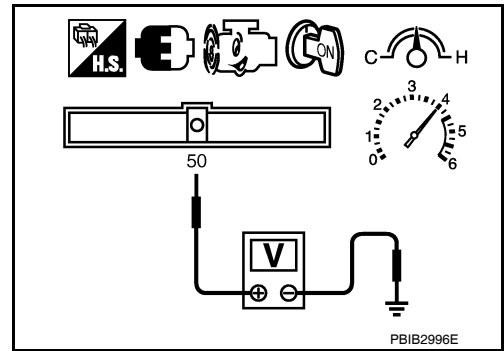
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
If the voltage can be confirmed at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be above 0.72 V and below 0.18 V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2. Refer to [EX-5](#).

CAUTION:

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



DTC P0138 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

DTC P0138 HO2S2

Component Description

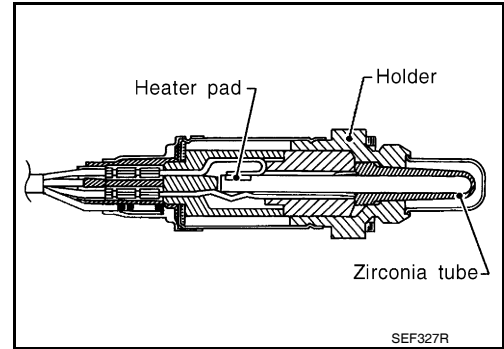
INFOID:000000006580522

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580524

Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 (B1)	<ul style="list-style-type: none"> Revsing engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 0.3 V ←→ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)		LEAN ←→ RICH

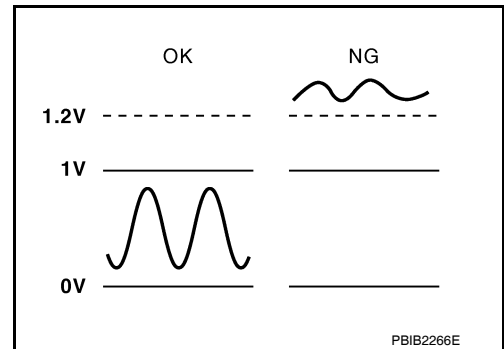
On Board Diagnosis Logic

INFOID:000000006580524

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 before the three way catalyst (manifold) causes the longer switching time.

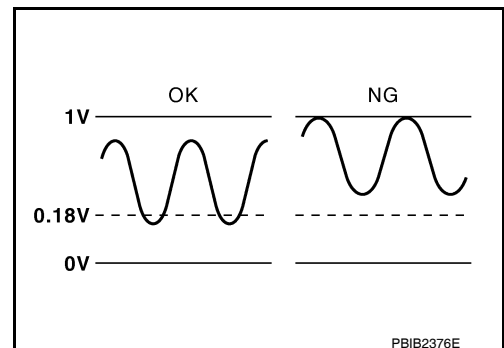
MALFUNCTION A

To judge the malfunctions of rear heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition 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 the various driving condition such as fuel-cut.



DTC P0138 HO2S2

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0138 0138	Heated oxygen sensor 2 circuit high voltage	A)	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">• Harness or connectors (Heated oxygen sensor 2 circuit is open or shorted.)• Heated oxygen sensor 2
		B)	The minimum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none">• Harness or connectors (Heated oxygen sensor circuit is open or shorted.)• Heated oxygen sensor 2• Fuel pressure• Fuel injector

DTC Confirmation Procedure

INFOID:000000006580525

Perform PROCEDURE FOR MALFUNCTION A first.

If DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.

NOTE:

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

PROCEDURE FOR MALFUNCTION A

④ WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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 2 minutes.
6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-799. "Diagnosis Procedure"](#).

④ WITH GST

Follow the procedure "With CONSULT-III" above.

PROCEDURE FOR MALFUNCTION B

④ WITH CONSULT-III

TESTING CONDITION:

For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III
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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1146" (for DTC P0138) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
9. Following the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

10. Make sure that "OK" is displayed after touching "ON-BOARD DIAGNOSIS".

If "NG" is displayed, refer to [EC-799. "Diagnosis Procedure"](#).

If "CAN NOT BE DIAGNOSED" is displayed, perform the following.

- a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
- b. Return to step 1.

DTC P0138 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

INFOID:000000006580526

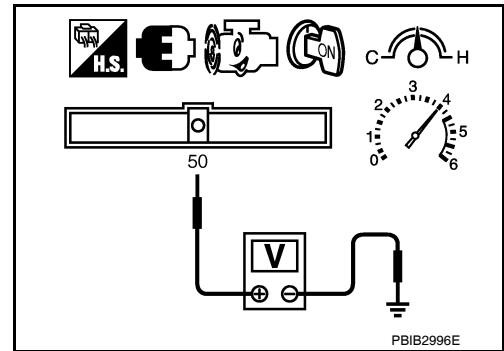
Overall Function Check

PROCEDURE FOR MALFUNCTION B

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

Ⓢ WITH GST

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 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 0.18 V at least once during this procedure.
If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be below 0.18 V at least once during this procedure.
8. If NG, go to [EC-799, "Diagnosis Procedure"](#).



DTC P0138 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

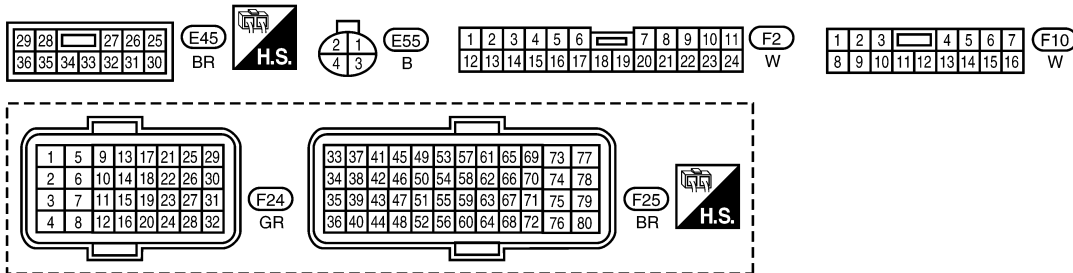
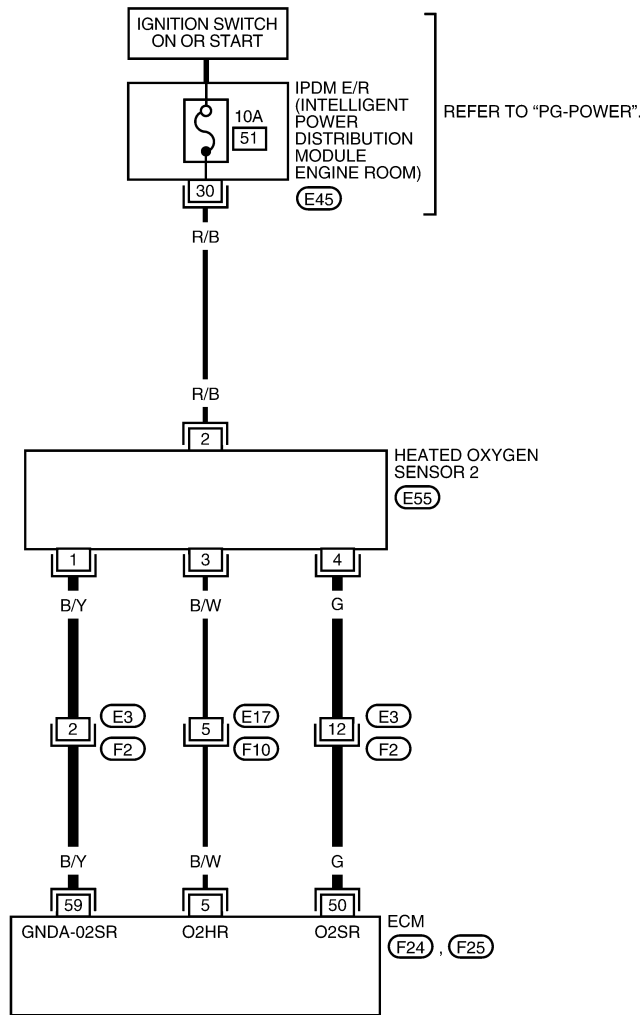
< SERVICE INFORMATION >

INFOID:000000006580527

Wiring Diagram

EC-HO2S2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0236GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

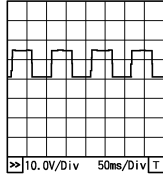
CAUTION:

DTC P0138 HO2S2

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
5	B/W	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★ 
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
50	G	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> Revsing engine from idle to 3,000 rpm quickly after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
59	B/Y	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed 	Approximately 0 V

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

Diagnosis Procedure

INFOID:000000006580528

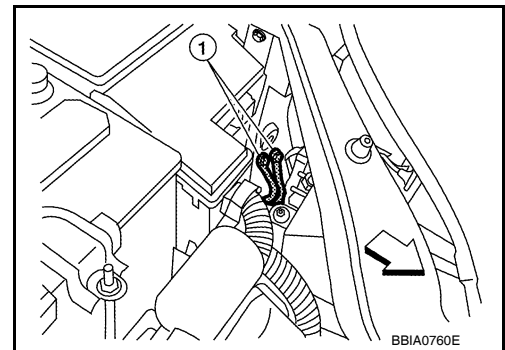
PROCEDURE FOR MALFUNCTION A

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten engine screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



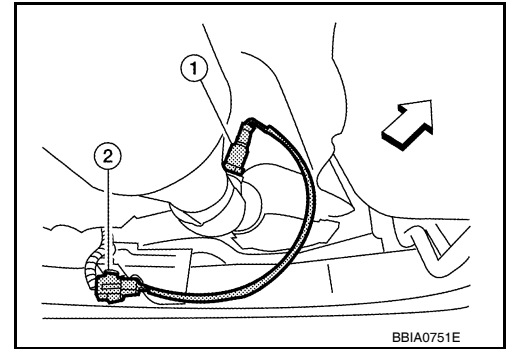
2. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

DTC P0138 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect heated oxygen sensor 2 harness connector (2).
 - ⇐ : Vehicle front
 - Heated oxygen sensor 2 (1)
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 59 and HO2S2 terminal 1. Refer to Wiring Diagram.



Continuity should exist.

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

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and HO2S2 terminal 4. Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground. Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

6. CHECK HO2S2 CONNECTOR FOR WATER

Check connectors for water.

Water should not exist.

OK or NG

- OK >> GO TO 7.
- NG >> Repair or replace harness or connectors.

7. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-802, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace heated oxygen sensor 2. Refer to [EX-5](#).

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

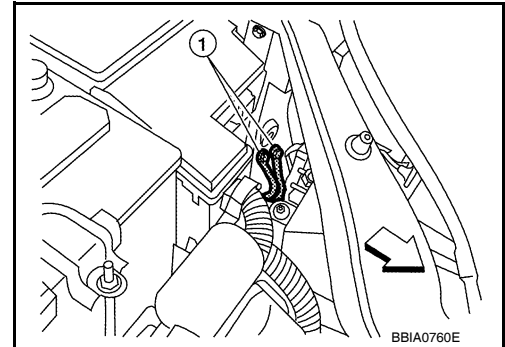
PROCEDURE FOR MALFUNCTION B

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ⇐ : Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.



2. CLEAR THE SELF-LEARNING DATA

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.

**Is the 1st trip DTC P0172 detected?
Is it difficult to start engine?**

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-609, "Emission-related Diagnostic Information"](#).
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

**Is the 1st trip DTC P0172 detected?
Is it difficult to start engine?**

Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-826](#).
No >> GO TO 3.

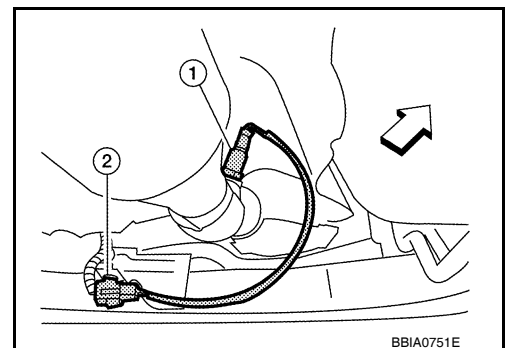
3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector (2).
- ⇐ : Vehicle front
- Heated oxygen sensor 2 (1)
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 59 and HO2S2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG



DTC P0138 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- OK >> GO TO 5.
- NG >> GO TO 4.

4.CHECK MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

5.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and HO2S2 terminal 4.
Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground.
Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6.CHECK MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

7.CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-802, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace heated oxygen sensor 2. Refer to [EX-5](#).

8.CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580529

HEATED OXYGEN SENSOR 2

ⓘ WITH CONSULT-III

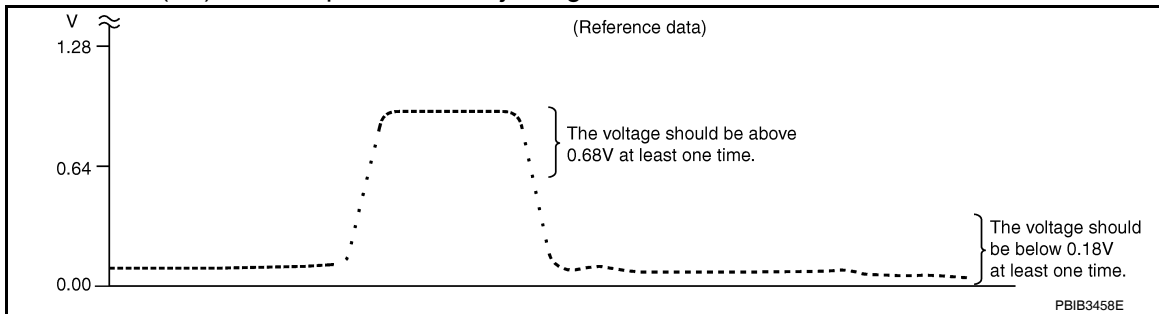
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-III.

DTC P0138 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



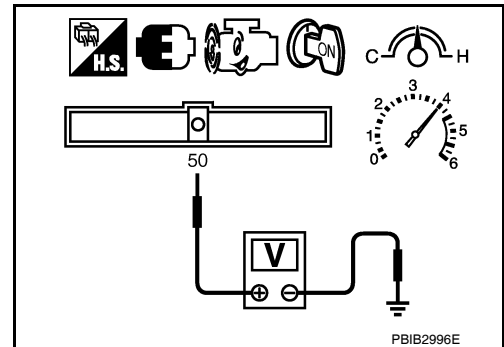
"HO2S2 (B1)" should be above 0.68 V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

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

⊗ WITHOUT CONSULT-III

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. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
If the voltage can be confirmed at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2. Refer to [EX-5](#).



CAUTION:

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

DTC P0139 HO2S2

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0139 HO2S2

Component Description

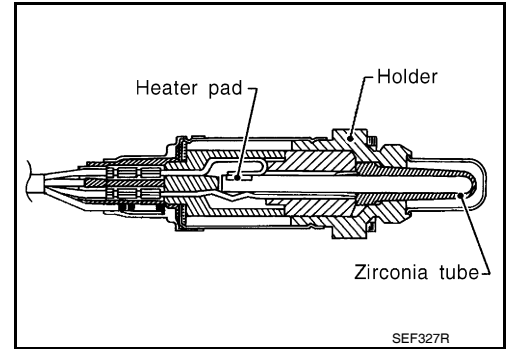
INFOID:000000006580531

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580532

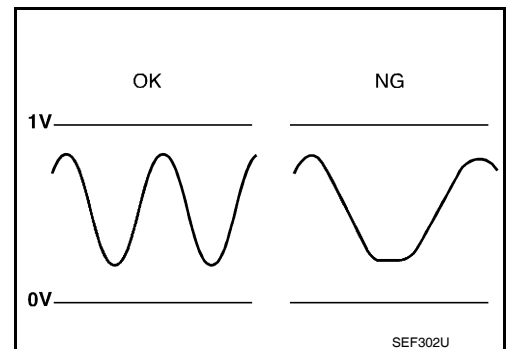
Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 (B1)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keep the engine speed between 3,500 rpm and 4,000 rpm for 1 minute and idle for 1 minute under no load 	0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1)		LEAN ↔ RICH
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (delayed response) is complete.	CMPLT
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (slow response) is complete.	CMPLT

On Board Diagnosis Logic

INFOID:000000006580533

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.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139 0139	Heated oxygen sensor 2 (bank 1) circuit slow response	The switching time between rich and lean of a heated oxygen sensor 2 signal delays more than the specified time computed by ECM.	<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel system • EVAP system • Intake air system

DTC Confirmation Procedure

INFOID:000000006580534

1. INSPECTION START

Do you have CONSULT-III?

DTC P0139 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Do you have CONSULT-III?

- 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).

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

Ⓜ With CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
9. Drive the vehicle in a proper at 60 km/h (38MPH) and maintain the speed.

CAUTION:

Always drive vehicle at a safe speed.

10. Release the accelerator pedal fully at least 5 seconds.

CAUTION:

- **Enable 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)	CMPLT
HO2 S2 DIAG2 (B1)	

Is "CMPLT" displayed on CONSULT-III 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.
2. Select "HO2S2 (B1) P0139" in "DTC WORK SUPPORT" mode with CONSULT-III.
3. Start engine and follow the instruction of CONSULT-III display.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

Is "COMPLETED" displayed on CONSULT-III 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.

DTC P0139 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

>> GO TO 3.

6. PERFORM SELF-DIAGNOSIS

With CONSULT-III

Perform ECM self-diagnosis.

Is DTC "P0139" detected?

YES >> Proceed to [EC-808. "Diagnosis Procedure"](#).

NO >> INSPECTION END

7. PERFORM OVERALL FUNCTION CHECK

Perform component function check. Refer to [EC-806. "Overall Function Check"](#).

NOTE:

Use overall 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 [EC-808. "Diagnosis Procedure"](#).

Overall Function Check

INFOID:000000006580535

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

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 between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)

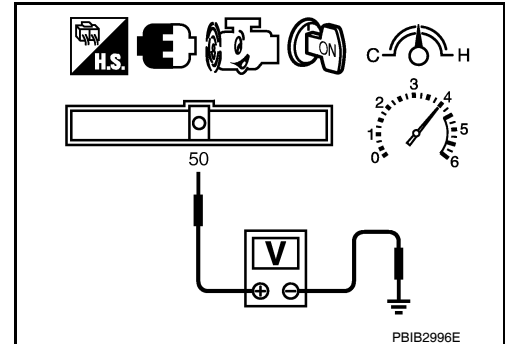
A change of voltage should be more than 0.8 V for 1 second during this procedure.

If the voltage can be confirmed in step 6, step 7 is not necessary.

7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).

A change of voltage should be more than 0.8 V for 1 second during this procedure.

8. If NG, go to [EC-808. "Diagnosis Procedure"](#).



DTC P0139 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

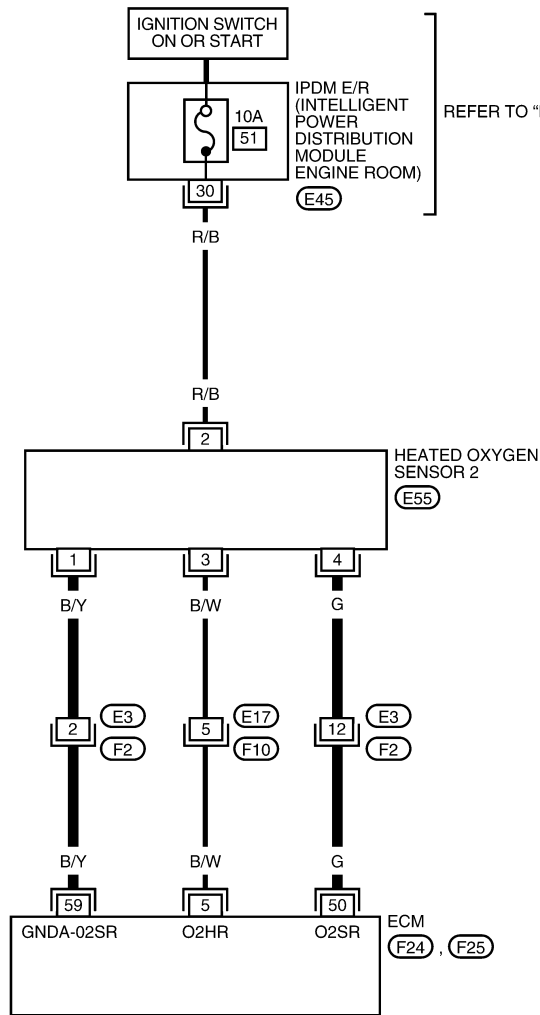
< SERVICE INFORMATION >

Wiring Diagram

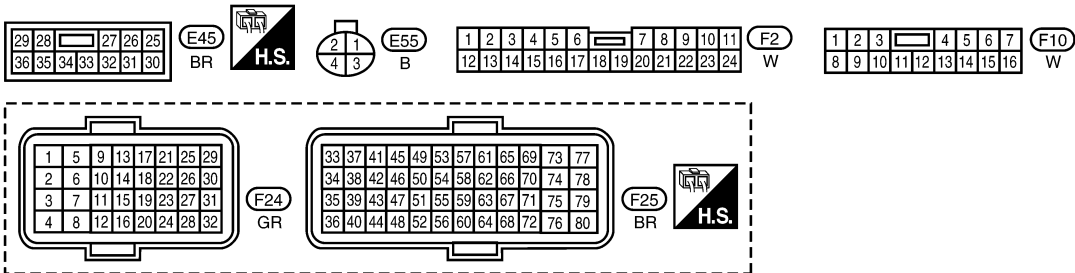
INFOID:000000006580536

EC-HO2S2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



REFER TO "PG-POWER".



AABWA0236GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

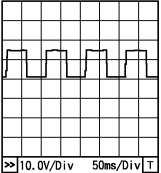
CAUTION:

DTC P0139 HO2S2

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

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

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
5	B/W	Heated oxygen sensor 2 heater	[Engine is running] <ul style="list-style-type: none"> Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	Approximately 10 V★  <small>PBIA8148J</small>
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm 	BATTERY VOLTAGE (11 - 14 V)
50	G	Heated oxygen sensor 2	[Engine is running] <ul style="list-style-type: none"> Revvng engine from idle to 3,000 rpm quickly after the following conditions are met. <ul style="list-style-type: none"> Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
59	B/Y	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed 	Approximately 0 V

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

Diagnosis Procedure

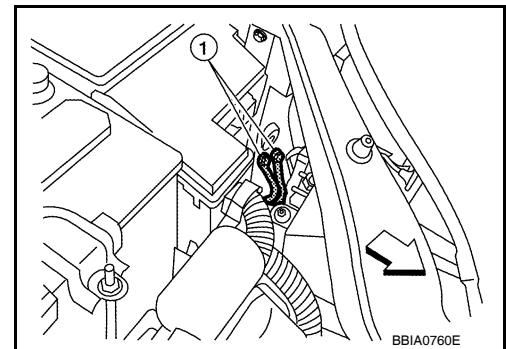
INFOID:000000006580537

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CLEAR THE SELF-LEARNING DATA

With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
- Clear the self-learning control coefficient by touching "CLEAR".
- Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 or P0172 detected?
Is it difficult to start engine?

Without CONSULT-III

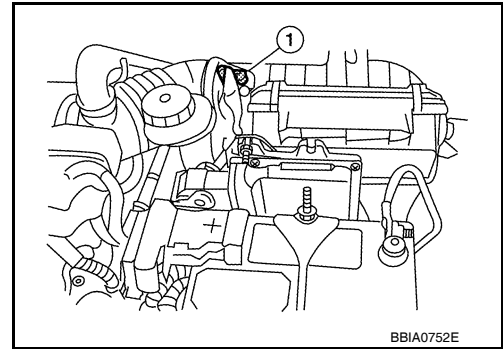
- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF.

DTC P0139 HO2S2

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-609. "Emission-related Diagnostic Information"](#).
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
**Is the 1st trip DTC P0171 or P0172 detected?
Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-820](#) or [EC-826](#).
No >> GO TO 3.

3.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector (2).
 - ⇐: Vehicle front
 - Heated oxygen sensor 2 (1)
3. Disconnect ECM harness connector.
4. Check harness continuity between HO2S2 terminal 1 and ECM terminal 59. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

5.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S2 terminal 4 and ECM terminal 50.
Refer to Wiring Diagram.

Continuity should exist.

2. Check harness continuity between ECM terminal 50 or HO2S2 terminal 4 and ground.
Refer to Wiring Diagram.

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open circuit or short between heated oxygen sensor 2 and ECM.

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

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7. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-810, "Component Inspection"](#).

OK or NG

OK >> GO TO 8.

NG >> Replace heated oxygen sensor 2. Refer to [EX-5](#).

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

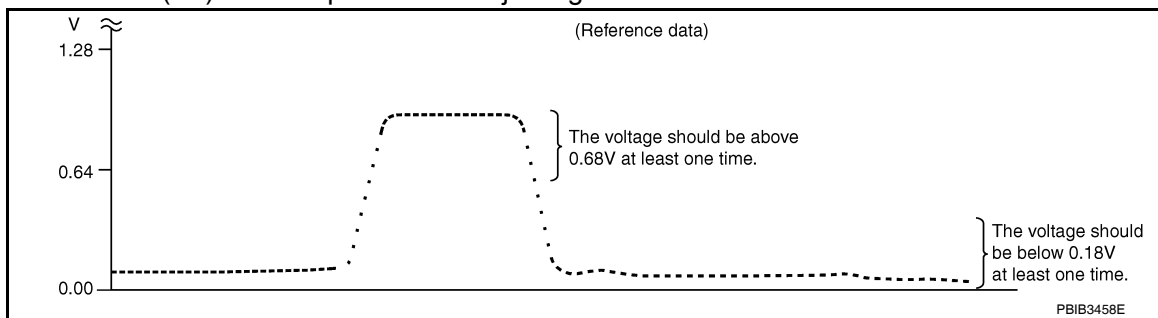
>> **INSPECTION END**

Component Inspection

INFOID:000000006580538

HEATED OXYGEN SENSOR 2**Ⓜ WITH CONSULT-III**

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. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-III.
6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"HO2S2 (B1)" should be above 0.68 V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.18 V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

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

Ⓧ WITHOUT CONSULT-III

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. Set voltmeter probes between ECM terminal 50 (HO2S2 signal) and ground.

DTC P0139 HO2S2

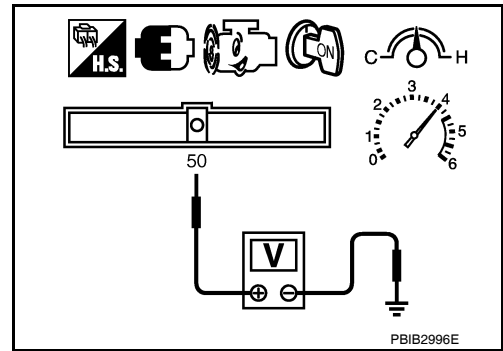
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
If the voltage can be confirmed at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2. Refer to [EX-5](#).

CAUTION:

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



DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

Component Description

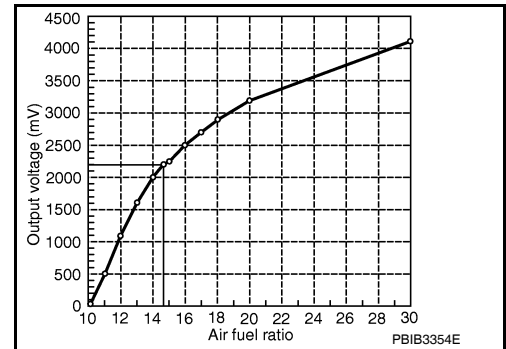
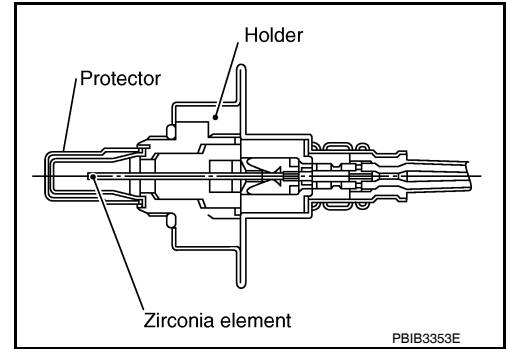
INFOID:000000006609057

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 λ 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 about 800°C (1,472°F).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006609058

Specification data are reference values.

Monitor item	Condition		Specification
A/F SEN1 (B1)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V
A/F SEN1 DIAG1 (B1)	DTC P015A and P015B self-diagnosis is incomplete.		INCMP
	DTC P015A and P015B self-diagnosis is complete.		CMPLT
A/F SEN1 DIAG2 (B1)	DTC P014C and P014D self-diagnosis is incomplete.		INCMP
	DTC P014C and P014D self-diagnosis is complete.		CMPLT
A/F SEN1 DIAG3 (B1)	The vehicle condition is not within the diagnosis range of DTC P014C, P014D, P015A or P015B.		ABSNT
	The vehicle condition is within the diagnosis range of DTC P014C, P014D, P015A or P015B.		PRSNL

On Board Diagnosis Logic

INFOID:000000006609059

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 (bank 1) circuit slow response	The response time of a A/F sensor 1 signal delays more than the specified time computed by ECM.	<ul style="list-style-type: none"> • Harness or connectors (The A/F sensor 1 circuit is open or shorted.) • A/F sensor 1
P014D			
P015A	Air fuel ratio (A/F) sensor 1 (bank 1) circuit delayed response		
P015B			

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC Confirmation Procedure

INFOID:00000006609060

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 more than 11 V at idle.

Do you have CONSULT-III?

- YES >> GO TO 2.
NO >> GO TO 6.

2. PERFORM DTC CONFIRMATION PROCEDURE-1

Ⓜ With CONSULT-III

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 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. Increase the engine speed up to 4,000 to 5,000 rpm and keep it for 10 seconds.
8. Fully release accelerator pedal and then let engine idle for about 1 minute.
9. Check the items status of "DATA MONITOR" as follows.

NOTE:

If "PRCNT" changed to "ABSNP", refer to [EC-814, "Overall Function Check"](#).

Data monitor item	Status
A/F SEN1 DIAG3 (B1)	PRCNT

Is "PRCNT" displayed on CONSULT-III screen?

- YES >> GO TO 4.
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-2

Ⓜ With CONSULT-III

Perform DTC confirmation procedure-1 again.

Is "PRCNT" displayed on CONSULT-III screen?

- YES >> GO TO 4.
NO >> Refer to [EC-814, "Overall Function Check"](#).

4. PERFORM DTC CONFIRMATION PROCEDURE-2

1. Wait for about 20 seconds at idle.
2. Check the items status of "DATA MONITOR" as follows.

NOTE:

If "CMPLT" changed to "INCMPT", refer to [EC-814, "Overall Function Check"](#).

Data monitor item	Status
A/F SEN1 DIAG1 (B1)	CMPLT
A/F SEN1 DIAG2 (B1)	

Is "CMPLT" displayed on CONSULT-III screen?

- YES >> GO TO 5.
NO >> Refer to [EC-814, "Overall Function Check"](#).

5. PERFORM SELF-DIAGNOSIS

Ⓜ With CONSULT-III

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

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Check the "SELF-DIAG RESULT".

Is any DTC detected?

- YES >> Proceed to [EC-816, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

6. CHECK AIR-FUEL RATIO SELF-LEARNING VALUE

 **With GST**

1. 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 $\pm 15\%$?

- YES >> GO TO 8.
- NO >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Intake air leaks
- Exhaust gas leaks
- Incorrect fuel pressure
- Lack of fuel
- Fuel injector
- Incorrect PCV hose connection
- PCV valve
- Mass air flow sensor

>> Repair or replace malfunctioning part.

8. PERFORM DTC CONFIRMATION PROCEDURE

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 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 4,000 to 5,000 rpm and keep it for 10 seconds.
7. Fully release accelerator pedal and then let engine idle for about 1 minute.
8. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-816, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Overall Function Check

INFOID:000000006610041

PROCEDURE MALFUNCTION B

Use this procedure to check the overall function of the A/F sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

 **WITH GST**

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in the suitable gear position.
3. Set shift lever to D position (CVT) or 5th position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (31 MPH).

NOTE:

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 and 3 for five times.
5. Stop the vehicle and turn ignition switch OFF.
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 and 3 for five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no 1st trip DTC is displayed.

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

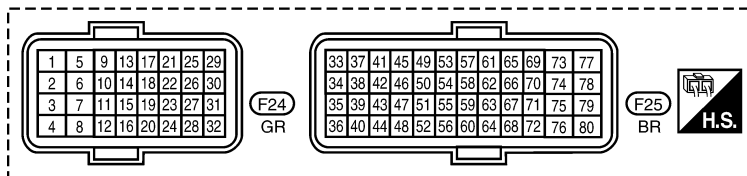
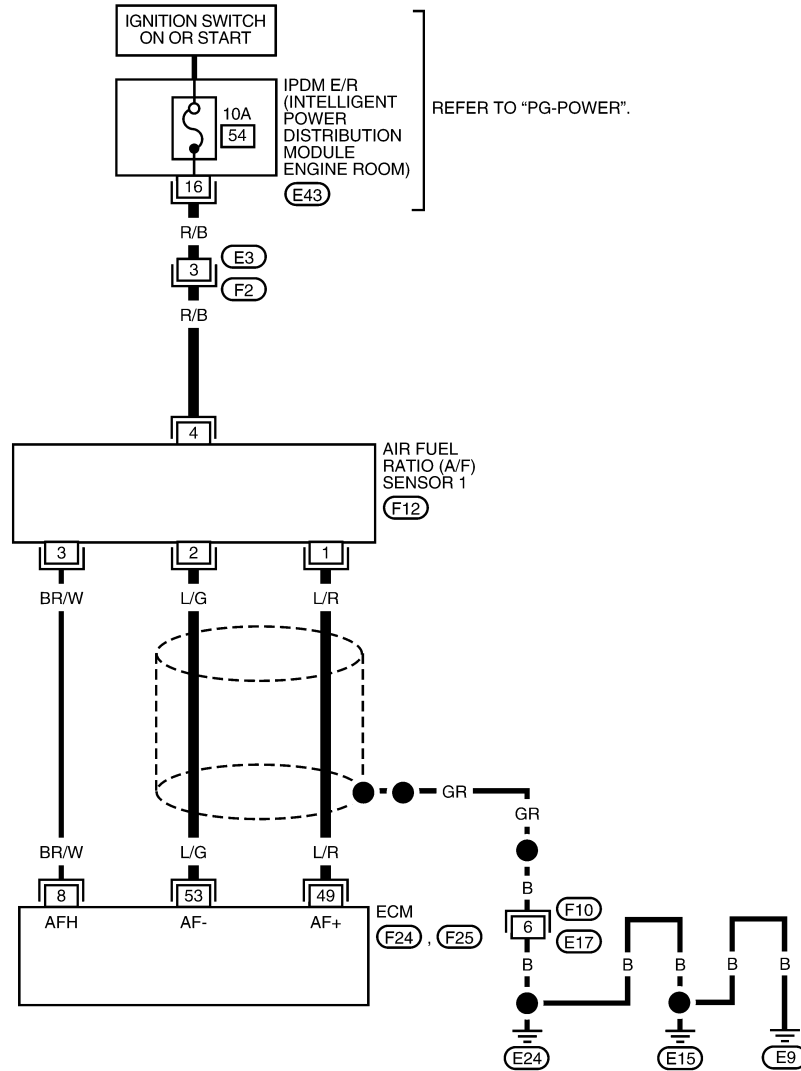
If 1st trip DTC is displayed, go to [EC-776. "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006580510

EC-A/F-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0160GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

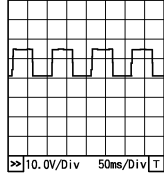
CAUTION:

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBI A8148J
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

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

Diagnosis Procedure

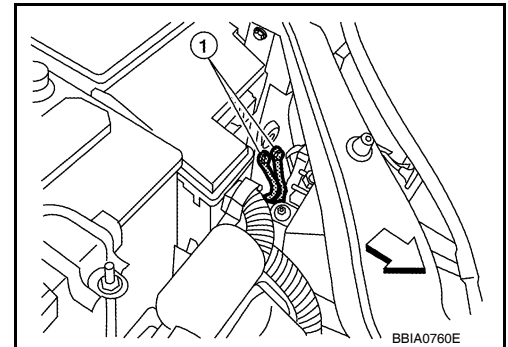
INFOID:000000006580511

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten engine screws on the body.
Refer to [EC-706](#), "Ground Inspection".
- ↔: Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



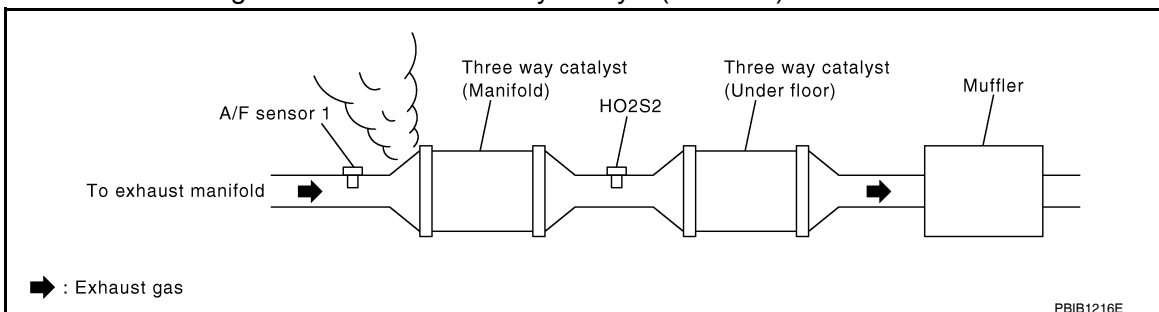
2. RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1

Loosen and retighten the air fuel ratio (A/F) sensor 1.
Refer to [EM-23](#), "Component".

>> GO TO 3.

3. CHECK EXHAUST GAS LEAK

- Start engine and run it at idle.
- Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

- OK >> GO TO 4.
- NG >> Repair or replace. Refer to [EX-5](#).

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace. Refer to [EM-16](#).

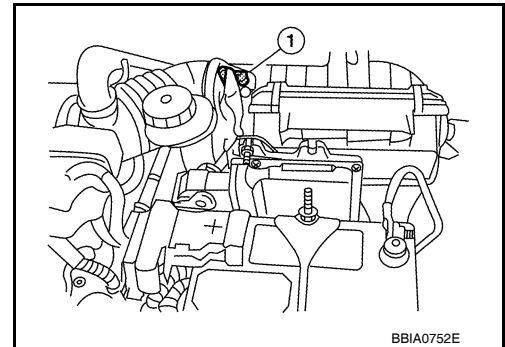
5. CLEAR THE SELF-LEARNING DATA

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
 2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
 3. Clear the self-learning control coefficient by touching "CLEAR" or "START".
 4. Run engine for at least 10 minutes at idle speed.
- Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?**

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
 2. Turn ignition switch OFF.
 3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
 4. Stop engine and reconnect mass air flow sensor harness connector.
 5. Make sure DTC P0102 is displayed.
 6. Erase the DTC memory. Refer to [EC-609](#), "[Emission-related Diagnostic Information](#)".
 7. Make sure DTC P0000 is displayed.
 8. Run engine for at least 10 minutes at idle speed.
- Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?**

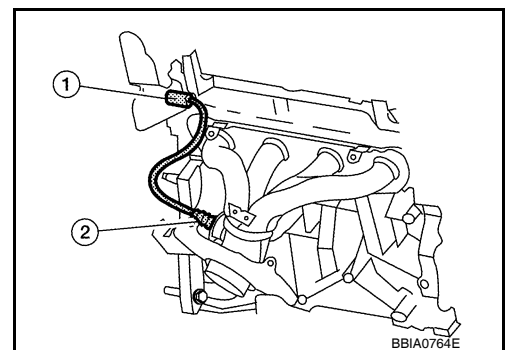


Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0172. Refer to [EC-820](#) or [EC-826](#).
- No >> GO TO 6.

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

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector (1).
3. Turn ignition switch ON.



DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

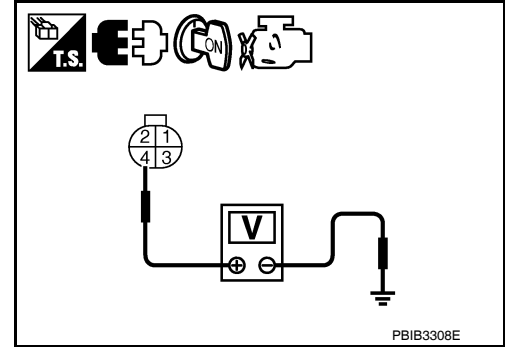
[MR20DE (EXCEPT FOR CALIFORNIA)]

4. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.



7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F3
- 10 A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to [EC-721, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 13.

10. CHECK MASS AIR FLOW SENSOR

Refer to [EC-739, "Component Inspection"](#).

OK or NG

- OK >> GO TO 11.
- NG >> Replace mass air flow sensor. Refer to [EM-16](#).

11. CHECK PCV VALVE

Refer to [EC-603, "Component Inspection"](#).

OK or NG

- OK >> GO TO 12.
- NG >> Repair or replace PCV valve. Refer to [EM-33](#).

DTC P014C, P014D, P015A, P015B A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

12. CHECK INTERMITTENT INCIDENT

Perform [EC-701](#).

OK or NG

OK >> GO TO 13.

NG >> Repair or replace.

13. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

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DTC P0171 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

On Board Diagnosis Logic

INFOID:000000006580540

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (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 lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Air fuel ratio (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
P0171 0171	Fuel injection system too lean	<ul style="list-style-type: none">Fuel injection system does not operate properly.The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)	<ul style="list-style-type: none">Intake air leaksAir fuel ratio (A/F) sensor 1Fuel injectorExhaust gas leaksIncorrect fuel pressureLack of fuelMass air flow sensorIncorrect PCV hose connection

DTC Confirmation Procedure

INFOID:000000006580541

NOTE:

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

④ WITH CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
- Clear the self-learning control coefficient by touching "CLEAR".
- Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction.
Perform the following procedure is advised.
 - 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.
 - If engine starts, go to [EC-823, "Diagnosis Procedure"](#).
If engine does not start, check exhaust and intake air leak visually.
- Keep engine at idle for at least 5 minutes.
- Check 1st trip DTC.
The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-823, "Diagnosis Procedure"](#).
NOTE:
If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.
 - Turn ignition switch OFF and wait at least 10 seconds.
 - Start engine.
 - Maintain the following conditions for at least 10 consecutive minutes.
Hold the accelerator pedal as steady as possible.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

VHCL SPEED SE	50 – 120 km/h (31 – 75 MPH)
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CAUTION:

Always drive vehicle at a safe speed.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-823, "Diagnosis Procedure"](#).

GS† 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. Disconnect mass air flow sensor (1) harness connector.
- 4. Restart engine and let idle for at least 5 seconds.
- 5. Stop engine and reconnect mass air flow sensor harness connector.
- 6. Select Service \$03 with GST. Make sure DTC P0102 is detected.
- 7. Select Service \$04 with GST and erase the DTC P0102.

- 8. Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction.

Perform the following procedure is advised.

- a. 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.

- b. If engine starts, go to [EC-823, "Diagnosis Procedure"](#).
If engine does not start, check exhaust and intake air leak visually.

- 9. Keep engine at idle for at least 5 minutes.

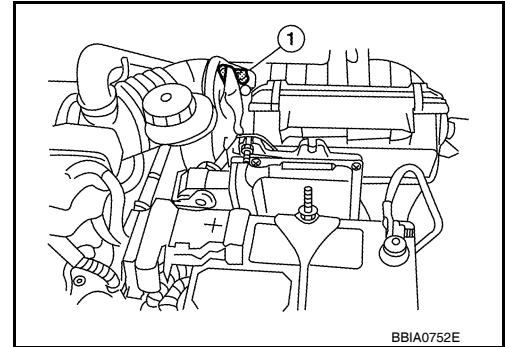
- 10. Check 1st trip DTC.

The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-823, "Diagnosis Procedure"](#).

NOTE:

If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

- a. Turn ignition switch OFF and wait at least 10 seconds.
- b. Start engine.
- c. 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.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-823, "Diagnosis Procedure"](#).

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

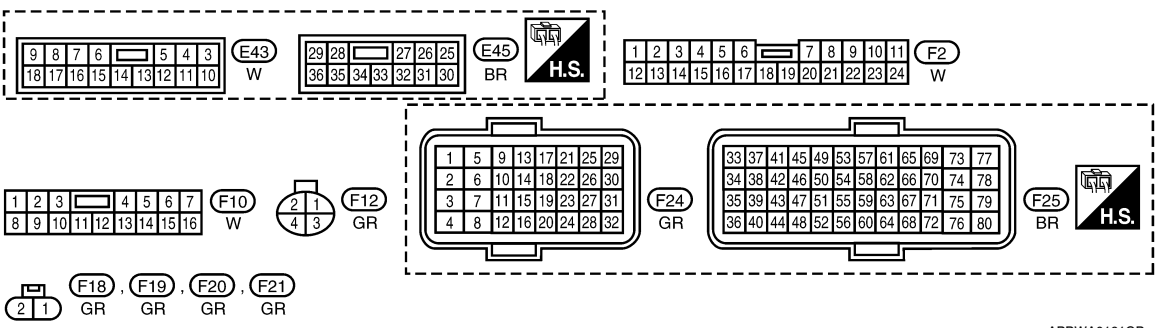
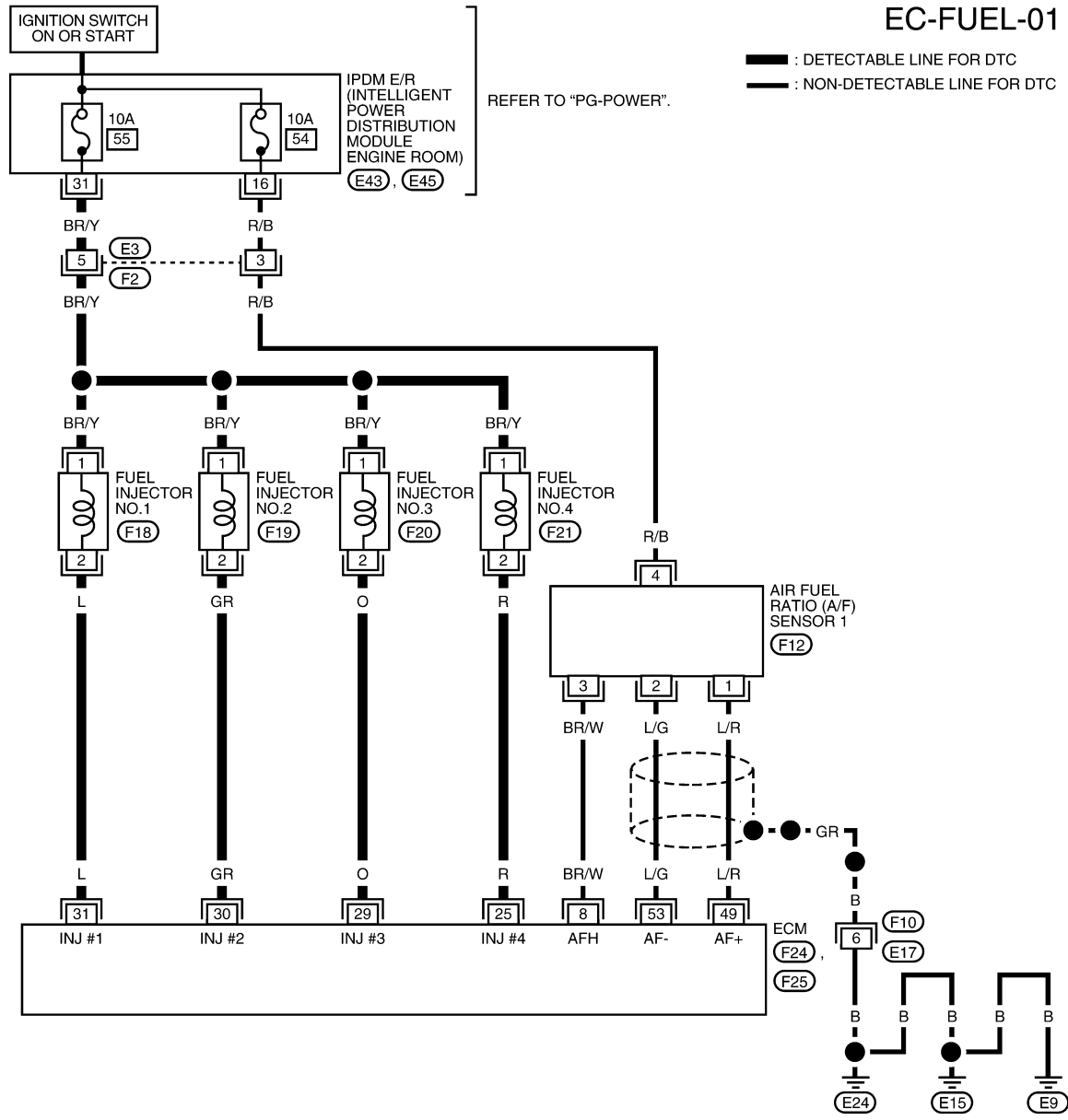
< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

INFOID:000000006580542

Wiring Diagram

EC-FUEL-01



ABBWA0161GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

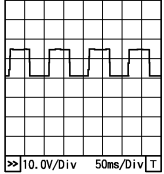
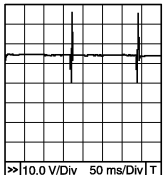
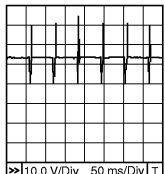
CAUTION:

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  <small>PBIA8148J</small>
25 29 30 31	R O GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIB0529E</small>
			[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIA4943J</small>
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

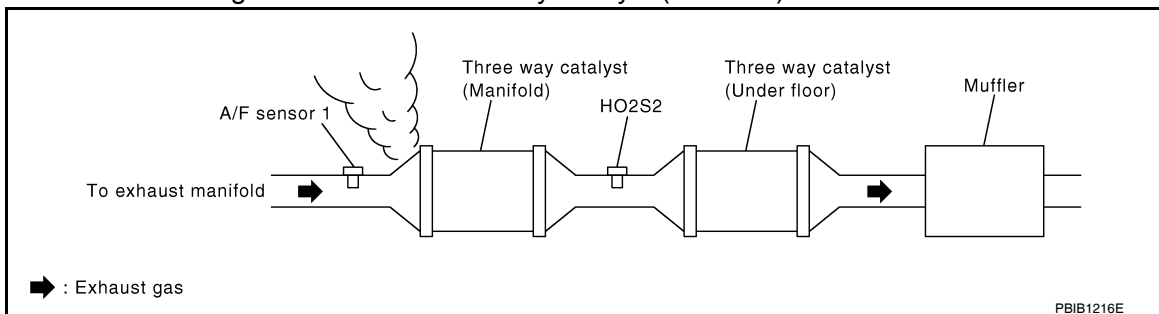
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006580543

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace. Refer to [EX-5](#).

2. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Listen for an intake air leak after the mass air flow sensor.
2. Check PCV hose connection.

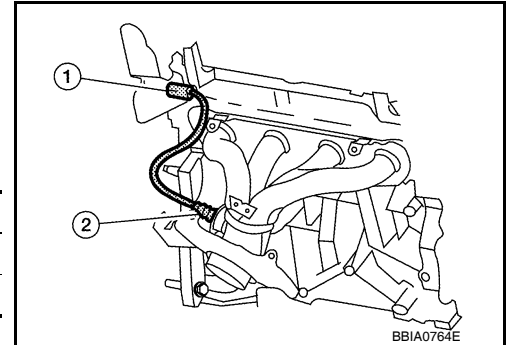
OK or NG

- OK >> GO TO 3.
NG >> Repair or replace. Refer to [EM-16](#).

3. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).
- Air fuel ratio (A/F) sensor 1 (2)
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.
Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53



Continuity should exist.

5. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground.
Refer to Wiring Diagram.

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-650, "Fuel Pressure Check"](#).
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-650, "Fuel Pressure Check"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

OK or NG

- OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-1083](#).)
- Fuel pressure regulator (Refer to [EC-650, "Fuel Pressure Check"](#).)
- Fuel lines (Refer to [FL-5, "Checking Fuel Line"](#).)
- Fuel filter for clogging

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III.

At idling : 1.0 - 4.0 g·m/sec

At 2,500 rpm : 2.0 - 10.0 g·m/sec

With GST

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check mass air flow sensor signal in Service \$01 with GST.

At idling : 1.0 - 4.0 g-m/sec

At 2,500 rpm : 2.0 - 10.0 g-m/sec

OK or NG

OK >> GO TO 7.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to [EC-734](#).

7. CHECK FUNCTION OF FUEL INJECTORS

With CONSULT-III

1. Let engine idle.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

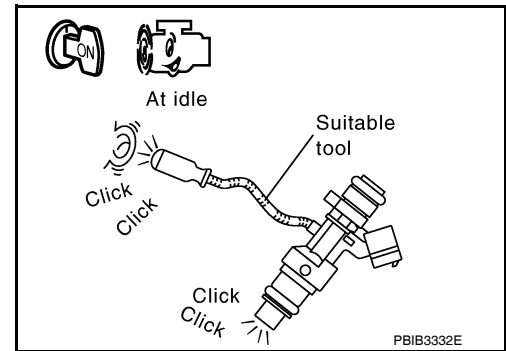
1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

OK or NG

OK >> GO TO 8.

NG >> Perform trouble diagnosis for [EC-1078](#).



8. CHECK FUEL INJECTOR

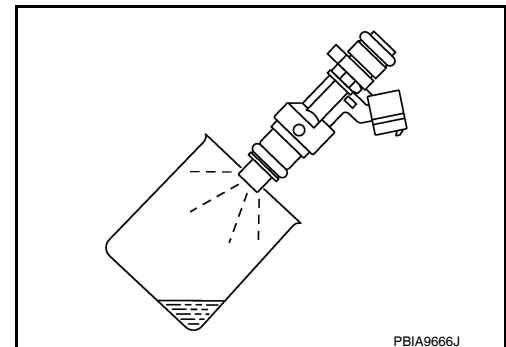
1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch OFF.
3. Reconnect all harness connectors disconnected.
4. Remove fuel tube assembly. Refer to [EM-36](#).
Keep fuel hose and all fuel injectors connected to fuel tube.
The fuel injector harness connectors should remain connected.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each fuel injector.
7. Crank engine for about 3 seconds. Make sure that fuel sprays out from fuel injectors.

Fuel should be sprayed evenly for each fuel injector.

OK or NG

OK >> GO TO 9.

NG >> Replace fuel injectors from which fuel does not spray out. Always replace O-ring with new ones. Refer to [EM-36](#).



9. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

On Board Diagnosis Logic

INFOID:000000006580544

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (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 lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Air fuel ratio (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 0172	Fuel injection system too rich	<ul style="list-style-type: none">Fuel injection system does not operate properly.The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)	<ul style="list-style-type: none">Air fuel ratio (A/F) sensor 1Fuel injectorExhaust gas leaksIncorrect fuel pressureMass air flow sensor

DTC Confirmation Procedure

INFOID:000000006580545

NOTE:

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

④ WITH CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
- Clear the self-learning control coefficient by touching "CLEAR".
- Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction.
Perform the following procedure is advised.
 - 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.
 - If engine starts, go to [EC-829. "Diagnosis Procedure"](#).
If engine does not start, remove ignition plugs and check for fouling, etc.
- Keep engine at idle for at least 5 minutes.
- Check 1st trip DTC.
The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-829. "Diagnosis Procedure"](#).
NOTE:
If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.
 - Turn ignition switch OFF and wait at least 10 seconds.
 - Start engine.
 - 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)
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DTC P0172 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

CAUTION:

Always drive vehicle at a safe speed.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-829, "Diagnosis Procedure"](#).

Ⓢ 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. Disconnect mass air flow sensor (1) harness connector.
- 4. Restart engine and let idle for at least 5 seconds.
- 5. Stop engine and reconnect mass air flow sensor harness connector.
- 6. Select Service \$03 with GST. Make sure DTC P0102 is detected.
- 7. Select Service \$04 with GST and erase the DTC P0102.

- 8. Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction.

Perform the following procedure is advised.

- a. 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.

- b. If engine starts, go to [EC-829, "Diagnosis Procedure"](#).
If engine does not start, remove ignition plugs and check for fouling, etc.

- 9. Keep engine at idle for at least 5 minutes.

- 10. Check 1st trip DTC.

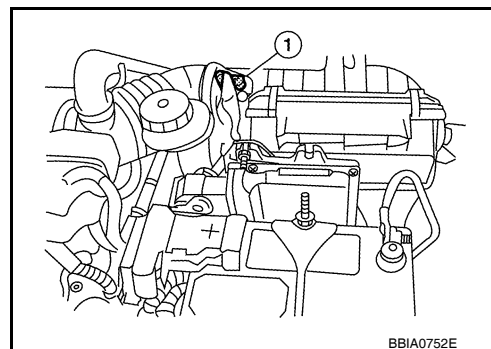
The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-829, "Diagnosis Procedure"](#).

NOTE:

If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

- a. Turn ignition switch OFF and wait at least 10 seconds.
- b. Start engine.
- c. 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.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-829, "Diagnosis Procedure"](#).

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

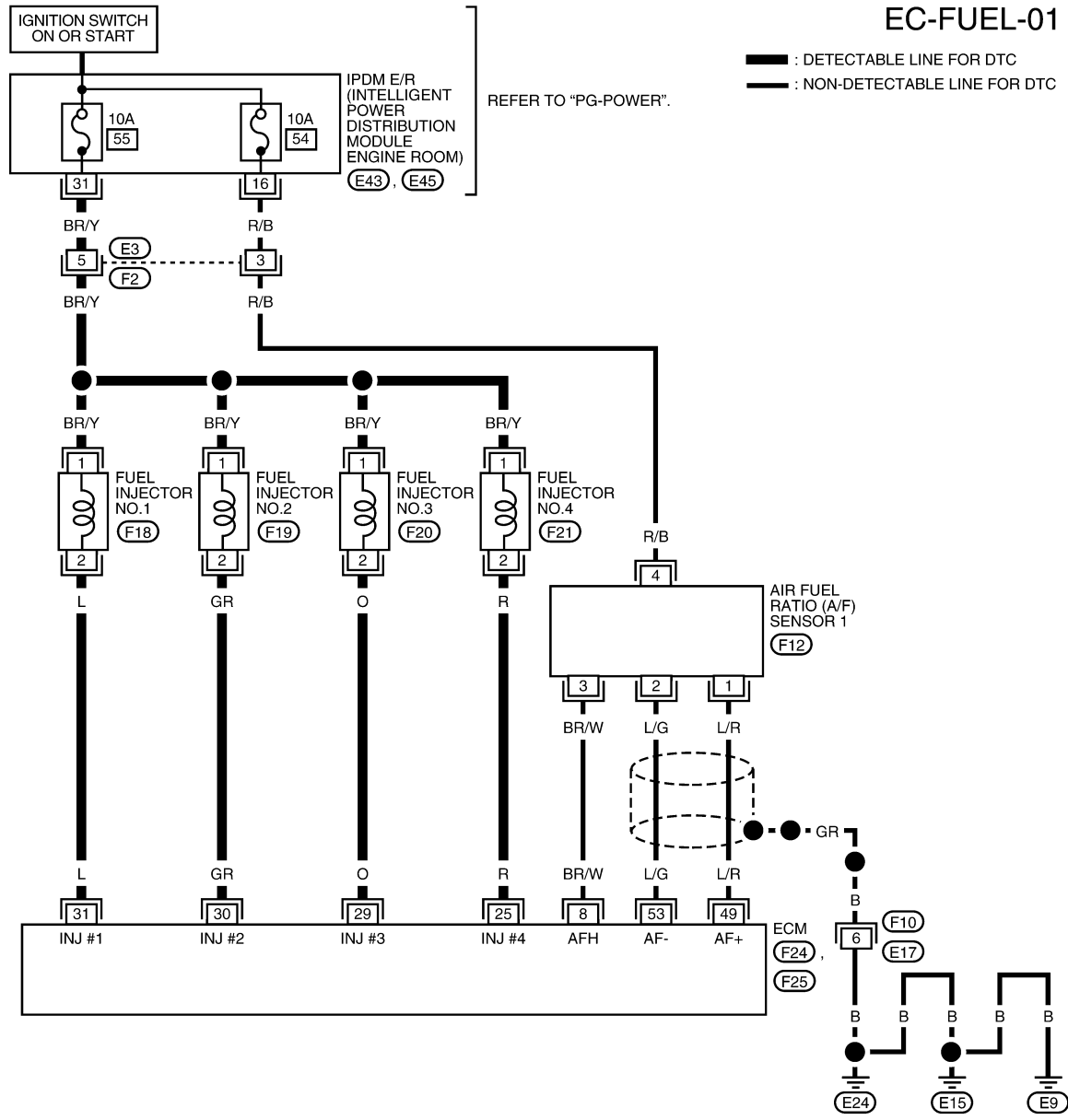
< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

INFOID:000000006580546

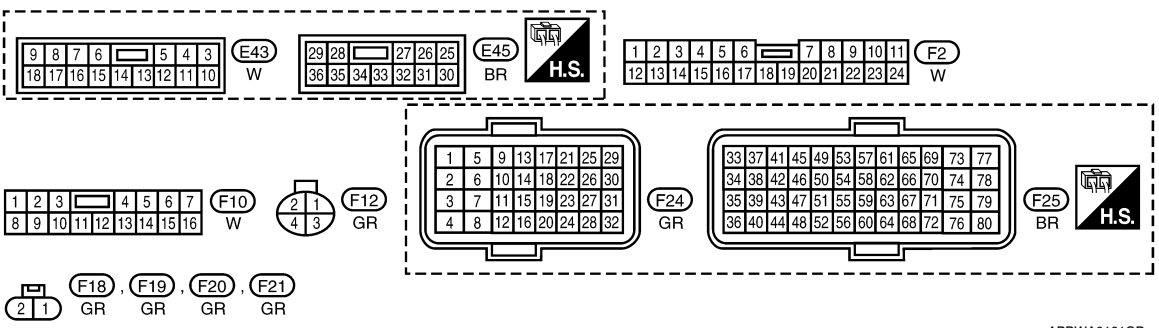
Wiring Diagram

EC-FUEL-01



— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC

REFER TO "PG-POWER".



ABBWA0161GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

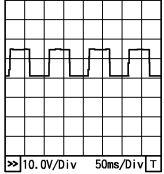
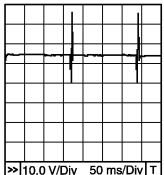
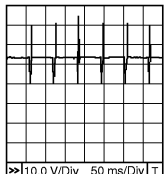
CAUTION:

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

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

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed (More than 140 seconds after starting engine) 	<p>Approximately 2.9 - 8.8 V★</p>  <p>PBIA8148J</p>
25 29 30 31	R O GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle</p>	<p>BATTERY VOLTAGE (11 - 14 V)★</p>  <p>PBIB0529E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	<p>BATTERY VOLTAGE (11 - 14 V)★</p>  <p>PBIA4943J</p>
49	L/R	A/F sensor 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	<p>Approximately 1.8 V Output voltage varies with air fuel ratio.</p>
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

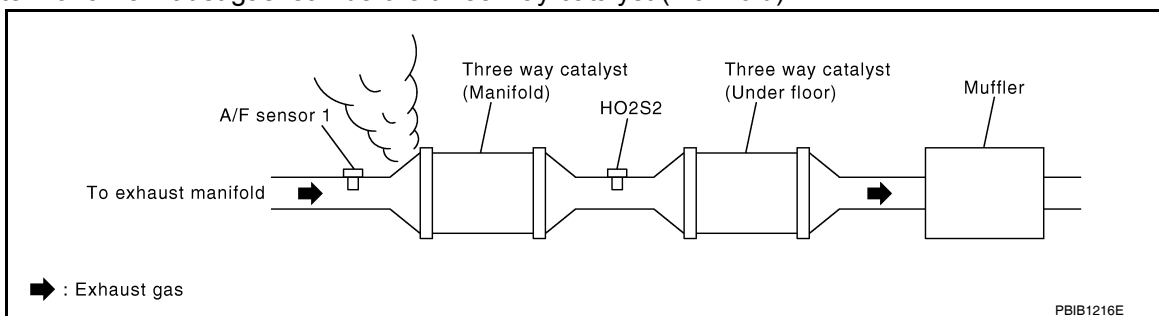
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006580547

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace. Refer to [EX-5](#).

2. CHECK FOR INTAKE AIR LEAK

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Listen for an intake air leak after the mass air flow sensor.

OK or NG

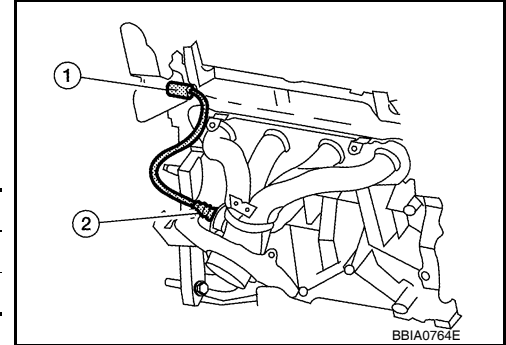
OK >> GO TO 3.

NG >> Repair or replace. Refer to [EM-16](#).

3. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).
 - Air fuel ratio (A/F) sensor 1 (2)
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53



Continuity should exist.

5. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

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

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-650, "Fuel Pressure Check"](#).
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-650, "Fuel Pressure Check"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-1083](#).)
- Fuel pressure regulator (Refer to [EC-650, "Fuel Pressure Check"](#).)

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

 **With CONSULT-III**

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III.

At idling : 1.0 - 4.0 g·m/sec

At 2,500 rpm : 2.0 - 10.0 g·m/sec

 **With GST**

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check mass air flow sensor signal in Service \$01 with GST.

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

- At idling : 1.0 - 4.0 g·m/sec**
At 2,500 rpm : 2.0 - 10.0 g·m/sec

OK or NG

OK >> GO TO 7.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to [EC-734](#).

7. CHECK FUNCTION OF FUEL INJECTORS

With CONSULT-III

1. Let engine idle.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

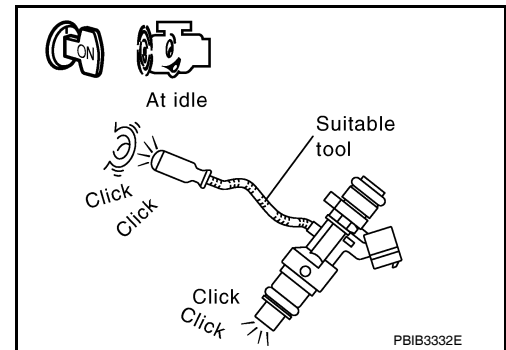
1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

OK or NG

OK >> GO TO 8.

NG >> Perform trouble diagnosis for [EC-1078](#).



8. CHECK FUEL INJECTOR

1. Remove fuel injector assembly. Refer to [EM-36](#).
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. Reconnect all harness connectors disconnected.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each fuel injectors.
6. Crank engine for about 3 seconds.
Make sure fuel does not drip from fuel injector.

OK or NG

OK (Does not drip.)>>GO TO 9.

NG (Drips.)>>Replace the fuel injectors from which fuel is dripping. Always replace O-ring with new one.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> INSPECTION END

DTC P0181 FTT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

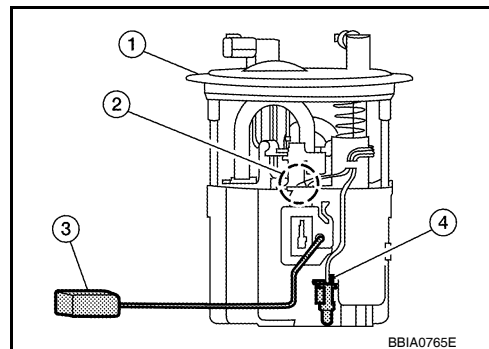
DTC P0181 FTT SENSOR

Component Description

INFOID:000000006580548

The fuel tank temperature sensor (4) 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.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)



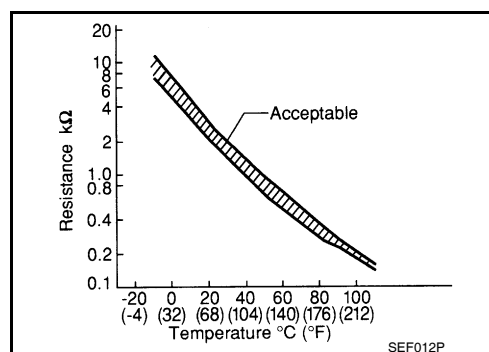
<Reference data>

Fluid temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference values and is measured between ECM terminal 43 (Fuel tank temperature sensor) and ground.

CAUTION:

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



On Board Diagnosis Logic

INFOID:000000006580549

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0181 0181	Fuel tank temperature sensor circuit range/performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	<ul style="list-style-type: none"> • Harness or connectors (Fuel tank temperature sensor circuit is open or shorted) • Fuel tank temperature sensor

DTC Confirmation Procedure

INFOID:000000006580550

NOTE:

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

WITH CONSULT-III

1. Turn ignition switch ON wait at least 10 seconds.
2. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-833. "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to following step.
3. Select "DATA MONITOR" mode with CONSULT-III.
4. Check "COOLAN TEMP/S" value.
If the "COOLAN TEMP/S" is less than 60°C (140°F), the result will be OK.
If the "COOLAN TEMP/S" is above 60°C (140°F), go to the following step.
5. Cool engine down until "COOLAN TEMP/S" signal is less than 60°C (140°F).
6. Wait at least 10 seconds.
7. Check 1st trip DTC.
8. If 1st trip DTC is detected, go to [EC-833. "Diagnosis Procedure"](#).

WITH GST

DTC P0181 FTT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

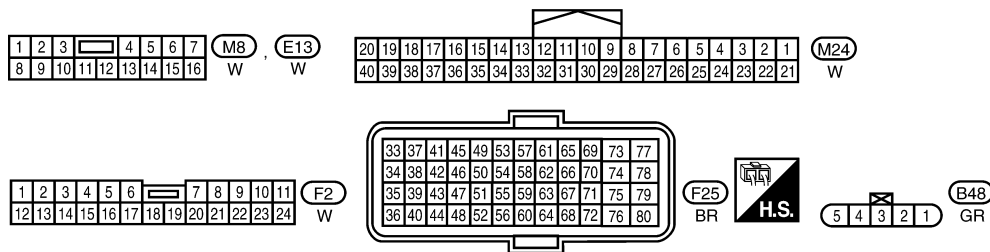
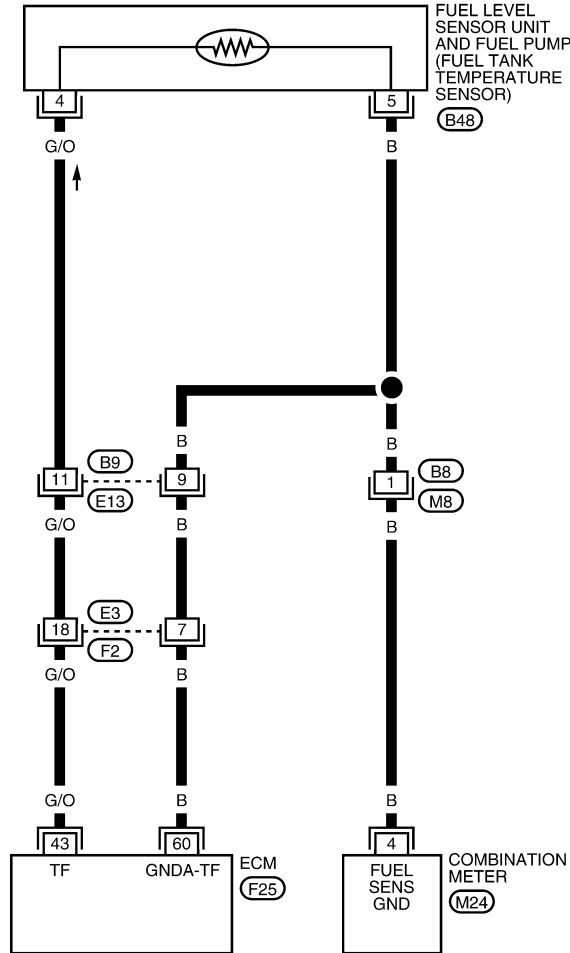
Follow the procedure "WITH CONSULT-III" above.

Wiring Diagram

INFOID:000000006580551

EC-FTTS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0162GB

Diagnosis Procedure

INFOID:000000006580552

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0181 FTT SENSOR

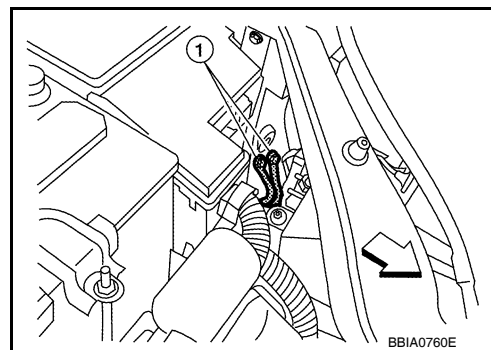
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

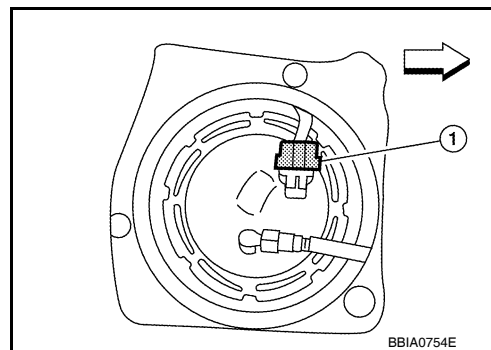
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
 - Disconnect "fuel level sensor unit and fuel pump" harness connector (1).
- ↔ : Vehicle front
- Turn ignition switch ON.

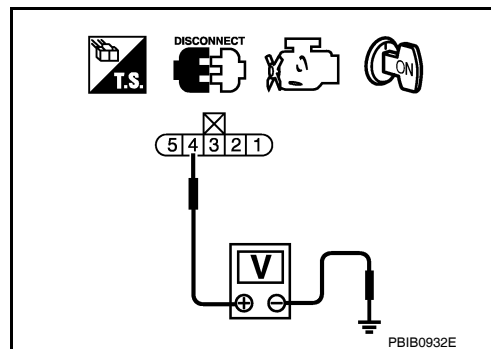


- Check voltage between "fuel level sensor unit and fuel pump" terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness connectors E3, F2
- Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

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

4. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect combination meter harness connector.
- Check harness continuity between "fuel level sensor unit and fuel pump" terminal 5 and combination meter terminal 4, ECM terminal 60. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

DTC P0181 FTT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B8, M8
- Harness connectors B9, E13
- Harness connectors E3, F2
- Harness for open or short between “fuel level sensor unit and fuel pump” and combination meter.
- Harness for open or short between “fuel level sensor unit and fuel pump” and ECM.

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

6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, [EC-835. "Component Inspection"](#).

OK or NG

OK >> GO TO 7.

NG >> Replace “fuel level sensor unit and fuel pump”. Refer to [FL-6](#).

7. CHECK INTERMITTENT INCIDENT

Perform [EC-701](#).

>> **INSPECTION END**

Component Inspection

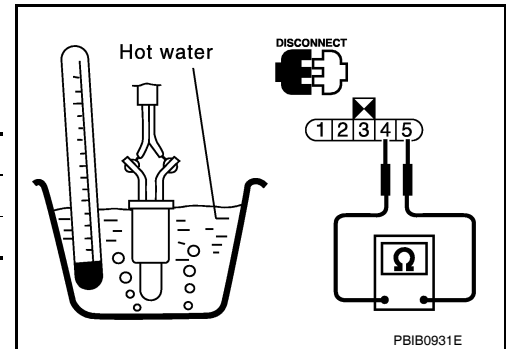
INFOID:000000006580553

FUEL TANK TEMPERATURE SENSOR

1. Check resistance between “fuel level sensor unit and fuel pump” terminal 4 and 5 by heating with hot water as shown in the figure.

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

2. If NG, replace “fuel level sensor unit and fuel pump”. Refer to [FL-6](#).



DTC P0182, P0183 FTT SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

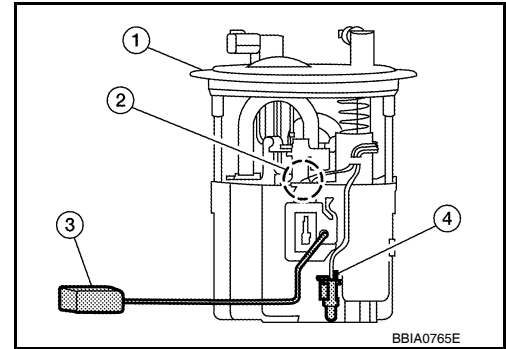
DTC P0182, P0183 FTT SENSOR

Component Description

INFOID:000000006580555

The fuel tank temperature sensor (4) 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.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)



BBI A0765E

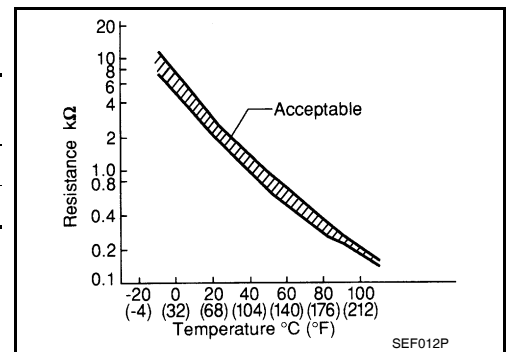
<Reference data>

Fluid temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference values and is measured between ECM terminal 43 (Fuel tank temperature sensor) and ground.

CAUTION:

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



SEF012P

On Board Diagnosis Logic

INFOID:000000006580556

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182 0182	Fuel tank temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Fuel tank temperature sensor circuit is open or shorted.) • Fuel tank temperature sensor
P0183 0183	Fuel tank temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006580557

NOTE:

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

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-837. "Diagnosis Procedure"](#).

DTC P0182, P0183 FTT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

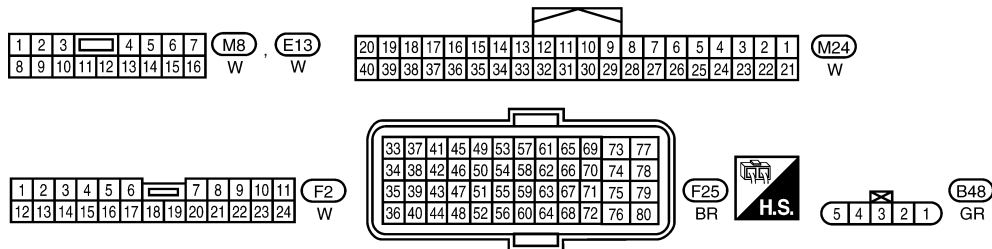
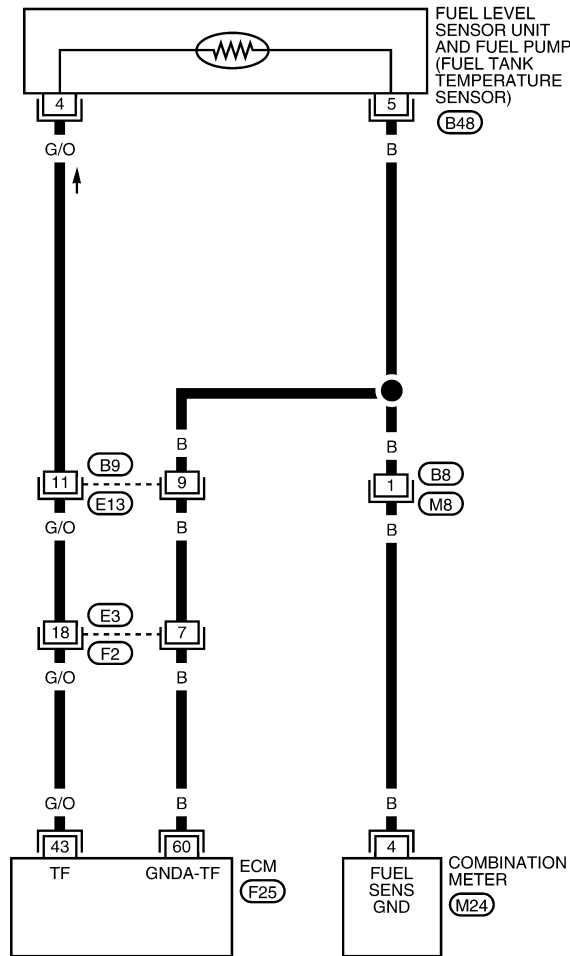
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006580558

EC-FTTS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0162GB

Diagnosis Procedure

INFOID:000000006580559

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0182, P0183 FTT SENSOR

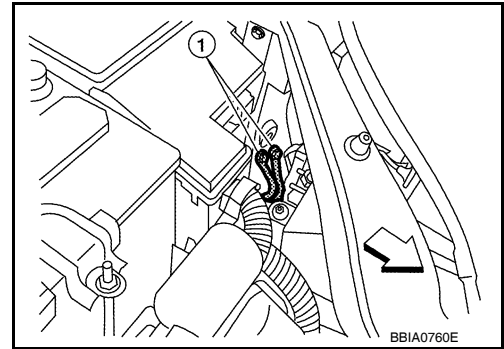
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screw on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

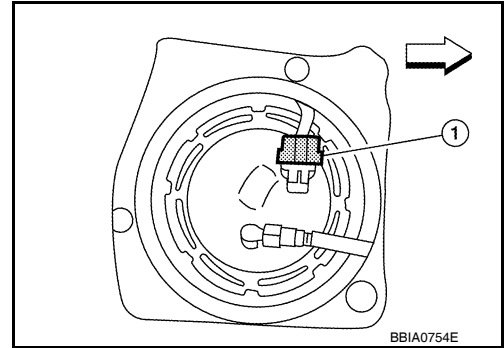
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- Disconnect "fuel level sensor unit and fuel pump" harness connector (1).
- ↔ : Vehicle front
- Turn ignition switch ON.

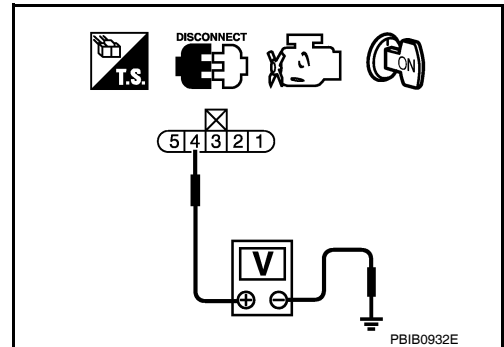


- Check voltage between "fuel level sensor unit and fuel pump" terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness connectors E3, F2
- Harness for open or short to ground or short between ECM and "fuel level sensor unit and fuel pump"

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

4. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect combination meter harness connector.
- Check harness continuity between "fuel level sensor unit and fuel pump" terminal 5 and combination meter terminal 4, ECM terminal 60. Refer to Wiring Diagram.

Continuity should exist.

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

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

DTC P0182, P0183 FTT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Check the following.

- Harness connectors B8, M8
- Harness connectors B9, E13
- Harness connectors E3, F2
- Harness for open or short between “fuel level sensor unit and fuel pump” and combination meter
- Harness for open or short between “fuel level sensor unit and fuel pump” and ECM

>> Repair open circuit or short to ground or short to power in harness or connector.

6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, [EC-839. "Component Inspection"](#).

OK or NG

OK >> GO TO 7.

NG >> Replace “fuel level sensor unit and fuel pump”. Refer to [FL-6](#).

7. CHECK INTERMITTENT INCIDENT

Perform [EC-701](#).

>> **INSPECTION END**

Component Inspection

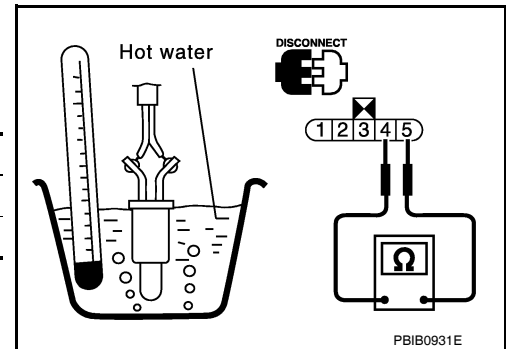
INFOID:000000006580560

FUEL TANK TEMPERATURE SENSOR

1. Check resistance between “fuel level sensor unit and fuel pump” terminal 4 and 5 by heating with hot water as shown in the figure.

Temperature [°C (°F)]	Resistance (k Ω)
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

2. If NG, replace “fuel level sensor unit and fuel pump”. Refer to [FL-6](#).



DTC P0196 EOT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

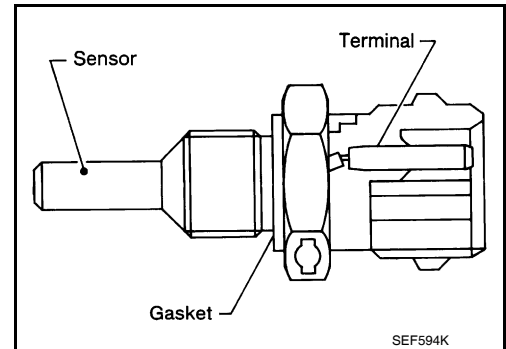
< SERVICE INFORMATION >

DTC P0196 EOT SENSOR

Component Description

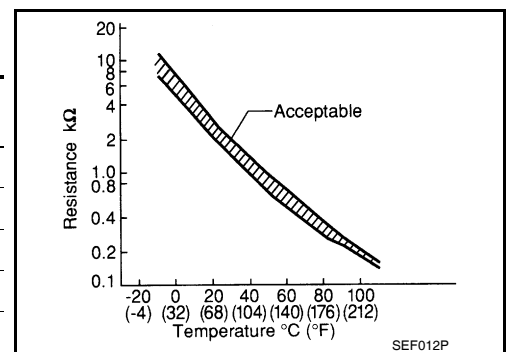
INFOID:000000006580562

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.



<Reference data>

Engine coolant temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
-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
150 (302)	0.3	0.050 - 0.065



*: This data is reference values and is measured between ECM terminal 27 (Engine oil temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

INFOID:000000006580563

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0196 0196	Engine oil temperature sensor range/performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Engine oil temperature sensor

DTC Confirmation Procedure

INFOID:000000006580564

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

④ WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for 5 minutes and 10 seconds.
4. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-841, "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to following steps.
5. Select "DATA MONITOR" mode with CONSULT-III.

DTC P0196 EOT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

6. Check that "COOLAN TEMP/S" indicates above 70°C (158°F).
If it is above 70°C (158°F), go to the following steps.
If it is below 70°C (158°F), warm engine up until "COOLAN TEMP/S" indicates more than 70°C (158°F). Then go to the following steps.
7. Turn ignition switch OFF and soak the vehicle at cool place.
8. Turn ignition switch ON.
NOTE:
Do not turn ignition switch OFF until step 12
9. Select "DATA MONITOR" mode with CONSULT-III.
10. 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, go to following steps.

If they are out of the specified range, soak the vehicle to met the above conditions. Then go to 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.**

11. Start engine and let it idle for 5 minutes.
12. Check 1st trip DTC.
13. If 1st trip DTC is detected, go to [EC-841. "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

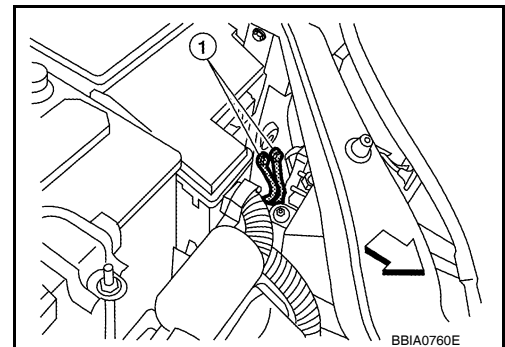
INFOID:000000006580565

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-158. "Ground Inspection"](#).
- ⇐ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK ENGINE OIL TEMPERATURE SENSOR

Refer to [EC-842. "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace engine oil temperature sensor. Refer to [EM-80](#).

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

Refer to [EC-296. "Wiring Diagram"](#).

>> **INSPECTION END**

DTC P0196 EOT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

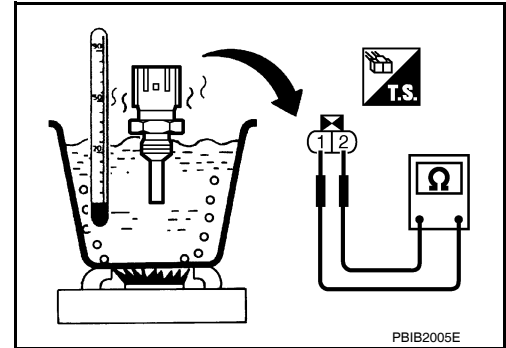
< SERVICE INFORMATION >

INFOID:000000006580566

Component Inspection

ENGINE OIL TEMPERATURE SENSOR

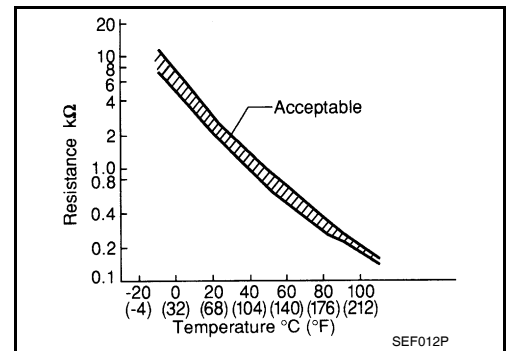
1. Check resistance between engine oil temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Engine coolant temperature [°C (°F)]	Resistance (k Ω)
20 (68)	2.37 - 2.63
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine oil temperature sensor. Refer to [EM-80](#).



DTC P0197, P0198 EOT SENSOR

< SERVICE INFORMATION >

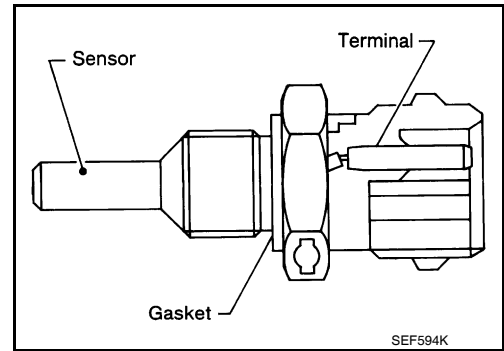
[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0197, P0198 EOT SENSOR

Component Description

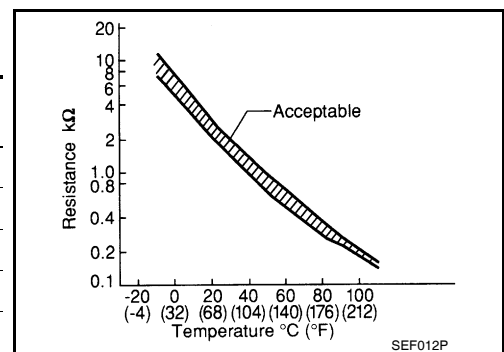
INFOID:000000006580568

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.



<Reference data>

Engine coolant temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
-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
150 (302)	0.3	0.050 - 0.065



*: This data is reference values and is measured between ECM terminal 27 (Engine oil temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

INFOID:000000006580569

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0197 0197	Engine oil temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Engine oil temperature sensor circuit is open or shorted.) • Engine oil temperature sensor
P0198 0198	Engine oil temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006580570

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Start engine and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-844, "Diagnosis Procedure"](#).

DTC P0197, P0198 EOT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

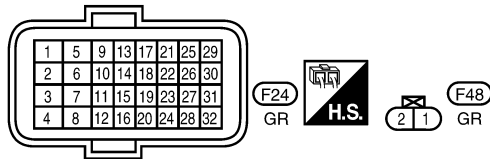
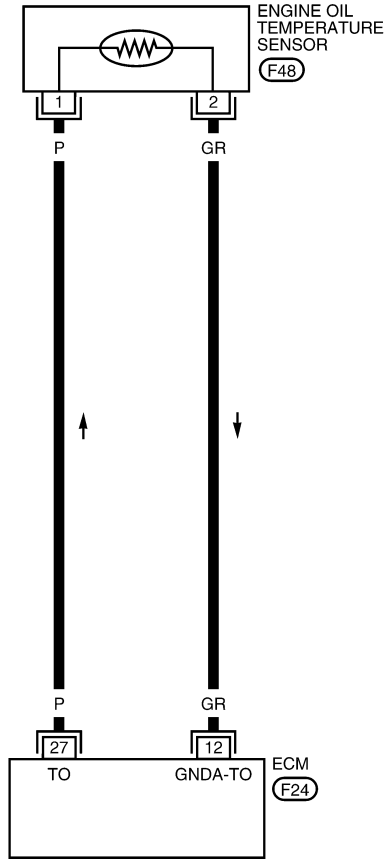
< SERVICE INFORMATION >

INFOID:000000006580571

Wiring Diagram

EC-EOTS-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



AABWA0303GB

Diagnosis Procedure

INFOID:000000006580572

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0197, P0198 EOT SENSOR

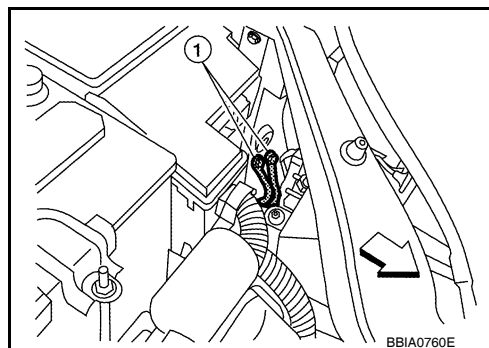
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-158, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



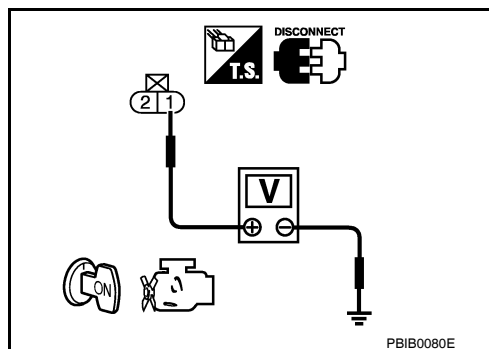
2. CHECK EOT SENSOR POWER SUPPLY CIRCUIT

- Disconnect engine oil temperature (EOT) sensor harness connector.
- Turn ignition switch ON.
- Check voltage between EOT sensor terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK EOT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check harness continuity between ECM terminal 12 and ECT sensor terminal 2.
Refer to Wiring Diagram.

Continuity should exist.

- Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ENGINE OIL TEMPERATURE SENSOR

Refer to [EC-845, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace engine oil temperature sensor. Refer to [EM-80](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

>> **INSPECTION END**

Component Inspection

ENGINE OIL TEMPERATURE SENSOR

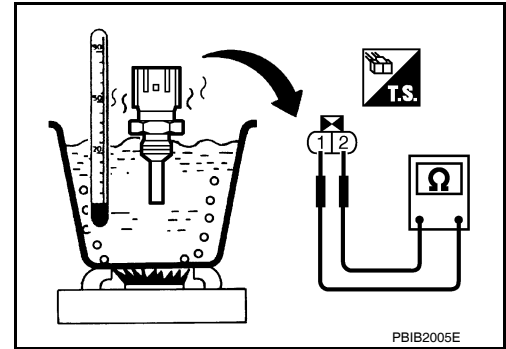
INFOID:000000006580573

DTC P0197, P0198 EOT SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

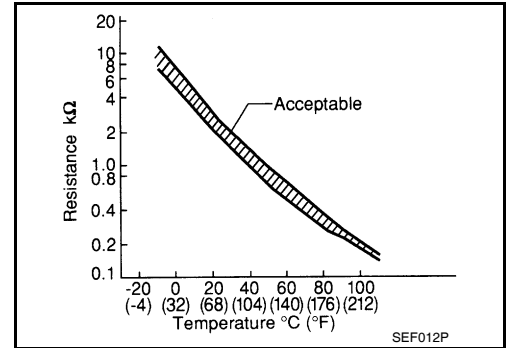
1. Check resistance between engine oil temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Engine coolant temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.37 - 2.63
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine oil temperature sensor. Refer to [EM-80](#).



DTC P0222, P0223 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

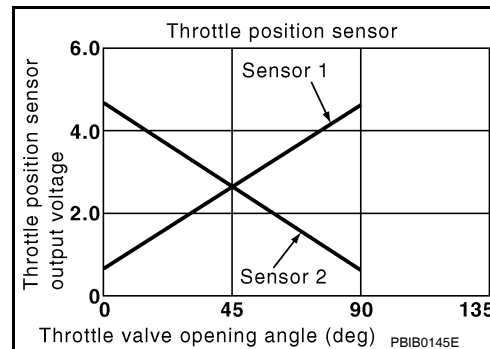
DTC P0222, P0223 TP SENSOR

Component Description

INFOID:000000006580575

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580576

Specification data are reference values.

Monitor item	Condition	Specification
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	More than 0.36 V
	• Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully depressed	Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:000000006580577

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (TP sensor 1 circuit is open or shorted.) (APP sensor 2 circuit is shorted.) • Electric throttle control actuator (TP sensor 1) • Accelerator pedal position sensor (APP sensor 2)
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

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. So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006580578

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-849, "Diagnosis Procedure"](#).

DTC P0222, P0223 TP SENSOR

< SERVICE INFORMATION >

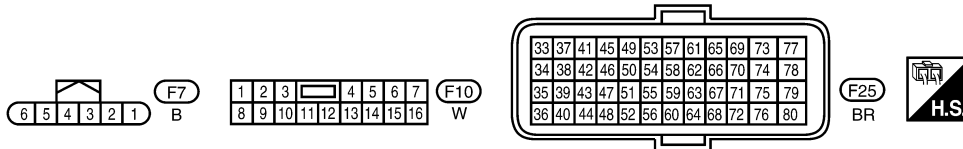
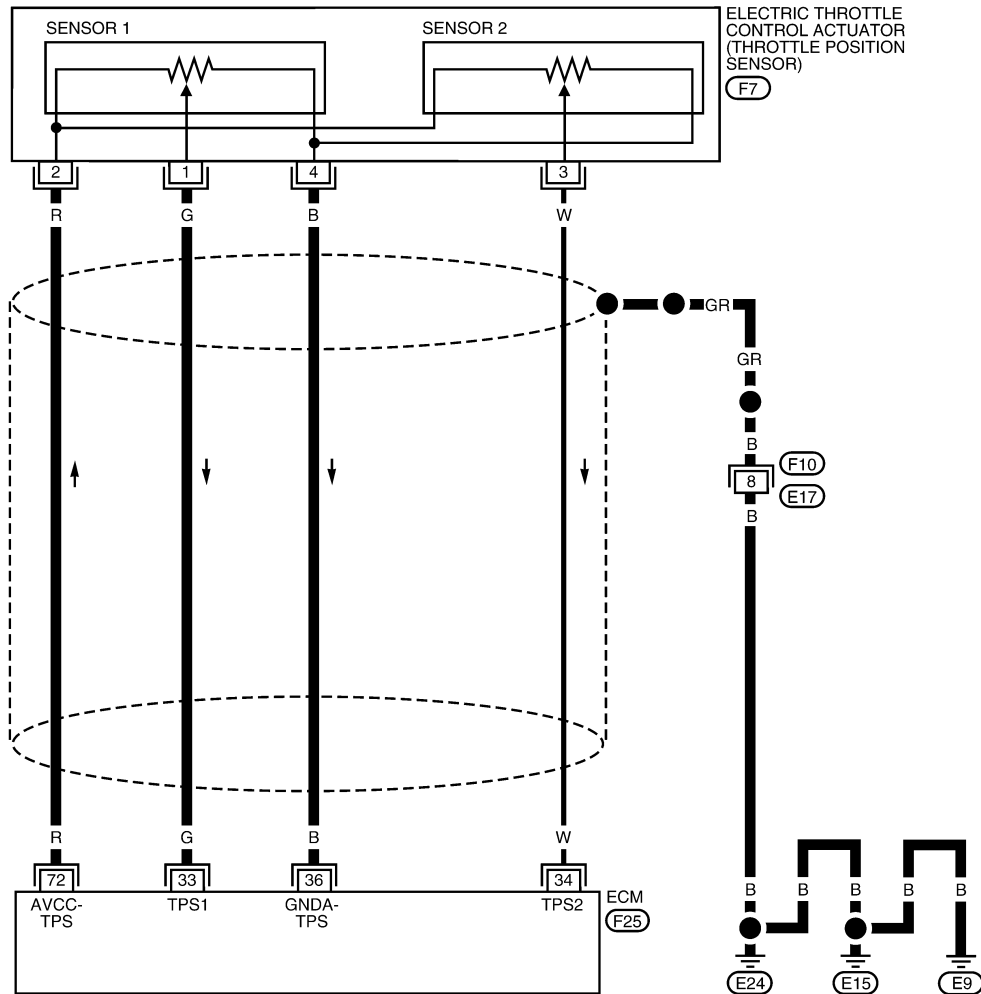
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:00000006580579

EC-TPS1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0163GB

Specification data are reference values and are measured between each terminal and ground.
CAUTION:
 Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0222, P0223 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
33	Y/B	Throttle position sensor 1	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34	R/W	Throttle position sensor 2	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
36	BR/W	Sensor ground (Throttle position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
72	R	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

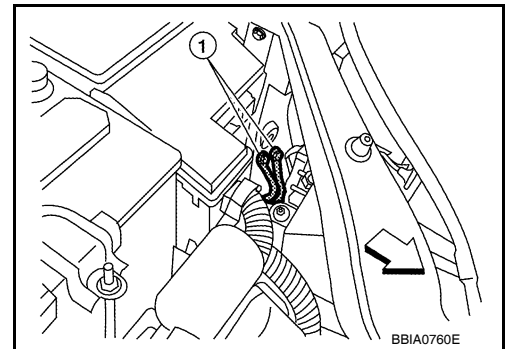
INFOID:000000006580580

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

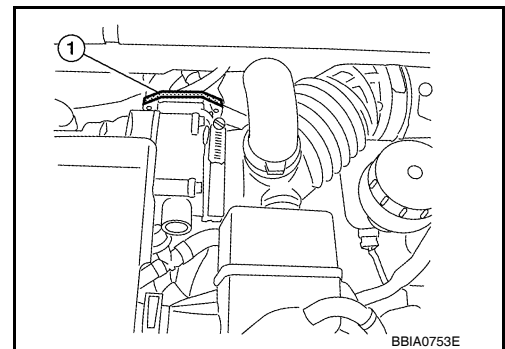
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-I

- Disconnect electric throttle control actuator (1) harness connector.
- Turn ignition switch ON.



DTC P0222, P0223 TP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

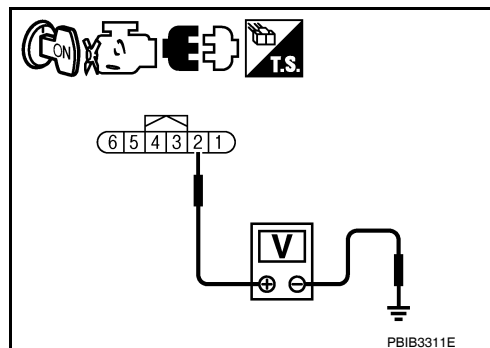
< SERVICE INFORMATION >

3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness connectors.



3. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 36 and electric throttle control actuator terminal 4. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 33 and electric throttle control actuator terminal 1. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-850, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18](#).

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580581

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform [EC-648, "Throttle Valve Closed Position Learning"](#).
3. Turn ignition switch ON.

DTC P0222, P0223 TP SENSOR

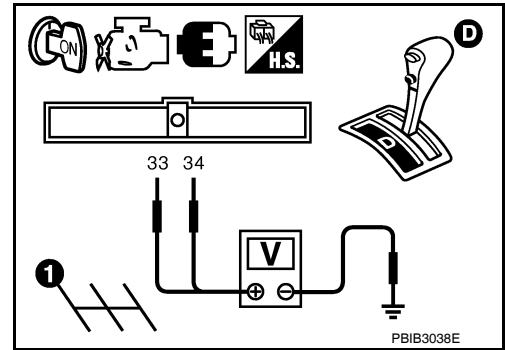
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Set shift lever to D position (CVT) or 1st position (M/T).
- Check voltage between ECM terminals 33 (TP sensor 1 signal), 34 (TP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
33 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
34 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V

- If NG, replace electric throttle control actuator and go to the next step. Refer to [EM-18](#).



A
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DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

On Board Diagnosis Logic

INFOID:000000006580583

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
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 (POS) signal every 200 engine revolutions for a change.
When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.
If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.
When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.
If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
2. Two Trip Detection Logic (Exhaust quality deterioration)
For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.
A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300 0300	Multiple cylinder misfire detected	Multiple cylinder misfire.	<ul style="list-style-type: none">• Improper spark plug• Insufficient compression• Incorrect fuel pressure• Fuel injector circuit is open or shorted• Fuel injector• Intake air leak• The ignition signal circuit is open or shorted• Lack of fuel• Drive plate or flywheel• Air fuel ratio (A/F) sensor 1• Incorrect PCV hose connection
P0301 0301	No. 1 cylinder misfire detected	No. 1 cylinder misfires.	
P0302 0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	
P0303 0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	
P0304 0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	

DTC Confirmation Procedure

INFOID:000000006580584

CAUTION:

Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Restart engine and let it idle for about 15 minutes.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-853. "Diagnosis Procedure"](#).

NOTE:

If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

- a. Turn ignition switch OFF and wait at least 10 seconds.
- b. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to table below.

Hold the accelerator pedal as steady as possible.

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following condition should be satisfied at the same time:

Engine speed	Engine speed in the freeze frame data \pm 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data \pm 10 km/h (6 MPH)
Basic fuel schedule	Basic fuel schedule in the freeze frame data \times (1 \pm 0.1)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F)
	When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F)

The time to driving varies according to the engine speed in the freeze frame data. Refer to the following table.

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

WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

INFOID:000000006580585

1. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace.

2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace.

3. PERFORM POWER BALANCE TEST

With CONSULT-III

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

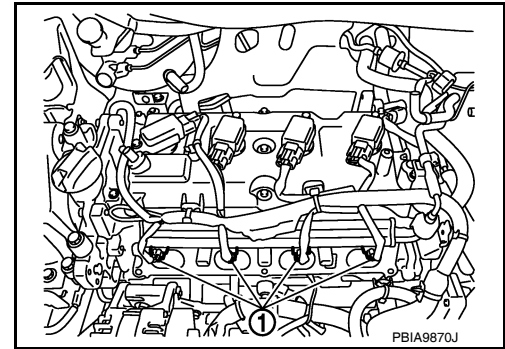
Without CONSULT-III

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

When disconnecting each fuel injector (1) harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



Yes or No

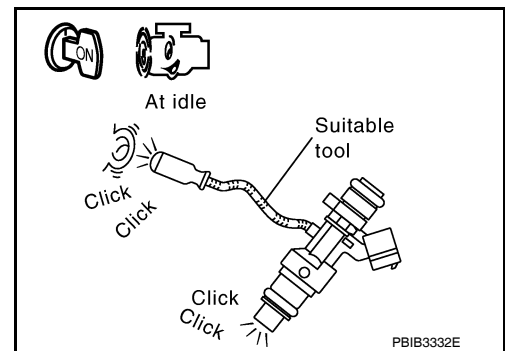
- Yes >> GO TO 4.
- No >> GO TO 9.

4. CHECK FUEL INJECTOR

Does each fuel injector make an operating sound at idle?

Yes or No

- Yes >> GO TO 5.
- No >> Check fuel injector(s) and circuit(s). Refer to [EC-1078](#).



5. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

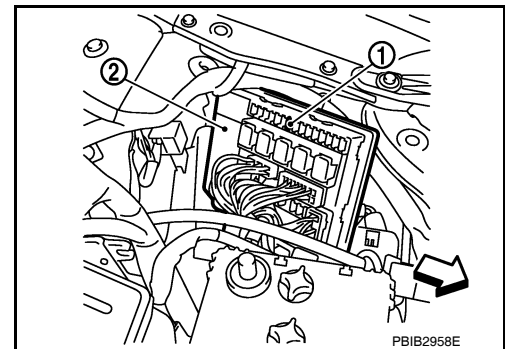
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Remove fuel pump fuse (1) in IPDM E/R (2) to release fuel pressure.

NOTE:

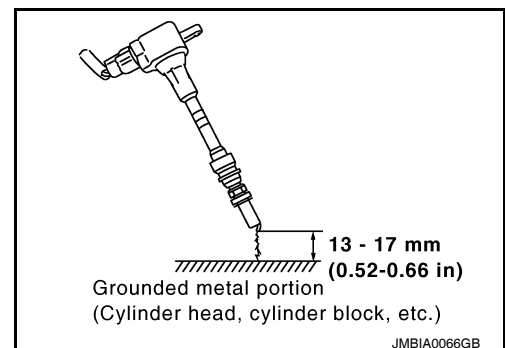
Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.

- ⇐ : Vehicle front
3. Start engine.
 4. After engine stalls, crank it two or three 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 about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:



DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

- Do not approach to the spark plug and the ignition coil within 50 cm. 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.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 6.

6. 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 about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

OK or NG

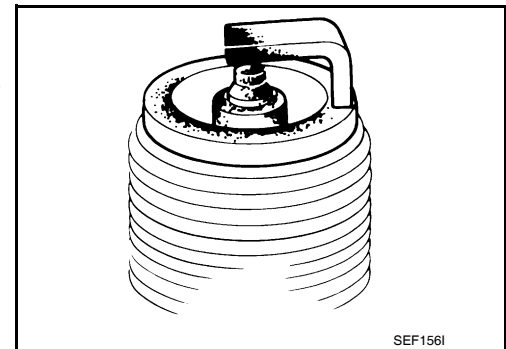
- OK >> GO TO 7.
- NG >> Check ignition coil, power transistor and their circuits. Refer to [EC-1088](#).

7. CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

OK or NG

- OK >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-33](#).
- NG >> 1. Repair or clean spark plug.
2. GO TO 8.



8. CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about three seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-33](#).

9. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-65. "On-Vehicle Service"](#).

OK or NG

- OK >> GO TO 10.
- NG >> 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-650. "Fuel Pressure Check"](#).
3. Install fuel pressure gauge and check fuel pressure. Refer to [EC-650. "Fuel Pressure Check"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

OK or NG

- OK >> GO TO 12.
- NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-1083](#).)
- Fuel pressure regulator (Refer to [EC-650](#), "Fuel Pressure Check".)
- Fuel lines (Refer to [FL-5](#), "Checking Fuel Line".)
- Fuel filter for clogging

>> Repair or replace.

12. CHECK IGNITION TIMING

Check the following items. Refer to [EC-642](#), "Basic Inspection".

Items	Specifications
Target idle speed	CVT: 675 ± 50 rpm (in P or N position)
	M/T: 700 ± 50 rpm (in Neutral position)
Ignition timing	CVT: 6 ± 5° BTDC (in Neutral position)
	M/T: 6 ± 5° BTDC (in Neutral position)

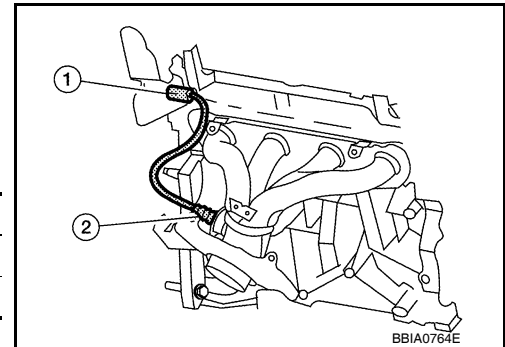
OK or NG

- OK >> GO TO 13.
- NG >> Follow the [EC-642](#), "Basic Inspection".

13. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector (1).
 - Air fuel ratio (A/F) sensor 1 (2)
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

A/F sensor 1 terminal	ECM terminal
1	49
2	53



Continuity should exist.

5. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

- OK >> GO TO 14.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to [EC-721](#), "Component Inspection".

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

15. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

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 tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> INSPECTION END

16. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check mass air flow sensor signal in "DATA MONITOR" mode with CONSULT-III.

At idling : 1.0 - 4.0 g·m/sec
At 2,500 rpm : 2.0 - 10.0 g·m/sec

With GST

1. Start engine and warm it up to normal operating temperature.
2. Check mass air flow sensor signal in Service \$01 with GST.

At idling : 1.0 - 4.0 g·m/sec
At 2,500 rpm : 2.0 - 10.0 g·m/sec

OK or NG

- OK >> GO TO 17.
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to [EC-734](#).

17. CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in [EC-660, "Symptom Matrix Chart"](#).

OK or NG

- OK >> GO TO 18.
NG >> Repair or replace.

18. 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 [EC-609, "Emission-related Diagnostic Information"](#).

>> GO TO 19.

19. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> INSPECTION END

DTC P0327, P0328 KS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

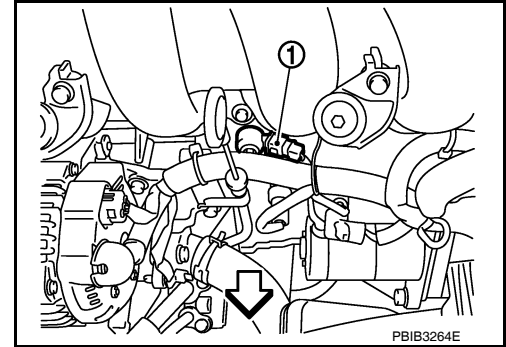
DTC P0327, P0328 KS

Component Description

INFOID:000000006580586

The knock sensor (1) 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.

- ↵: Vehicle front



On Board Diagnosis Logic

INFOID:000000006580587

The MIL will not light up for these self-diagnoses.

DTC No.	Trouble Diagnosis Name	DTC Detected Condition	Possible Cause
P0327 0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">• Harness or connectors (Knock sensor circuit is open or shorted.)• Knock sensor
P0328 0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006580588

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Start engine and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-860. "Diagnosis Procedure"](#).

DTC P0327, P0328 KS

[MR20DE (EXCEPT FOR CALIFORNIA)]

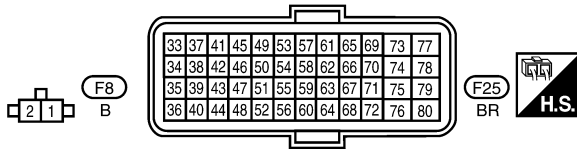
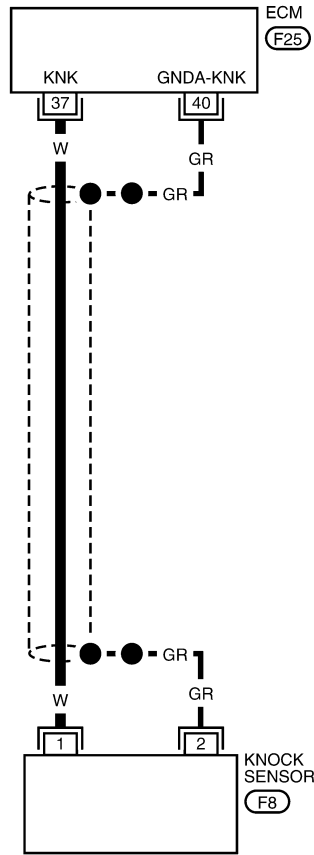
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006580589

EC-KS-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



ABBWA0164GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0327, P0328 KS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
37	W	Knock sensor	[Engine is running] <ul style="list-style-type: none">• Idle speed	Approximately 2.5 V
40	GR	Sensor ground (Knock sensor)	[Engine is running] <ul style="list-style-type: none">• Warm-up condition• Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006580590

1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 37 and ground. Refer to Wiring Diagram.

NOTE:

It is necessary to use an ohmmeter which can measure more than 10 M Ω .

Resistance: Approximately 532 - 588 k Ω [at 20°C (68°F)]

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 2.

2. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-II

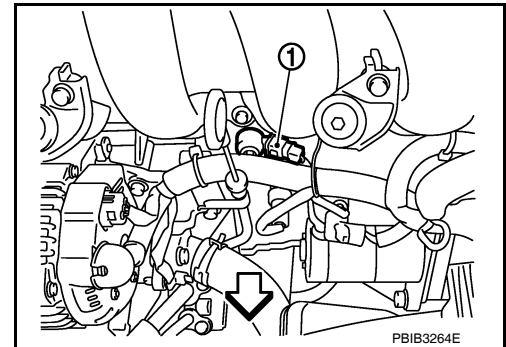
1. Disconnect knock sensor (1) harness connector.
 - \leftarrow : Vehicle front
2. Check harness continuity between ECM terminal 37 and knock sensor terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK KNOCK SENSOR

Refer to [EC-861, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace knock sensor. Refer to [EM-80](#).

4. CHECK GROUND CONNECTIONS

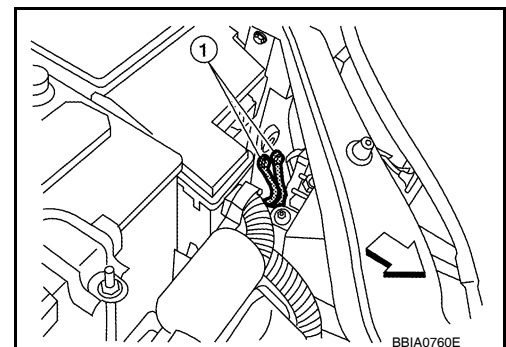
Loosen and retighten ground screws on the body.

Refer to [EC-706, "Ground Inspection"](#).

- \leftarrow : Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace ground connections.



DTC P0327, P0328 KS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

5. CHECK KNOCK SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT

1. Reconnect knock sensor harness connector.
2. Check harness continuity between ECM terminal 40 and knock sensor terminal 2.
Refer to Wiring Diagram.

Continuity should exist

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> INSPECTION END

Component Inspection

INFOID:000000006580591

KNOCK SENSOR

1. Check resistance between knock sensor terminal 1 and ground.

NOTE:

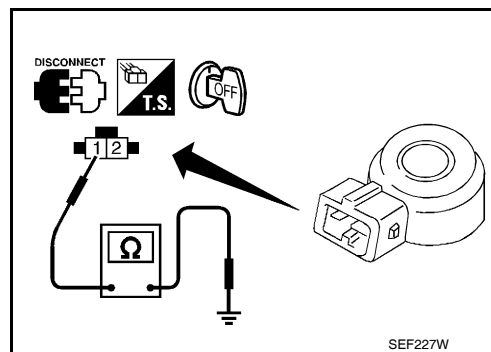
It is necessary to use an ohmmeter which can measure more than 10 M Ω .

Resistance: Approximately 532 - 588 k Ω [at 20°C (68°F)]

CAUTION:

Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

2. If NG, replace knock sensor. Refer to [EM-80](#).



DTC P0335 CKP SENSOR (POS)

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

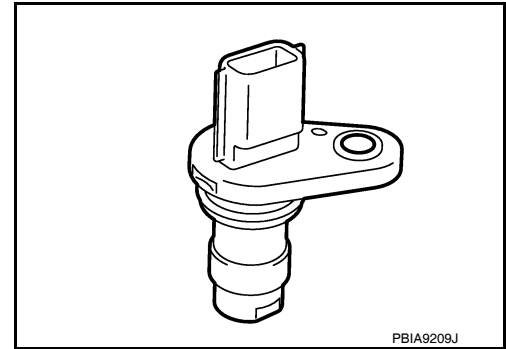
DTC P0335 CKP SENSOR (POS)

Component Description

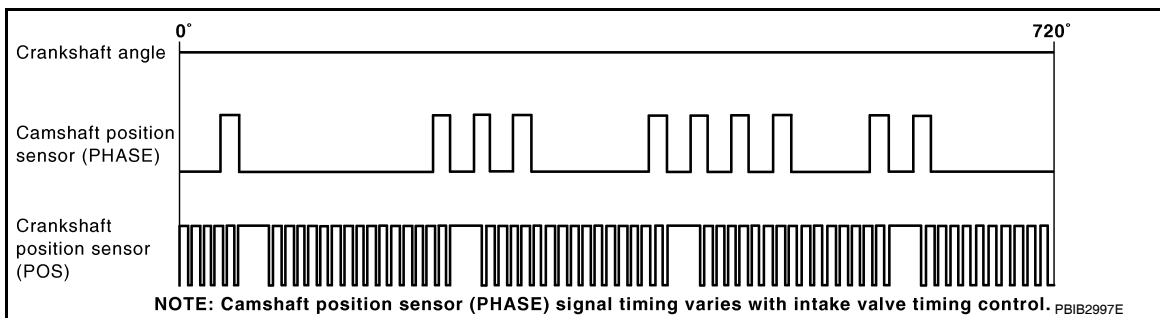
INFOID:000000006580593

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. 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.



PBIA9209J



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580594

Specification data are reference values.

Monitor item	Condition	Specification
ENG SPEED	<ul style="list-style-type: none"> Run engine and compare CONSULT-III value with the tachometer indication. 	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

INFOID:000000006580595

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor (POS) circuit	<ul style="list-style-type: none"> The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. The crankshaft position sensor (POS) signal is not in the normal pattern during engine running. 	<ul style="list-style-type: none"> Harness or connectors [Crankshaft position sensor (POS) circuit is open or shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is sorted.) Crankshaft position sensor (POS) Accelerator pedal position sensor Refrigerant pressure sensor EVAP control system pressure sensor Signal plate

DTC Confirmation Procedure

INFOID:000000006580596

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

DTC P0335 CKP SENSOR (POS)

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

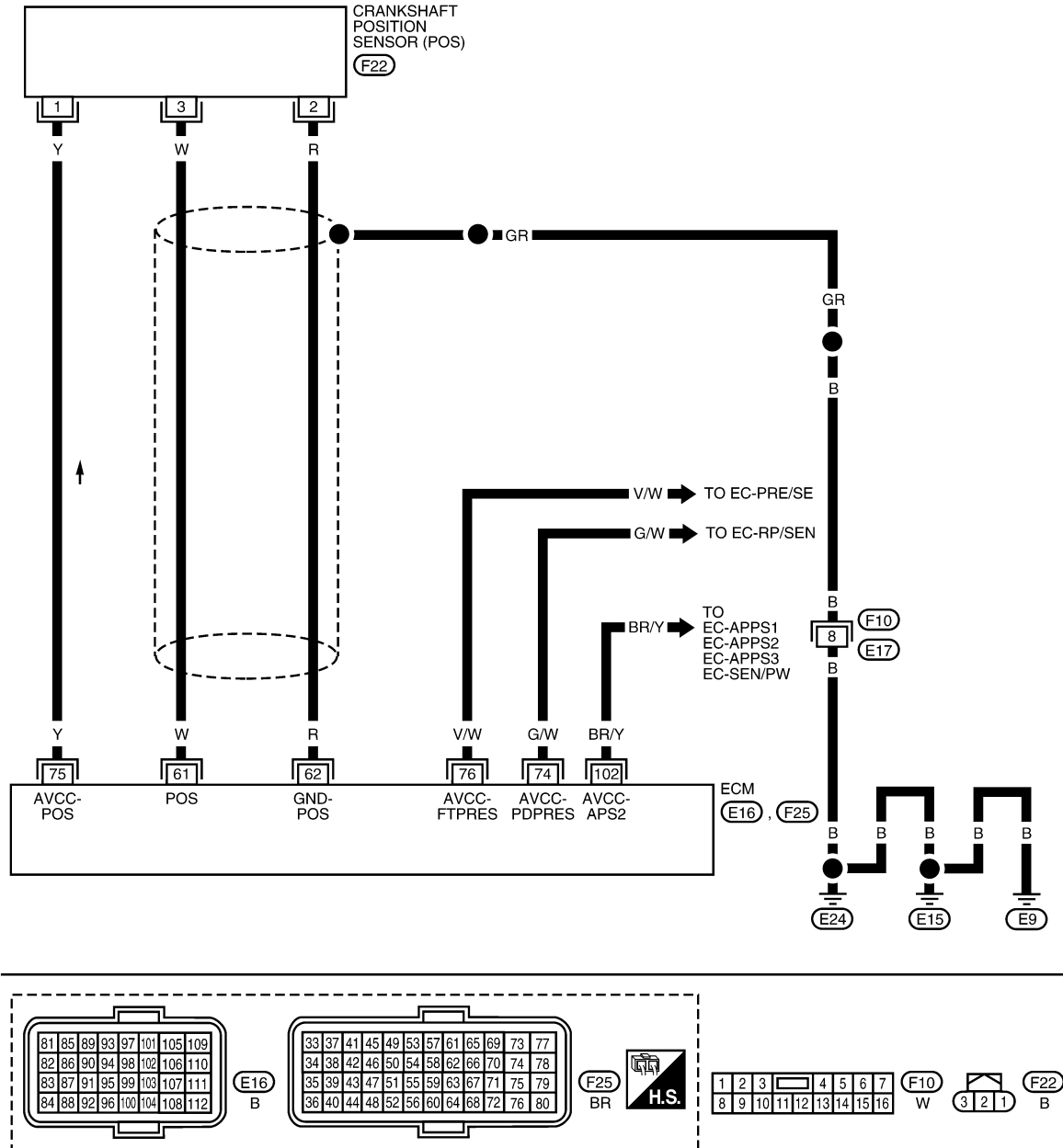
1. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-864, "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006580597

EC-POS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0165GB

DTC P0335 CKP SENSOR (POS)

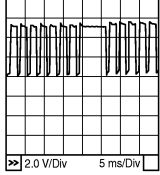
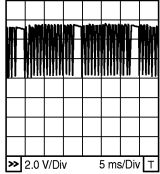
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-III.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
61	W	Crankshaft position sensor (POS)	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	Approximately 4.0 V★  PBIB2998E
			[Engine is running] • Engine speed: 2,000 rpm	Approximately 4.0 V★  PBIB2999E
62	R	Sensor ground [Crankshaft position sensor (POS)]	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

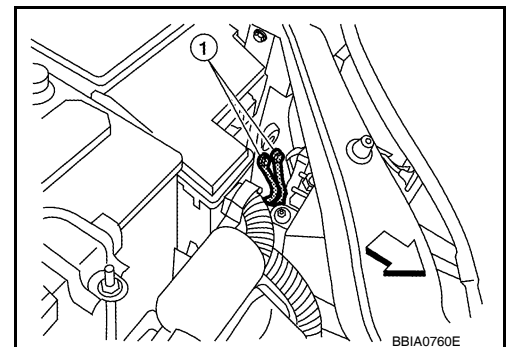
INFOID:000000006580598

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ⇐ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



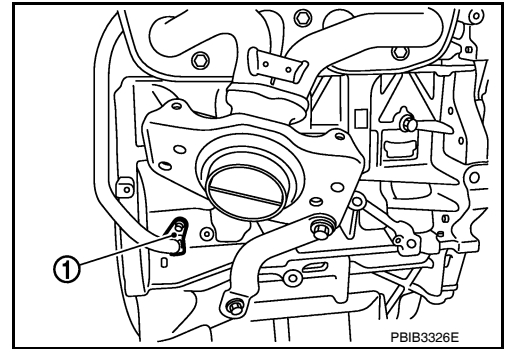
2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

DTC P0335 CKP SENSOR (POS)

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect crankshaft position (CKP) sensor (POS) (1) harness connector.
2. Turn ignition switch ON.

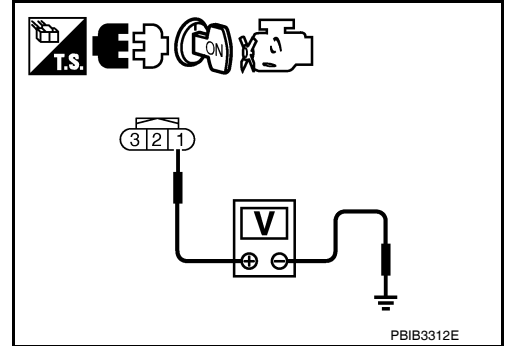


3. Check voltage between CKP sensor (POS) terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 3.



3.CHECK CKP SENSOR (POS) POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between CKP sensor (POS) terminal 1 and ECM terminal 75. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit.

4.CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-1098. "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-863. "Wiring Diagram"
76	EVAP control system pressure sensor terminal3	EC-921. "Wiring Diagram"
102	APP sensor terminal 5	EC-1041. "Wiring Diagram"

OK or NG

- OK >> GO TO 5.
- NG >> Repair short to ground or short to power in harness or connectors.

5.CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace refrigerant pressure sensor. Refer to [MTC-92](#).

6.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-925. "Component Inspection"](#).

OK or NG

DTC P0335 CKP SENSOR (POS)

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK >> GO TO 7.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

7. CHECK APP SENSOR

Refer to [EC-1044, "Component Inspection"](#).

OK or NG

OK >> GO TO 13.

NG >> GO TO 8.

8. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4](#).

>> **INSPECTION END**

9. CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between CKP sensor (POS) terminal 2 and ECM terminal 62.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 10.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between CKP sensor (POS) terminal 3 and ECM terminal 61.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 11.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-866, "Component Inspection"](#).

OK or NG

OK >> GO TO 12.

NG >> Replace crankshaft position sensor (POS). Refer to [EM-80](#).

12. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 13.

NG >> Replace the signal plate. Refer to [EM-80](#).

13. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580599

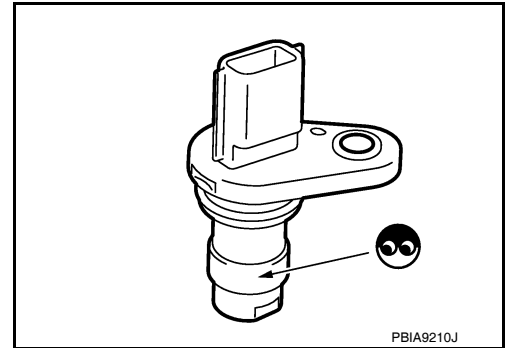
CRANKSHAFT POSITION SENSOR (POS)

DTC P0335 CKP SENSOR (POS)

[MR20DE (EXCEPT FOR CALIFORNIA)]

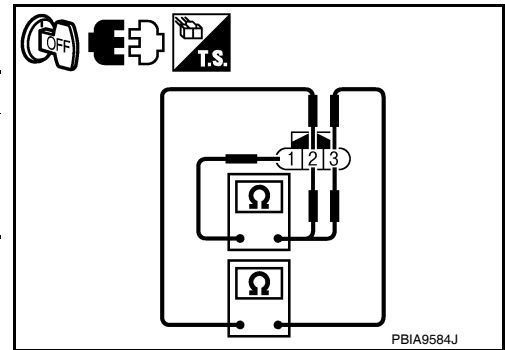
< SERVICE INFORMATION >

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	



6. If NG, replace crankshaft position sensor (POS). Refer to [EM-80](#).

DTC P0340 CMP SENSOR (PHASE)

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

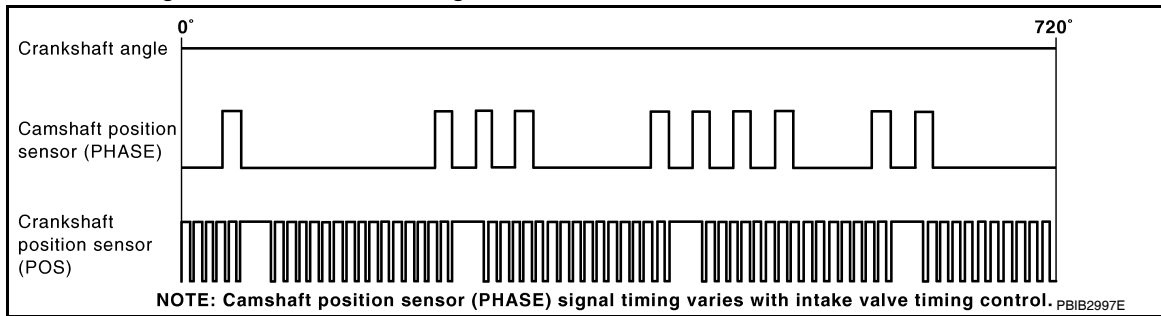
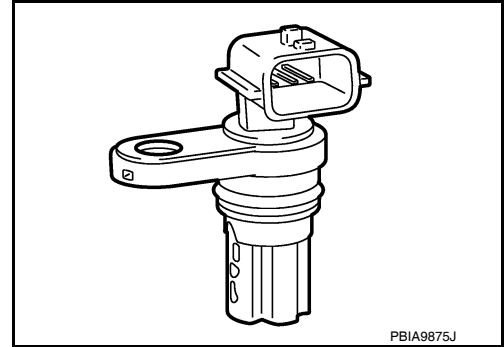
DTC P0340 CMP SENSOR (PHASE)

Component Description

INFOID:000000006580601

The camshaft position sensor (PHASE) senses the protrusion of camshaft (INT) 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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580602

Specification data are reference values.

Monitor item	Condition	Specification
ENG SPEED	• Run engine and compare CONSULT-III value with the tachometer indication.	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

INFOID:000000006580603

NOTE:

If DTC P0340 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-969](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor (PHASE) circuit	<ul style="list-style-type: none"> • The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. • The cylinder No. signal is not set to ECM during engine running. • The cylinder No. signal is not in the normal pattern during engine running. 	<ul style="list-style-type: none"> • Harness or connectors [Camshaft position sensor (PHASE) circuit is open or shorted.] • Camshaft position sensor (PHASE) • Camshaft (INT) • Starter motor (Refer to SC-11.) • Starting system circuit (Refer to SC-11.) • Dead (Weak) battery

DTC Confirmation Procedure

INFOID:000000006580604

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

1. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.

DTC P0340 CMP SENSOR (PHASE)

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

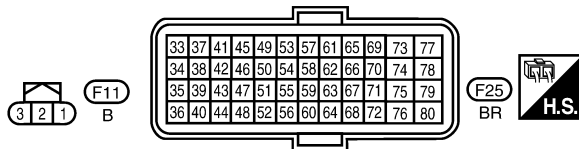
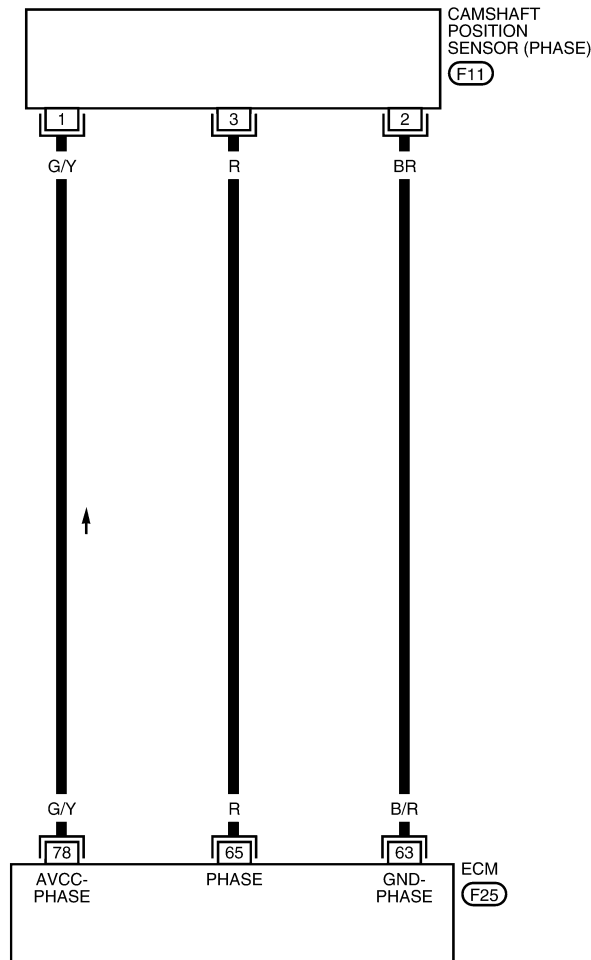
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-870, "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to next step.
4. Maintain engine speed at more than 800 rpm for at least 5 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-870, "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006580605

EC-PHASE-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA2885E

DTC P0340 CMP SENSOR (PHASE)

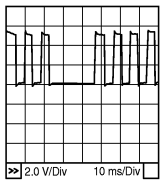
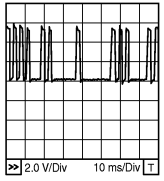
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-III.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
63	B/R	Sensor ground [Camshaft position sensor (PHASE)]	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
65	R	Camshaft position sensor (PHASE)	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle.	1.0 - 2.0 V★ 
			[Engine is running] • Engine speed: 2,000 rpm.	1.0 - 2.0 V★ 
78	G/Y	Sensor power supply [Camshaft position sensor (PHASE)]	[Ignition switch: ON]	Approximately 5 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006580606

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

Yes or No

Yes >> GO TO 2.

No >> Check starting system. (Refer to [SC-11](#).)

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.

DTC P0340 CMP SENSOR (PHASE)

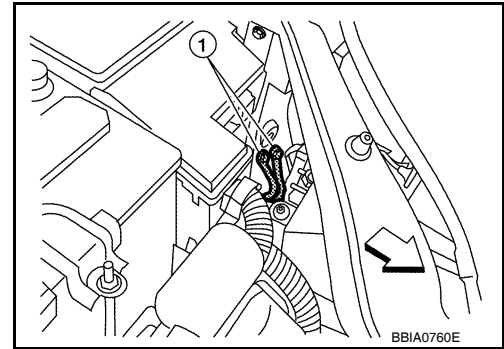
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

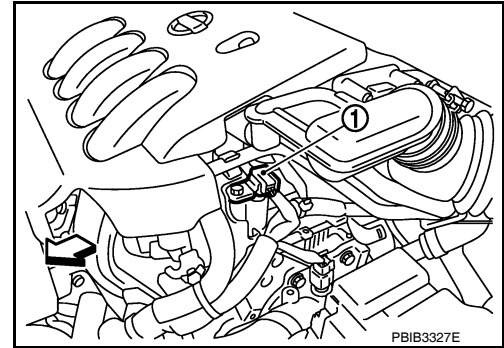
OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace ground connections.



3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

- Disconnect camshaft position (CMP) sensor (PHASE) (1) harness connector.
- ↔: Vehicle front
- Turn ignition switch ON.

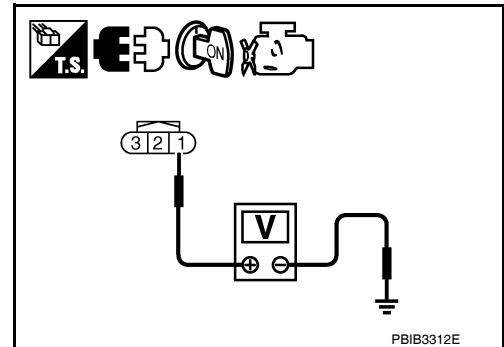


- Check voltage between CMP sensor (PHASE) terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check harness continuity between CMP sensor (PHASE) terminal 2 and ECM terminal 63.
Refer to Wiring Diagram.

Continuity should exist.

- Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- Check harness continuity between CMP sensor (PHASE) terminal 3 and ECM terminal 65.
Refer to Wiring Diagram.

Continuity should exist.

- Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.

DTC P0340 CMP SENSOR (PHASE)

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-872, "Component Inspection"](#).

OK or NG

OK >> GO TO 7.

NG >> Replace camshaft position sensor (PHASE). Refer to [EM-50](#).

7. CHECK CAMSHAFT (INTAKE)

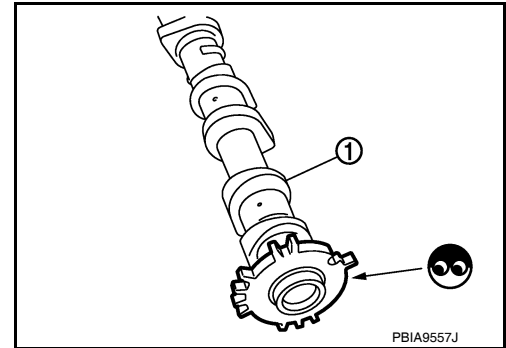
Check the following.

- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 8.

NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to [EM-50](#).



8. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

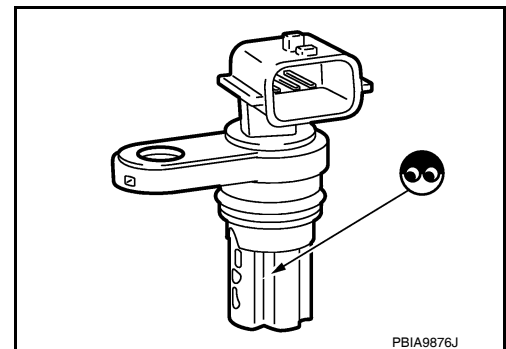
>> **INSPECTION END**

Component Inspection

INFOID:000000006580607

CAMSHAFT POSITION SENSOR (PHASE)

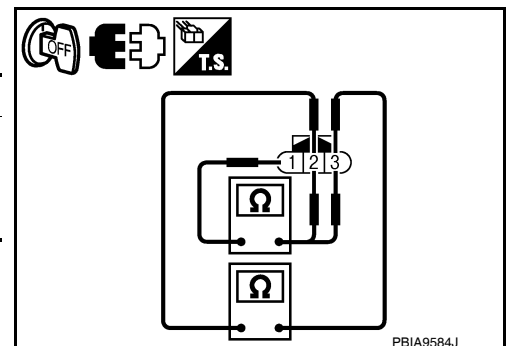
1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor (PHASE) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	

6. If NG, replace camshaft position sensor (PHASE). Refer to [EM-50](#).



DTC P0420 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0420 THREE WAY CATALYST FUNCTION

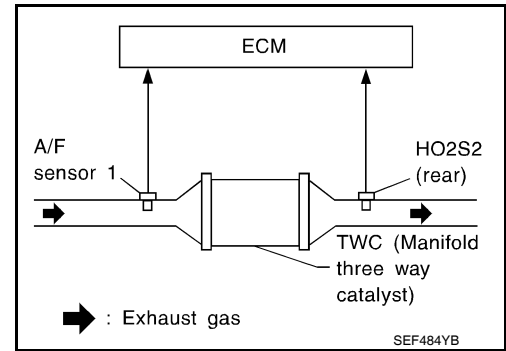
On Board Diagnosis Logic

INFOID:000000006580609

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 air fuel ratio (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 0420	Catalyst system efficiency below threshold	<ul style="list-style-type: none"> • Three way catalyst (manifold) does not operate properly. • Three way catalyst (manifold) does not have enough oxygen storage capacity. 	<ul style="list-style-type: none"> • Three way catalyst (manifold) • Exhaust tube • Intake air leaks • Fuel injector • Fuel injector leaks • Spark plug • Improper ignition timing

DTC Confirmation Procedure

INFOID:000000006580610

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-III

TESTING CONDITION:

Do not hold engine speed for more than the specified minutes below.

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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. Make sure 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 to 70°C (158°F).
7. Open engine hood.
8. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.
9. Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
If "INCMP" of "CATALYST" changed to "CMPLT", go to step 12.
10. Wait 5 seconds at idle.
11. Rev engine up to 2,000 to 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to "CMPLT" (It will take approximately 5 minutes).
If not "CMPLT", stop engine and cool it down to less than 70°C (158°F) and then retest from step 1.
12. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
13. Confirm that 1st trip DTC is not detected.
If 1st trip DTC is detected, go to [EC-874, "Diagnosis Procedure"](#).

DTC P0420 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

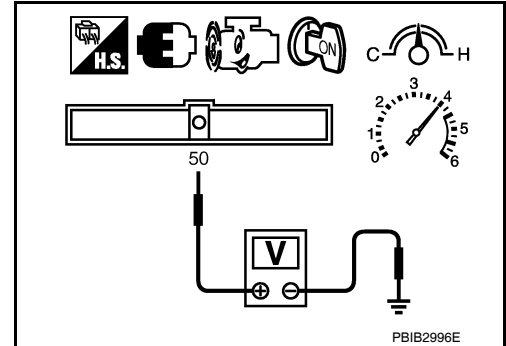
Overall Function Check

INFOID:000000006580611

Use this procedure to check the overall function of the three way catalyst (manifold). During this check, a 1st trip DTC might not be confirmed.

WITH GST

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. Open engine hood.
6. Set voltmeter probe between ECM terminals 50 HO2S2 signal and ground.
7. Keep engine speed at 2,500 rpm constant under no load.
8. Make sure that the voltage does not vary for more than 5 seconds.
If the voltage fluctuation cycle takes less than 5 seconds, go to [EC-874, "Diagnosis Procedure"](#).
 - 1 cycle: 0.6 - 1.0 → 0 - 0.3 → 0.6 - 1.0



Diagnosis Procedure

INFOID:000000006580612

1. CHECK EXHAUST SYSTEM

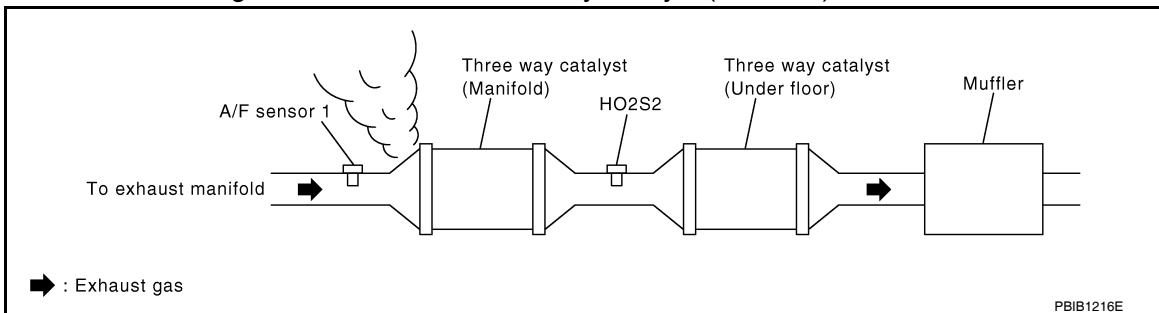
Visually check exhaust tubes and muffler for dent.

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace. Refer to [EX-5](#).

2. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (manifold).



OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace. Refer to [EX-5](#).

3. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace. [EM-16](#)

4. CHECK IGNITION TIMING

Check the following items. Refer to [EC-642, "Basic Inspection"](#).

DTC P0420 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Items	Specifications
Target idle speed	CVT: 675 ± 50 rpm (in P or N position)
	M/T: 700 ± 50 rpm (in Neutral position)
Ignition timing	CVT: 6 ± 5° BTDC (in P or N position)
	M/T: 6 ± 5° BTDC (in Neutral position)

OK or NG

OK >> GO TO 5.

NG >> Follow the [EC-642, "Basic Inspection"](#).

5. CHECK FUEL INJECTORS

1. Stop engine and turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Turn ignition switch ON.
4. Check voltage between ECM terminals 25, 29, 30, 31 and ground with CONSULT-III or tester. Refer to Wiring Diagram for fuel injectors, [EC-1079, "Wiring Diagram"](#).

Voltage: Battery voltage

OK or NG

OK >> GO TO 6.

NG >> Perform [EC-1080, "Diagnosis Procedure"](#).

6. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

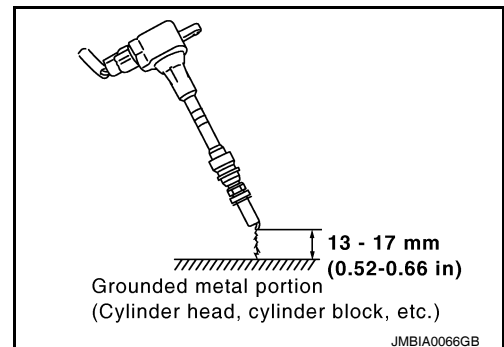
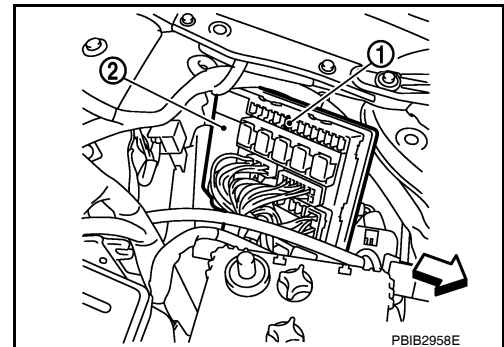
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Remove fuel pump fuse (1) in IPDM E/R (2) to release fuel pressure.

NOTE:

Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.

- ⇐ : Vehicle front
3. Start engine.
 4. After engine stalls, crank it two or three 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 about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:

- Do not approach to the spark plug and the ignition coil within 50cm. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.
- It might cause to damage the ignition coil if the gap of more than 17 mm (0.66 in) is taken.

NOTE:

DTC P0420 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

When the gap is less than 13 mm (0.52 in), the spark might be generated even if the coil is malfunctioning.

OK or NG

- OK >> GO TO 10.
- NG >> 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 about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

OK or NG

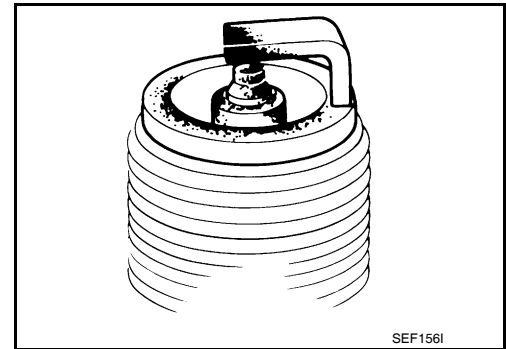
- OK >> GO TO 8.
- NG >> Check ignition coil, power transistor and their circuits. Refer to [EC-1088](#).

8.CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

OK or NG

- OK >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-33](#).
- NG >> 1. Repair or clean spark plug.
2. GO TO 9.



9.CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-33](#).

10.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Remove fuel injector assembly.
Refer to [EM-36](#).
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.
5. Turn ignition switch ON.
Make sure fuel does not drip from fuel injector.

OK or NG

- OK (Does not drip.)>>GO TO 11.
- NG (Drips.)>>Replace the fuel injector(s) from which fuel is dripping. Refer to [EM-36](#).

11.CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

Trouble is fixed.>>**INSPECTION END**

DTC P0420 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Trouble is not fixed.>>Replace three way catalyst (manifold). Refer to [EX-5](#).

A

EC

C

D

E

F

G

H

I

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K

L

M

N

O

P

DTC P0441 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

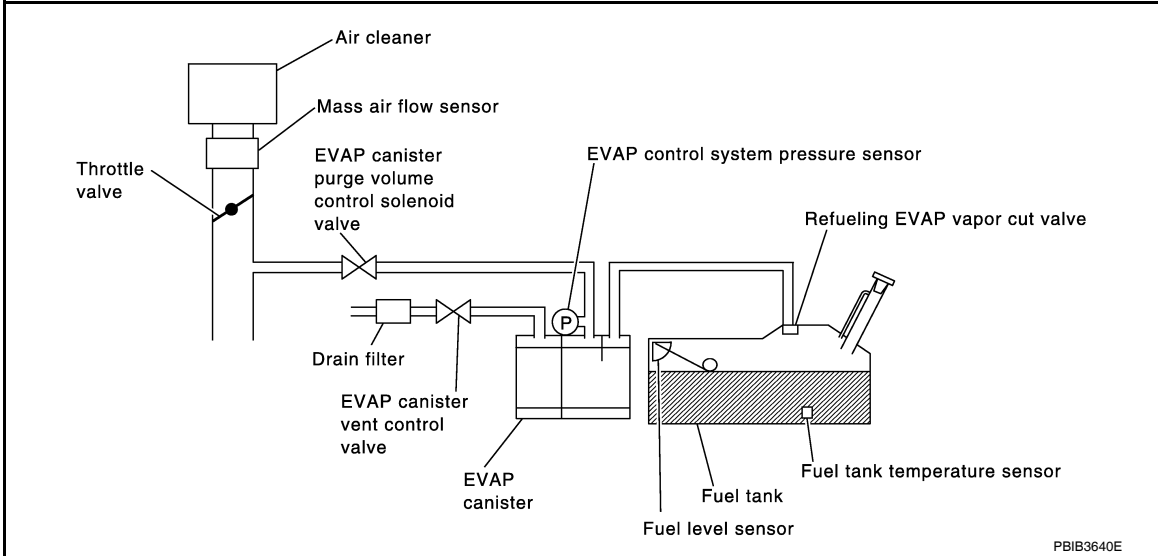
DTC P0441 EVAP CONTROL SYSTEM

System Description

INFOID:000000006580613

NOTE:

If DTC P0441 is displayed with other DTC such as P2122, P2123 P2127, P2128, 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.

On Board Diagnosis Logic

INFOID:000000006580614

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 0441	EVAP control system incorrect purge flow	<ul style="list-style-type: none"> EVAP control system does not operate properly. EVAP control system has a leak between intake manifold and EVAP control system pressure sensor. 	<ul style="list-style-type: none"> EVAP canister purge volume control solenoid valve stuck closed EVAP control system pressure sensor and the circuit Loose, disconnected or improper connection of rubber tube Blocked rubber tube Cracked EVAP canister EVAP canister purge volume control solenoid valve circuit Accelerator pedal position sensor Blocked purge port EVAP canister vent control valve Drain filter

DTC Confirmation Procedure

INFOID:000000006580615

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-III

DTC P0441 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 70 seconds.
4. Select "PURG FLOW P0441" of "EVAPORATIVE SYSTEM" in "DTC CONFIRMATION" mode with CONSULT-III.
5. Touch "START".
If "COMPLETED" is displayed, go to step 7.
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-III screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

Shift lever	Suitable position
VHCL SPEED SE	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,800 rpm
B/FUEL SCHDL	1.0 - 10.0 msec
COOLAN TEMP/S	More than 0°C (32 °F)

If TESTING is not changed for a long time, retry from step 2.

7. Make sure that "OK" is displayed after touching "ON-BOARD DIAGNOSIS". If "NG" is displayed, refer to [EC-879, "Diagnosis Procedure"](#).

Overall Function Check

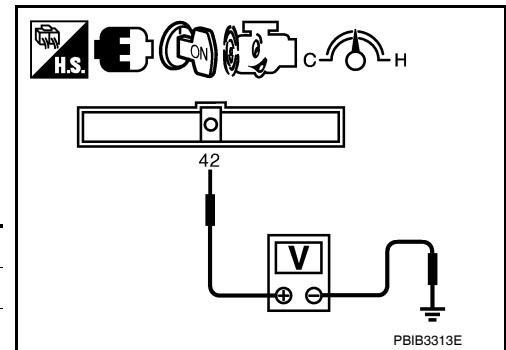
INFOID:000000006580616

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Lift up drive wheels.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.
5. Set voltmeter probes to ECM terminals 42 (EVAP control system pressure sensor signal) and ground.
6. Check EVAP control system pressure sensor value at idle speed and note it.
7. Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Shift lever	Any position other than P, N or R



8. 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.
9. If NG, go to [EC-879, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580617

1. CHECK EVAP CANISTER

1. Turn ignition switch OFF.
2. Check EVAP canister for cracks.

OK or NG

OK (With CONSULT-III)>>GO TO 2.

OK (Without CONSULT-III)>>GO TO 3.

NG >> Replace EVAP canister. Refer to [FL-14, "Removal and Installation"](#).

2. CHECK PURGE FLOW

DTC P0441 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Ⓟ With CONSULT-III

1. 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-593, "Description"](#).
2. Start engine and let it idle.
3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
4. Rev engine up to 2,000 rpm.
5. Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

PURG VOL CONT/V	VACUUM
100%	Should exist.
0%	Should not exist.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 4.

3. CHECK PURGE FLOW

ⓧ Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
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-593, "Description"](#).
4. Start engine and let it idle.
Do not depress accelerator pedal even slightly.
5. Check vacuum gauge indication before 60 seconds passed after starting engine.

Vacuum should not exist.

6. Revving engine up to 2,000 rpm after 100 seconds passed after starting engine.

Vacuum should exist.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 4.

4. CHECK EVAP PURGE LINE

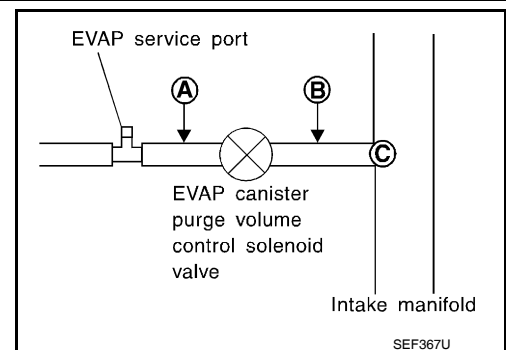
1. Turn ignition switch OFF.
2. Check EVAP purge line for improper connection or disconnection.
Refer to [EC-593, "Description"](#).

OK or NG

- OK >> GO TO 5.
NG >> Repair it.

5. CHECK EVAP PURGE HOSE AND PURGE PORT

1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.
2. Blow air into each hose and EVAP purge port **C**.



DTC P0441 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

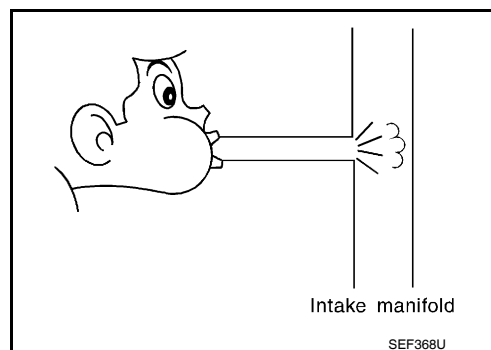
3. Check that air flows freely.

OK or NG

OK (With CONSULT-III)>>GO TO 6.

OK (Without CONSULT-III)>>GO TO 7.

NG >> Repair or clean hoses and/or purge port.



6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Start engine.

2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 8.

NG >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-903. "Component Inspection"](#).

OK or NG

OK >> GO TO 8.

NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18](#).

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.

2. Check connectors for water.

Water should not exist

OK or NG

OK >> GO TO 9.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to [EC-919](#) for DTC P0452 and [EC-926](#) for DTC P0453.

OK or NG

OK >> GO TO 10.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

10. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.

2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 11.

NG >> Clean the rubber tube using an air blower.

11. CHECK DRAIN FILTER

Refer to [EC-882. "Component Inspection"](#).

OK or NG

OK >> GO TO 12.

NG >> Replace drain filter. Refer to [FL-14](#).

12. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-908. "Component Inspection"](#).

DTC P0441 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 13.

NG >> Replace EVAP canister vent control valve. Refer to [FL-14](#).

13. CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-593, "Description"](#).

OK or NG

OK >> GO TO 14.

NG >> Replace it.

14. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 15.

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

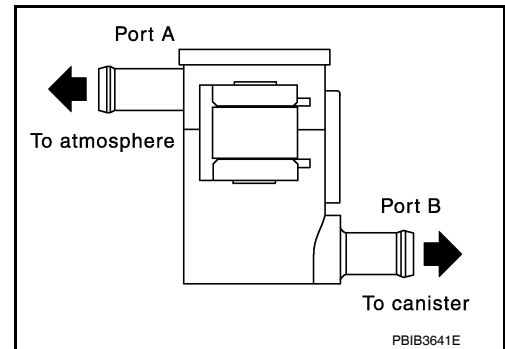
>> **INSPECTION END**

Component Inspection

INFOID:000000006580618

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to [FL-14](#).



DTC P0442 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0442 EVAP CONTROL SYSTEM

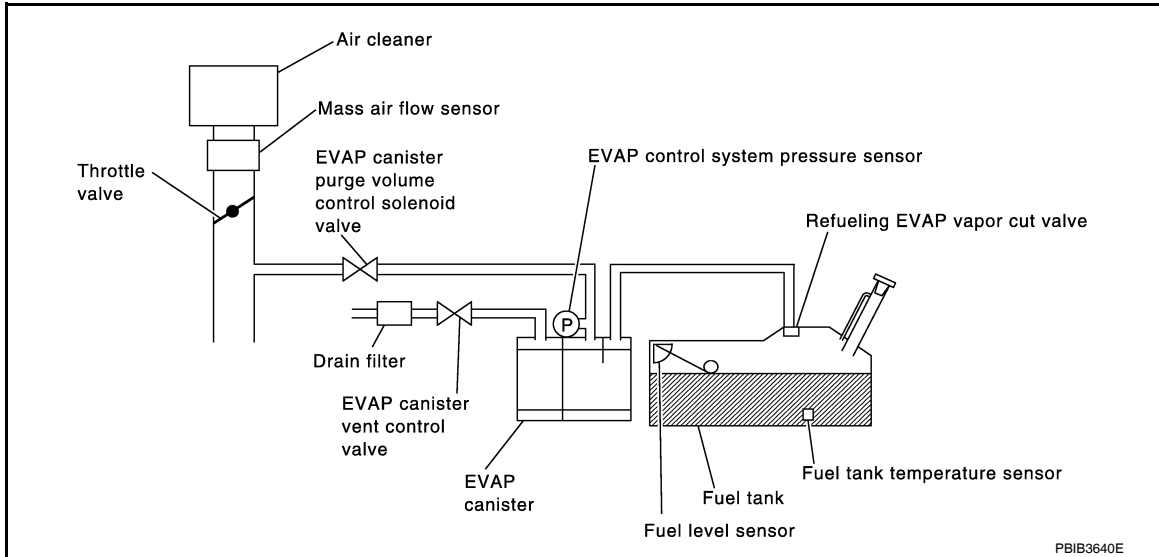
On Board Diagnosis Logic

INFOID:000000006580619

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following Vacuum test conditions.

The EVAP canister vent control valve is closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve will then be opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0442 0442	EVAP control system small leak detected (negative pressure)	EVAP control system has a leak, EVAP control system does not operate properly.	<ul style="list-style-type: none"> • Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap. • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged • Drain filter • EVAP canister is saturated with water • EVAP control system pressure sensor • Fuel level sensor and the circuit • Refueling EVAP vapor cut valve • ORVR system leaks

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC P0442 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC Confirmation Procedure

INFOID:000000006580620

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" 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 0 to 10°C (32 to 140°F).
- Open engine hood before conducting following procedure.

Ⓜ WITH CONSULT-III

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
4. Check the following conditions are met.
COOLAN TEMP/S: 0 - 100°C (32 - 212°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
5. Select "EVP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.
NOTE:
If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-642, "Basic Inspection"](#).
6. Make sure that "OK" is displayed.
If "NG" is displayed, refer to [EC-884, "Diagnosis Procedure"](#).

Ⓜ WITH GST

NOTE:

Be sure to read the explanation of Driving Pattern on [EC-609, "Emission-related Diagnostic Information"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to Driving Pattern, [EC-609, "Emission-related Diagnostic Information"](#)
3. Stop vehicle.
4. Turn ignition switch OFF and wait at least 10 seconds and then turn ignition switch ON.
5. Select Service \$07 with GST.
 - If P0442 is displayed on the screen, go to [EC-884, "Diagnosis Procedure"](#).
 - If P0441 is displayed on the screen, go to [EC-879, "Diagnosis Procedure"](#) for DTC P0441.

Diagnosis Procedure

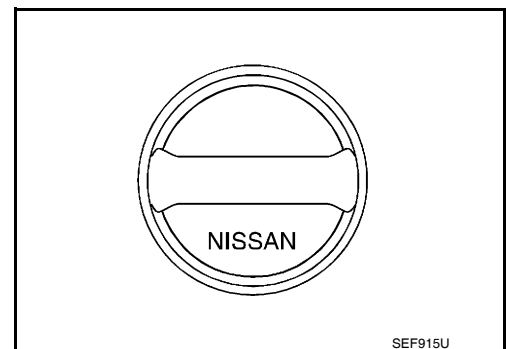
INFOID:000000006580621

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
- NG >> Replace with genuine NISSAN fuel filler cap.



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.
- NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.

DTC P0442 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

2. Retighten until rereaching sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-595. "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace fuel filler cap with a genuine one.

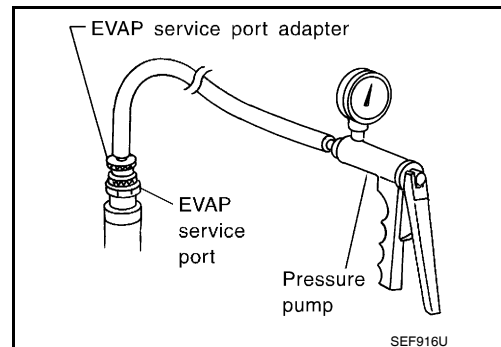
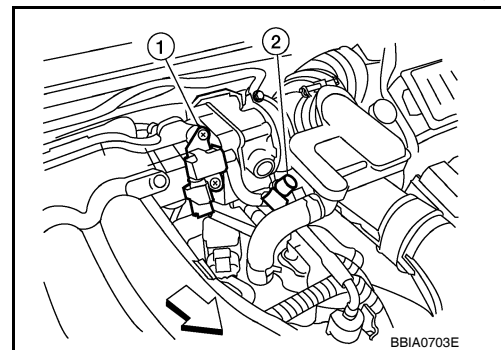
5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely. For the location of EVAP service port (2), refer to [EC-593. "Description"](#).

- EVAP canister purge volume control solenoid valve (1)
- ↵: Vehicle front

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



With CONSULT-III>>GO TO 6.

Without CONSULT-III>>GO TO 7.

6. CHECK FOR EVAP LEAK

With CONSULT-III

1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-III.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

CAUTION:

- **Never use compressed air or a high pressure pump.**
- **Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.**

DTC P0442 EVAP CONTROL SYSTEM

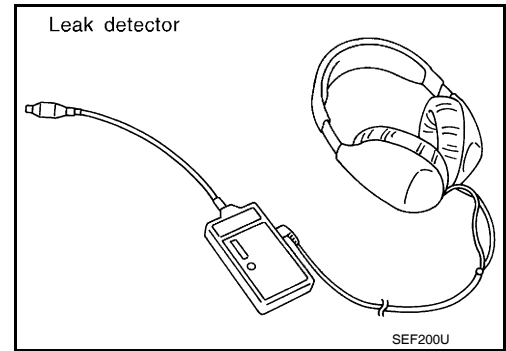
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-593. "Description"](#).

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace.



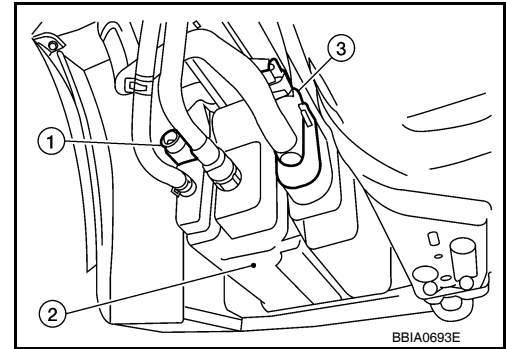
7. CHECK FOR EVAP LEAK

⊗ **Without CONSULT-III**

1. Turn ignition switch OFF.
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

CAUTION:

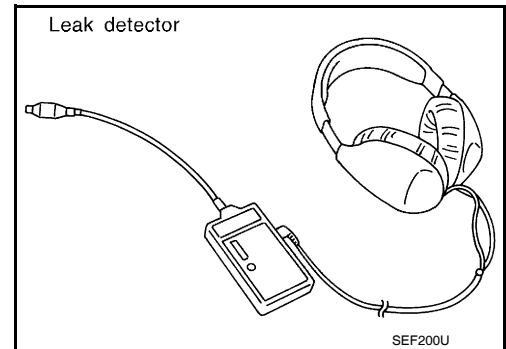
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-593. "Description"](#).

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace.



8. CHECK DRAIN FILTER

Refer to [EC-889. "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
NG >> Replace drain filter. Refer to [FL-14](#).

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following,

- EVAP canister vent control valve is installed properly. Refer to [FL-14](#).
- EVAP canister vent control valve. Refer to [FL-14](#).

OK or NG

- OK >> GO TO 10.
NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14](#).

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

DTC P0442 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

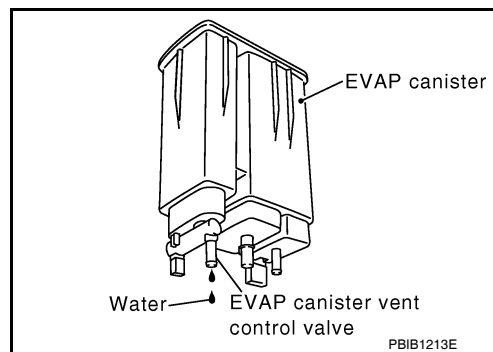
1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 11.

No (With CONSULT-III)>>GO TO 13.

No (Without CONSULT-III)>>GO TO 14.



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 1.9 kg (4.2 lb).

OK or NG

OK (With CONSULT-III)>>GO TO 13.

OK (Without CONSULT-III)>>GO TO 14.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose connected to EVAP canister for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to [FL-14](#).

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK >> GO TO 16.

NG >> GO TO 15.

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-III

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.

OK or NG

OK >> GO TO 17.

NG >> GO TO 15.

15. CHECK VACUUM HOSE

DTC P0442 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Check vacuum hoses for clogging or disconnection. Refer to [EC-670, "Vacuum Hose Drawing"](#).

OK or NG

- OK >> GO TO 16.
- NG >> Repair or reconnect the hose.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-903, "Component Inspection"](#).

OK or NG

- OK >> GO TO 17.
- NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18](#).

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-835, "Component Inspection"](#).

OK or NG

- OK >> GO TO 18.
- NG >> Replace fuel level sensor unit. Refer to [FL-6](#).

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-925, "Component Inspection"](#).

OK or NG

- OK >> GO TO 19.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

19. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-593](#).

OK or NG

- OK >> GO TO 20.
- NG >> Repair or reconnect the hose.

20. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 21.

21. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-597](#).

OK or NG

- OK >> GO TO 22.
- NG >> Repair or replace hoses and tubes.

22. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

- OK >> GO TO 23.
- NG >> Repair or replace hoses, tubes or filler neck tube. Refer to [FL-14](#).

23. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-600, "Component Inspection"](#).

OK or NG

- OK >> GO TO 24.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-14](#).

24. CHECK FUEL LEVEL SENSOR

Refer to [FL-6](#).

DTC P0442 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 25.

NG >> Replace fuel level sensor unit. Refer to [FL-6](#).

25. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

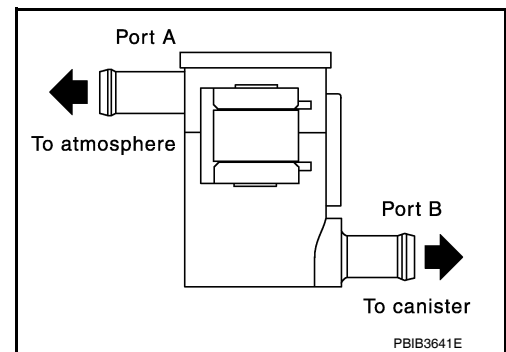
>> INSPECTION END

Component Inspection

INFOID:000000006580622

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter. Refer to [FL-14](#).



DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION > [MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:000000006580623

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed* ¹	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage* ¹		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
ABS actuator and electric unit (control unit)	Vehicle speed* ²		
Combination meter			

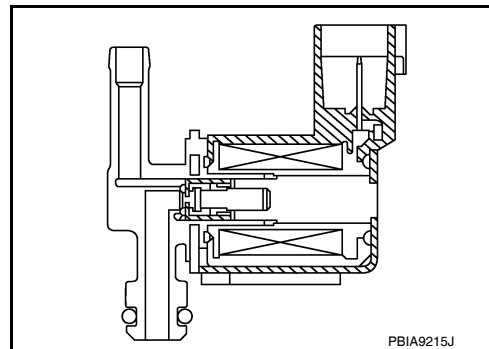
*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to the ECM though CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580624

Specification data are reference values.

Monitor item	Condition	Specification
PURG VOL C/V	<ul style="list-style-type: none"> • Engine: After warming up • Shift lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load 	Idle (Accelerator pedal is not depressed even slightly, after engine starting)
	2,000 rpm	0 - 50%

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

On Board Diagnosis Logic

INFOID:000000006580625

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0443 0443	EVAP canister purge volume control solenoid valve	A)	The canister purge flow is detected during the vehicle is stopped while the engine is running, even when EVAP canister purge volume control solenoid valve is completely closed.	<ul style="list-style-type: none"> • EVAP control system pressure sensor • EVAP canister purge volume control solenoid valve (EVAP canister purge volume control solenoid valve is stuck open.) • EVAP canister vent control valve • Drain filter • EVAP canister • Hoses (Hoses are connected incorrectly or clogged.)
		B)	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	

DTC Confirmation Procedure

INFOID:000000006580626

Perform PROCEDURE FOR MALFUNCTION A first.

If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

TESTING CONDITION:

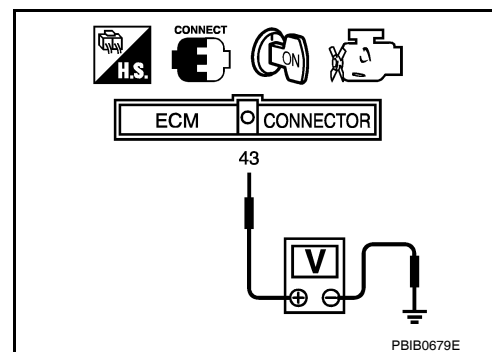
- Perform "DTC Confirmation Procedure" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Always perform test at a temperature of 5 to 60°C (41 to 140°F).
- Cool the vehicle so that engine coolant temperature becomes same level as ambient temperature.

WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Check that the following condition are met.
FUEL T/TMP SE: 0 – 35°C (32 – 95°F)
3. Start engine and wait at least 60 seconds.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-894, "Diagnosis Procedure"](#).

WITH GST

1. Turn ignition switch ON.
2. Set voltmeter probes to ECM terminal 43 (FTT sensor signal) and ground.
3. Check that the voltage is 3.1 – 4.2 V.
4. Start engine and wait at least 60 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-894, "Diagnosis Procedure"](#).



PROCEDURE FOR MALFUNCTION B

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-III

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. Touch "START".
6. Start engine and let it idle until "TESTING" on CONSULT-III changes to "COMPLETED". (It will take approximately 10 seconds.)
If "TESTING" is not displayed after 5 minutes, retry from step 2.
7. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-894, "Diagnosis Procedure"](#).

 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. Start engine and let it idle for at least 20 seconds.
4. Select Service \$07 with GST.
5. If 1st trip DTC is detected, go to [EC-894, "Diagnosis Procedure"](#).

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

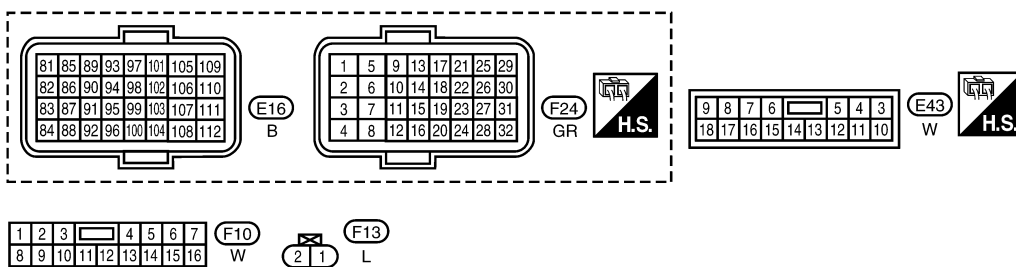
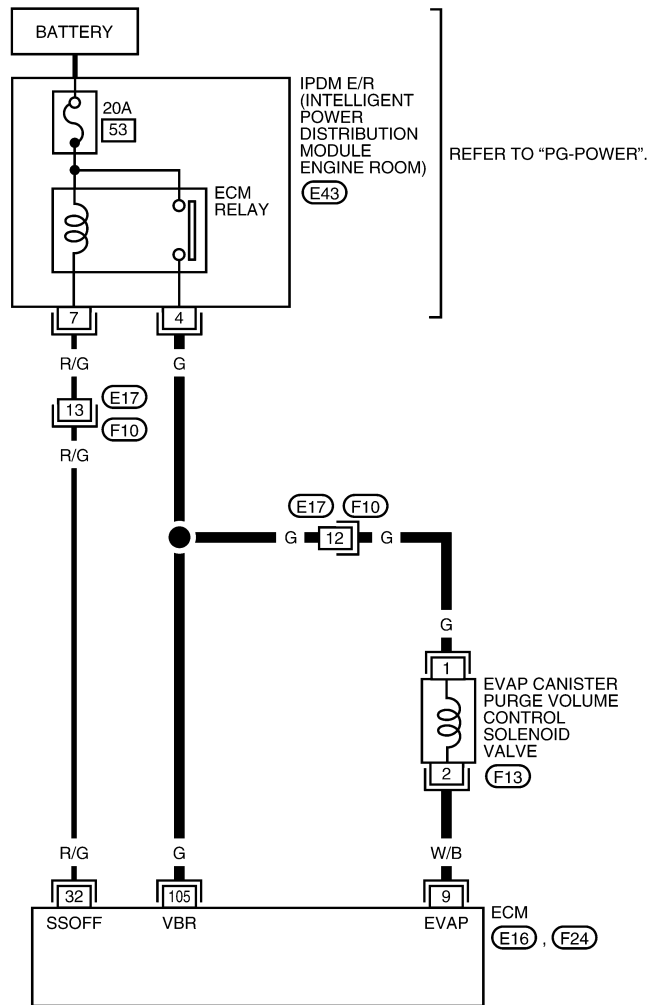
< SERVICE INFORMATION > [MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580627

EC-PGC/V-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

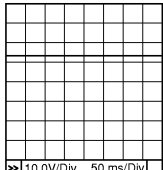
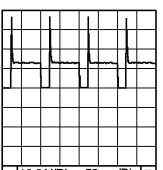
CAUTION:

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
9	W/B	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> Idle speed Accelerator pedal: Not depressed even slightly, after engine starting. 	BATTERY VOLTAGE (11 - 14 V)★  <small>10.0V/Div 50 ms/Div</small> PBIB0050E
			[Engine is running] <ul style="list-style-type: none"> Engine speed: About 2,000 rpm (More than 100 seconds after starting engine) 	Approximately 10 V★  <small>10.0 V/Div 50 ms/Div</small> PBIB0520E
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none"> For a few seconds after turning ignition switch OFF 	0 - 1.0 V
			[Ignition switch: OFF] <ul style="list-style-type: none"> More than a few seconds after turning ignition switch OFF 	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

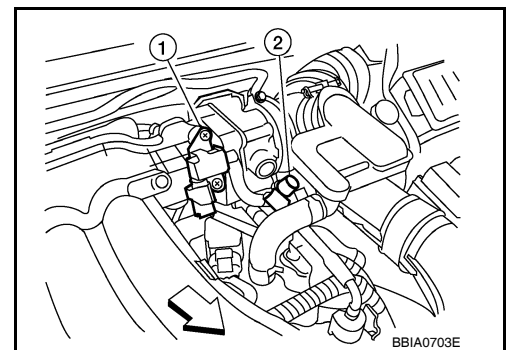
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006580628

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect EVAP canister purge volume control solenoid valve (1) harness connector.
 - EVAP service port (2)
 - ↔: Vehicle front
- Turn ignition switch ON.



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DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

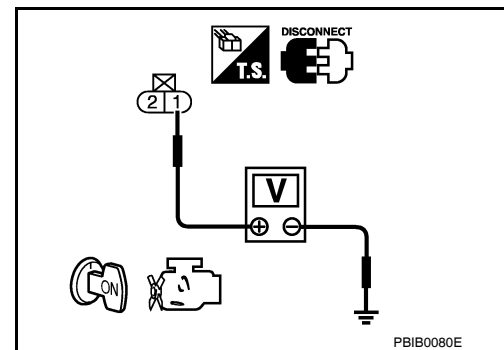
[MR20DE (EXCEPT FOR CALIFORNIA)]

4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 9 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

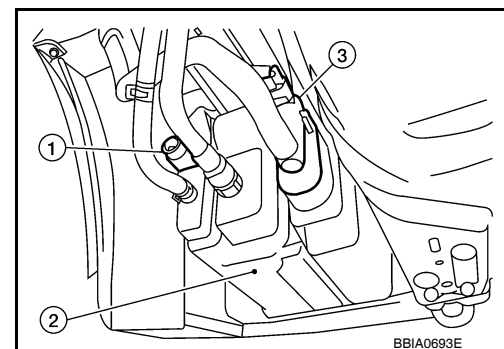
4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check connectors for water.



Water should not exist.

OK or NG

- OK >> GO TO 5.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-925. "Component Inspection"](#).

OK or NG

- OK (With CONSULT-III) >> GO TO 6.
- OK (Without CONSULT-III) >> GO TO 7.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Turn ignition switch OFF.

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Reconnect harness connectors disconnected.
3. Start engine.
4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.
NG >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-897, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18](#).

8. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 9.
NG >> Clean the rubber tube using an air blower.

9. CHECK DRAIN FILTER

Refer to [EC-882, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
NG >> Replace drain filter. Refer to [FL-14](#).

10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-908, "Component Inspection"](#).

OK or NG

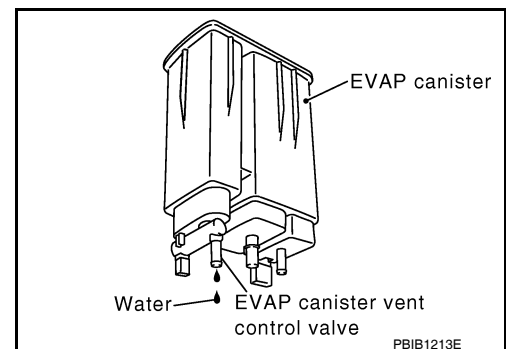
- OK >> GO TO 11.
NG >> Replace EVAP canister vent control valve. Refer to [FL-14](#).

11. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Does water drain from the EVAP canister?

YES or NO

- YES >> GO TO 12.
NO >> GO TO 14.



12. 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 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 14.
NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

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-14](#).

14.CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

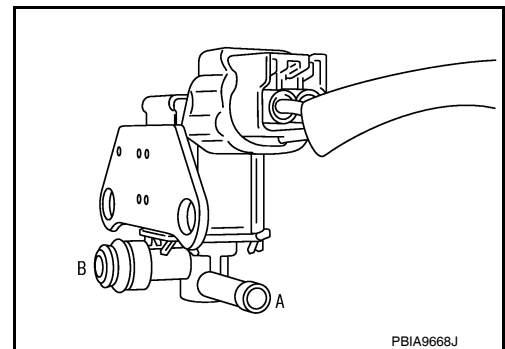
INFOID:000000006580629

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Ⓟ WITH CONSULT-III

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

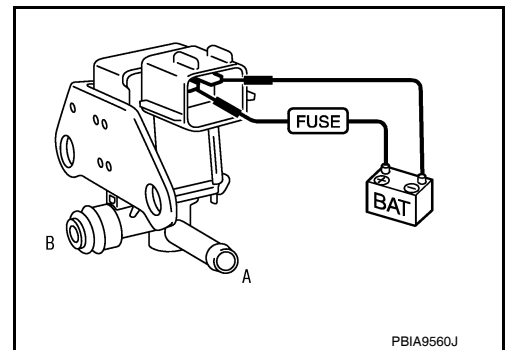
Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No



ⓧ WITHOUT CONSULT-III

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	Yes
No supply	No



DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:000000006580631

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
ABS actuator and electric unit (control unit)	Vehicle speed*2		
Combination meter			

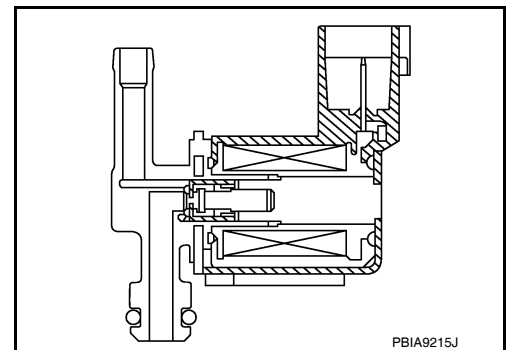
*1: The ECM determines the start signal status by the signal of engine speed and battery voltage.

*2: This signal is sent to the ECM through CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580632

Specification data are reference values.

Monitor item	Condition	Specification
PURG VOL C/V	<ul style="list-style-type: none"> • Engine: After warming up • Shift lever: N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load 	Idle (Accelerator pedal is not depressed even slightly, after engine starting)
	2,000 rpm	0 - 50%

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

On Board Diagnosis Logic

INFOID:000000006580633

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444 0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	<ul style="list-style-type: none"> • Harness or connectors (EVAP canister purge volume control solenoid valve circuit is open or shorted.) • EVAP canister purge volume control solenoid valve
P0445 0445	EVAP canister purge volume control solenoid valve circuit shorted	An excessively high voltage signal is sent to ECM through the valve	<ul style="list-style-type: none"> • Harness or connectors (EVAP canister purge volume control solenoid valve circuit is shorted.) • EVAP canister purge volume control solenoid valve

DTC Confirmation Procedure

INFOID:000000006580634

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11 V at idle.

1. Start engine and let it idle for at least 13 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-901. "Diagnosis Procedure"](#).

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DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

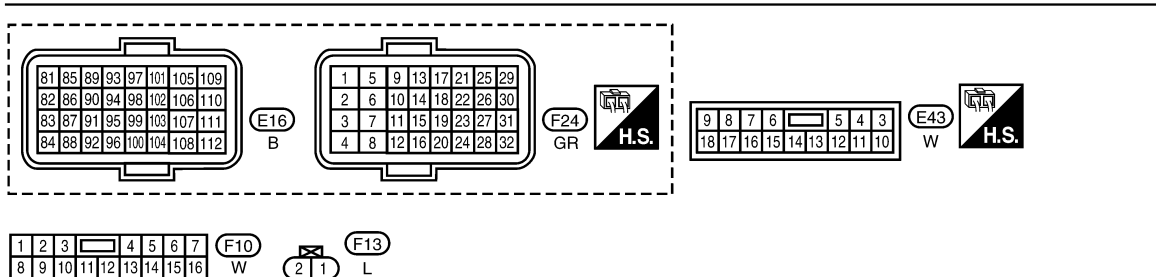
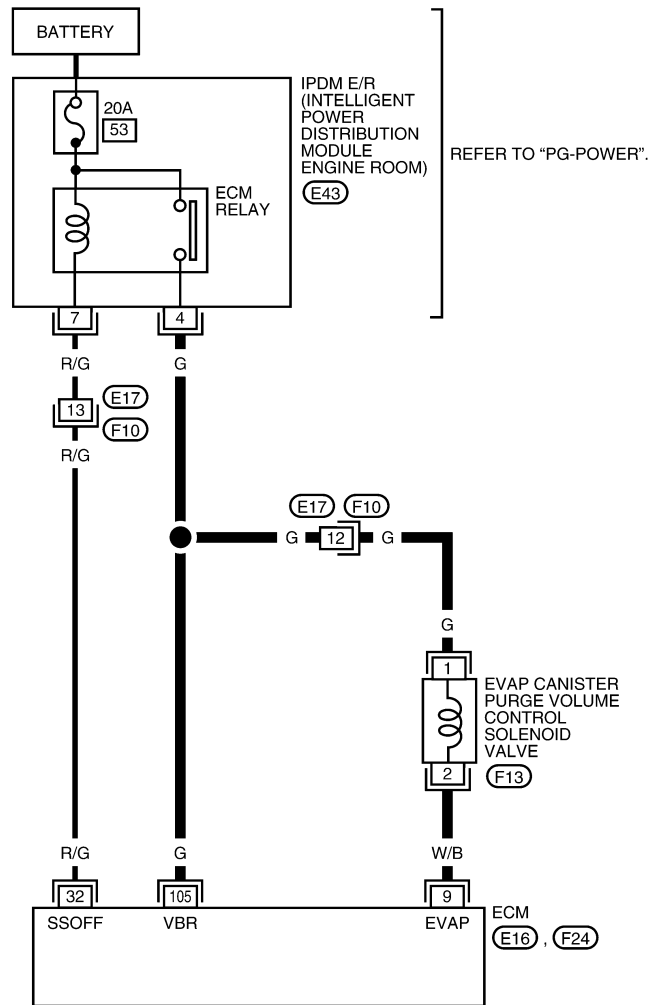
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006612236

EC-PGC/V-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

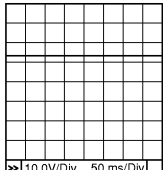
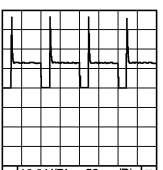
CAUTION:

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
9	W/B	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting. 	BATTERY VOLTAGE (11 - 14 V)★  <small>10.0V/Div 50 ms/Div</small> PBIB0050E
			[Engine is running] <ul style="list-style-type: none"> • Engine speed: About 2,000 rpm (More than 100 seconds after starting engine) 	Approximately 10 V★  <small>10.0 V/Div 50 ms/Div</small> PBIB0520E
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none"> • For a few seconds after turning ignition switch OFF 	0 - 1.0 V
			[Ignition switch: OFF] <ul style="list-style-type: none"> • More than a few seconds after turning ignition switch OFF 	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

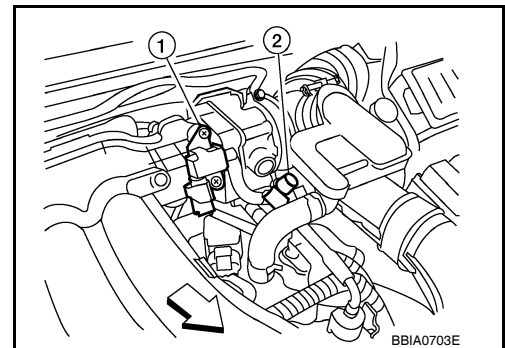
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006580636

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve (1) harness connector.
- EVAP canister port (2)
3. Turn ignition switch ON.



DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

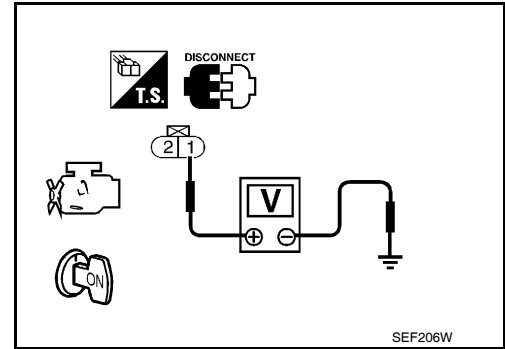
[MR20DE (EXCEPT FOR CALIFORNIA)]

4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 9 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK (With CONSULT-III) >> GO TO 4.
- OK (Without CONSULT-III) >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-903. "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18](#).

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Component Inspection

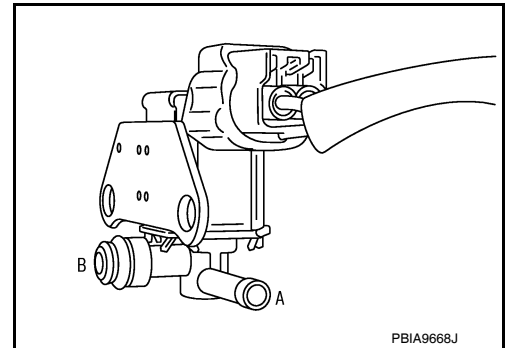
INFOID:000000006580637

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Ⓜ WITH CONSULT-III

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No

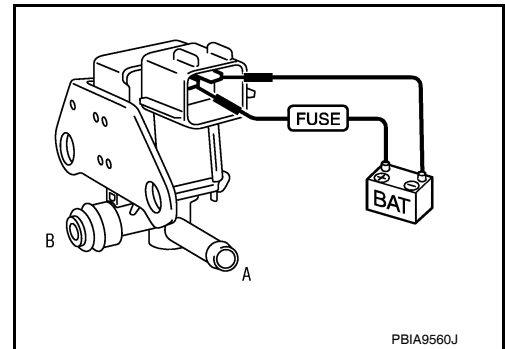


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ⓧ WITHOUT CONSULT-III

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	Yes
No supply	No



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DTC P0447 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

Component Description

INFOID:000000006580639

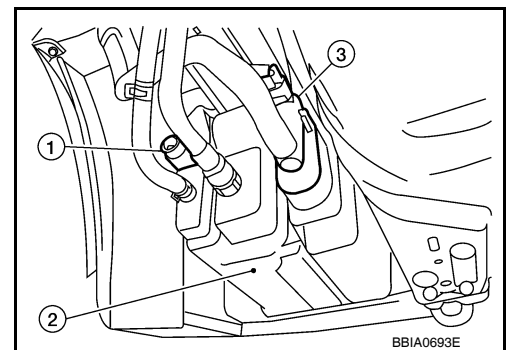
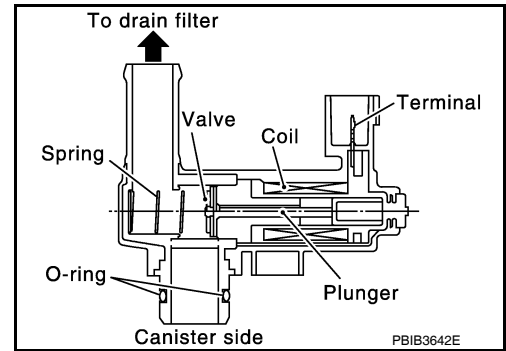
The EVAP canister vent control valve (3) is located on the EVAP canister (2) and is used to seal the canister vent.

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 diagnoses.

- This illustration is a view from under vehicle
- EVAP control system pressure sensor (1)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580640

Specification data are reference values.

Monitor item	Condition	Specification
VENT CONT/V	• Ignition switch: ON	OFF

On Board Diagnosis Logic

INFOID:000000006580641

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0447 0447	EVAP canister vent control valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	<ul style="list-style-type: none"> • Harness or connectors (EVAP canister vent control valve circuit is open or shorted.) • EVAP canister vent control valve • Drain filter

DTC Confirmation Procedure

INFOID:000000006580642

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11 V at idle.

1. Start engine and wait at least 8 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-906, "Diagnosis Procedure"](#).

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

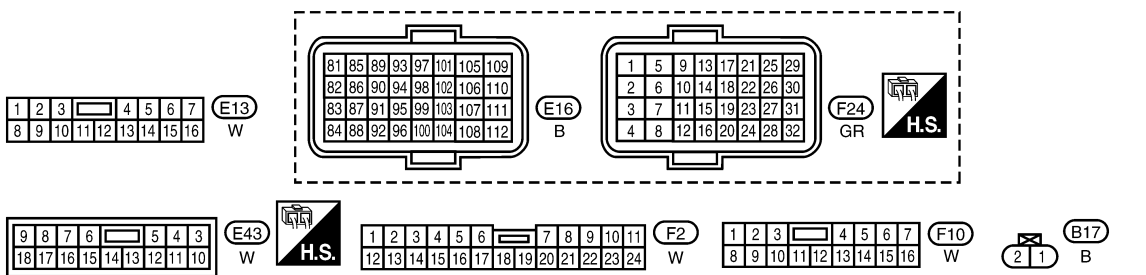
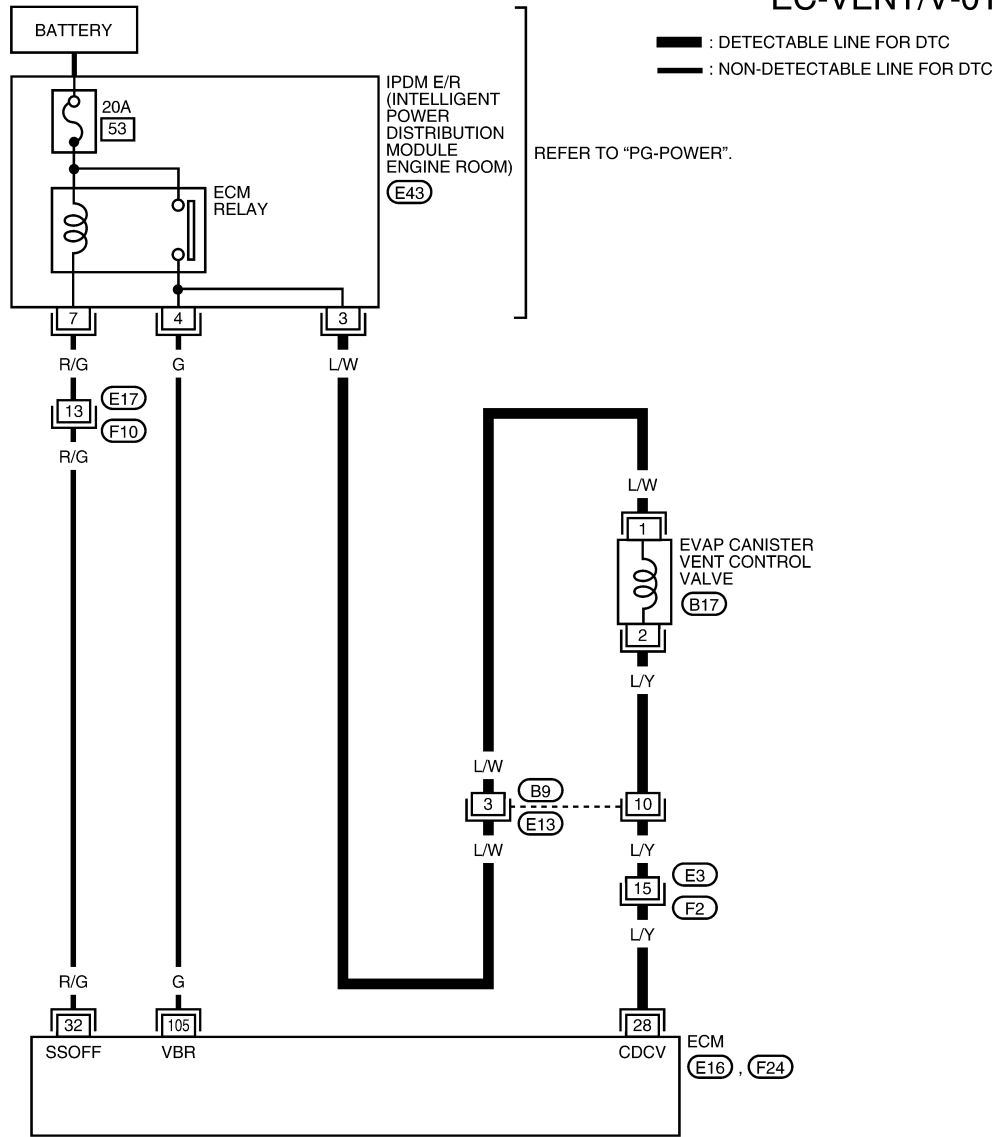
< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

INFOID:000000006580643

Wiring Diagram

EC-VENT/V-01



AABWA0243GB

Specification data are reference values and are measured between each terminal and ground.
CAUTION:
 Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
28	L/Y	EVAP canister vent control valve	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580644

1. INSPECTION START

1. Do you have CONSULT-III?

Yes or No

Yes >> GO TO 2.

No >> GO TO 3.

2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

Ⓟ **With CONSULT-III**

1. Turn ignition switch OFF and then turn ON.
2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-III.
3. Touch "ON/OFF" on CONSULT-III screen.
4. Check for operating sound of the valve.

Clicking noise should be heard.

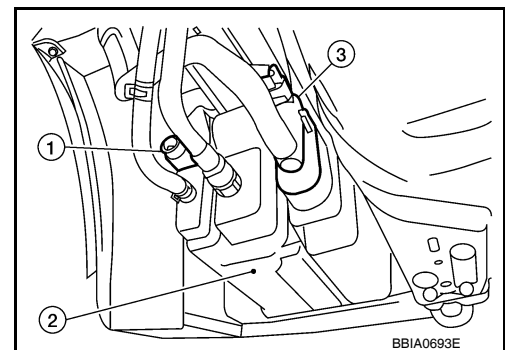
OK or NG

OK >> GO TO 8.

NG >> GO TO 3.

3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister vent control valve (3) harness connector.
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
3. Turn ignition switch ON.



DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[MR20DE (EXCEPT FOR CALIFORNIA)]

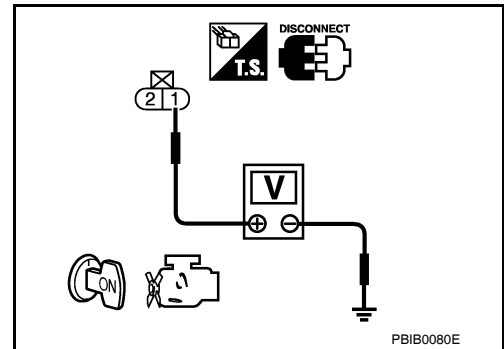
< SERVICE INFORMATION >

4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness for open or short between EVAP canister vent control valve and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 28 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between EVAP canister vent control valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7.CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 8.
- NG >> Clean the rubber tube using an air blower.

8.CHECK DRAIN FILTER

Refer to [EC-882. "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace drain filter. Refer to [FL-14](#).

9.CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-908. "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP canister vent control valve. Refer to [FL-14](#).

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

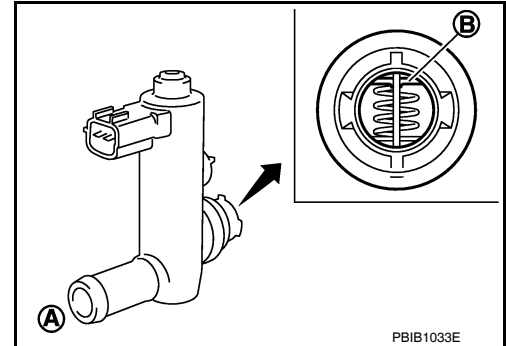
Component Inspection

INFOID:000000006580645

EVAP CANISTER VENT CONTROL VALVE

Ⓟ WITH CONSULT-III

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
If NG, replace EVAP canister vent control valve. Refer to [FL-14](#).
If OK, go to next step.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.



5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. Check air passage continuity and operation delay time.
Make sure new O-ring is installed properly.

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

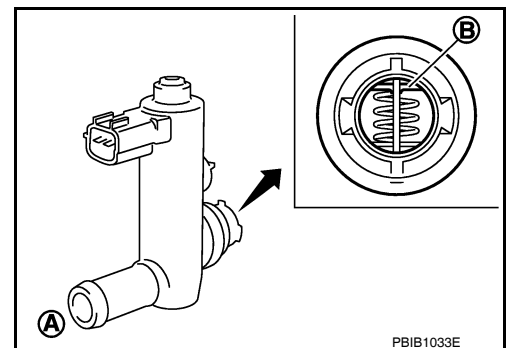
Operation takes less than 1 second.

If NG, go to next step.

7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.
If NG, replace EVAP canister vent control valve. Refer to [FL-14](#).

ⓧ WITHOUT CONSULT-III

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[MR20DE (EXCEPT FOR CALIFORNIA)]

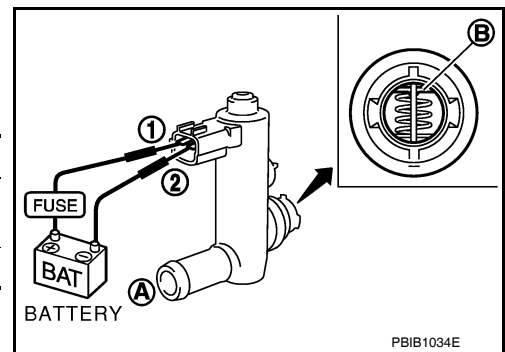
< SERVICE INFORMATION >

- Check air passage continuity and operation delay time under the following conditions.
Make sure 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.
 If NG, go to next step.

- Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
- Perform step 3 again.
 If NG, replace EVAP canister vent control valve. Refer to [FL-14](#).



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DTC P0448 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

Component Description

INFOID:000000006580646

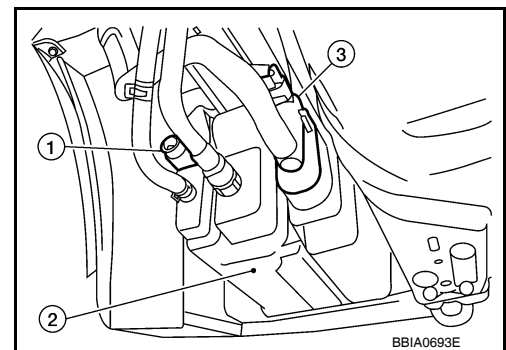
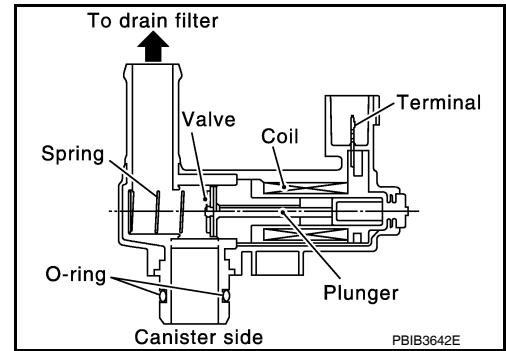
The EVAP canister vent control valve (3) is located on the EVAP canister (2) and is used to seal the canister vent.

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 diagnoses.

- This illustration is a view from under vehicle
- EVAP control system pressure sensor (1)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580647

Specification data are reference values.

Monitor item	Condition	Specification
VENT CONT/V	• Ignition switch: ON	OFF

On Board Diagnosis Logic

INFOID:000000006580648

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0448 0448	EVAP canister vent control valve close	EVAP canister vent control valve remains closed under specified driving conditions.	<ul style="list-style-type: none"> • EVAP canister vent control valve • EVAP control system pressure sensor and the circuit • Blocked rubber tube to EVAP canister vent control valve • EVAP canister is saturated with water • Drain filter

DTC Confirmation Procedure

INFOID:000000006580649

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

Ⓜ WITH CONSULT-III

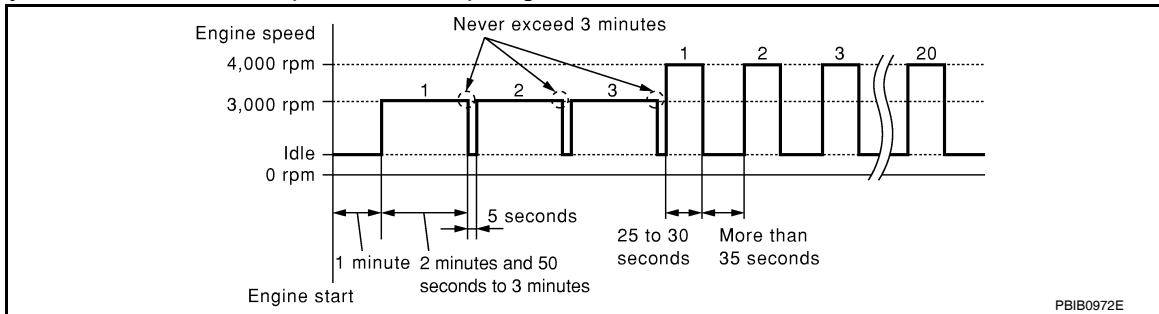
1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

4. Start engine and let it idle for at least 1 minute.
5. Repeat next procedures three times.
- a. Increase the engine speed up to 3,000 to 3,500 rpm and keep it for 2 minutes and 50 seconds to 3 minutes.
Never exceed 3 minutes.
- b. Fully released accelerator pedal and keep engine idle for about 5 seconds.
6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-913, "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to the next step.
8. Repeat next procedure 20 times.
- a. Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.
- b. Fully released accelerator pedal and keep engine idle for at least 35 seconds.



9. Check 1st trip DTC.
10. If 1st trip DTC is detected, go to [EC-913, "Diagnosis Procedure"](#).

 WITH GST

Follow the procedure "WITH CONSULT-III" above.

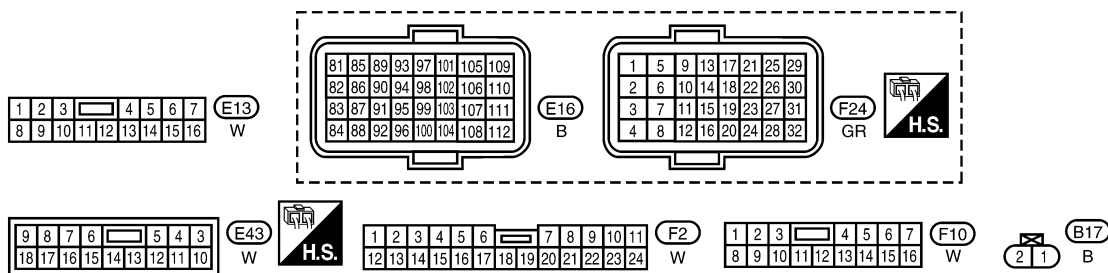
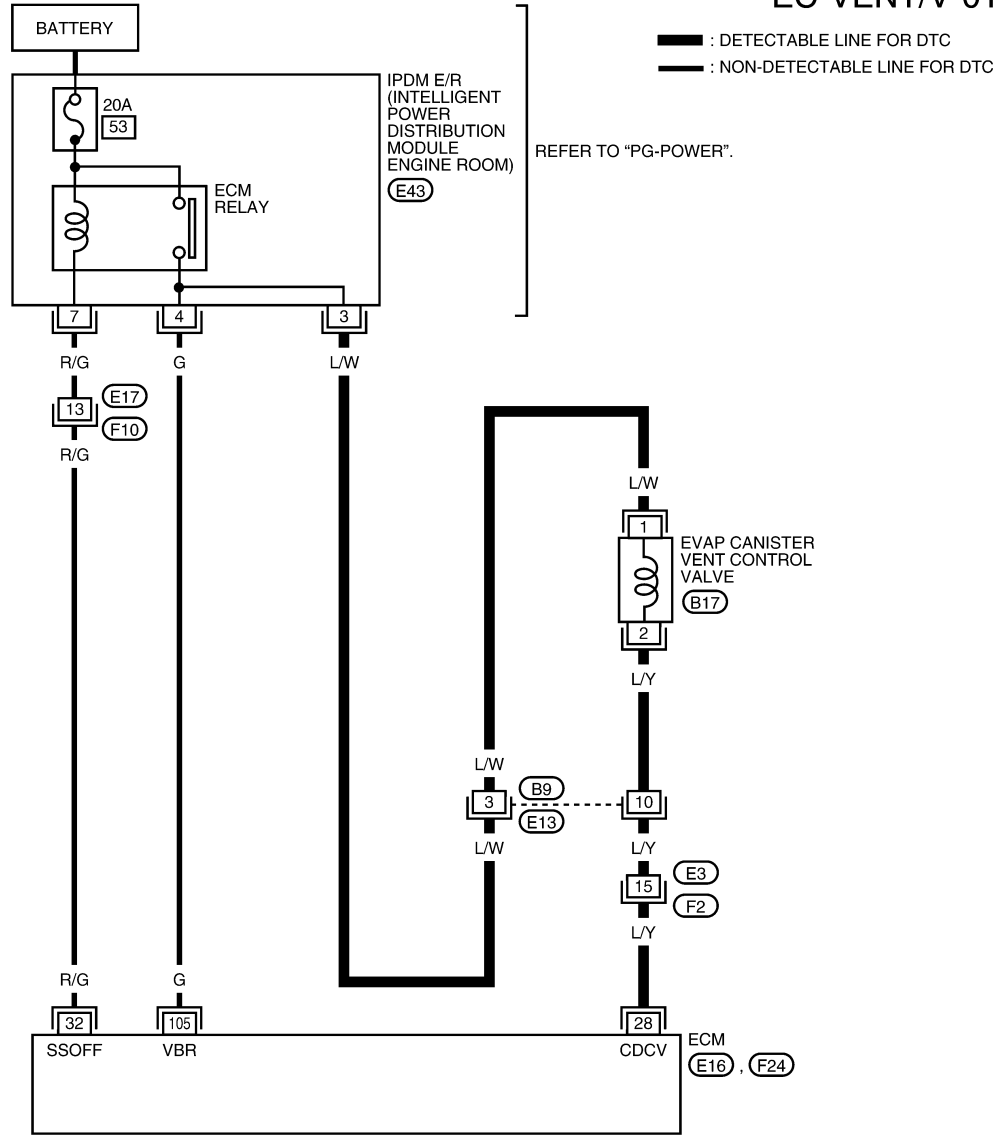
DTC P0448 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:00000006580650



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

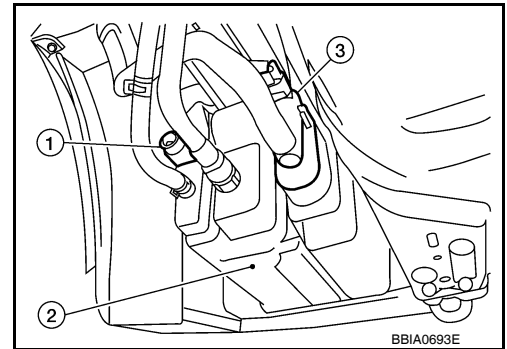
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
28	L/Y	EVAP canister vent control valve	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580651

1. CHECK RUBBER TUBE

- Turn ignition switch OFF.
- Disconnect rubber tube connected to EVAP canister vent control valve (3).
- Check the rubber tube for clogging.
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)



OK or NG

- OK >> GO TO 2.
- NG >> Clean rubber tube using an air blower.

2. CHECK DRAIN FILTER

Refer to [EC-882, "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace drain filter. Refer to [FL-14](#).

3. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-914, "Component Inspection"](#).

OK or NG

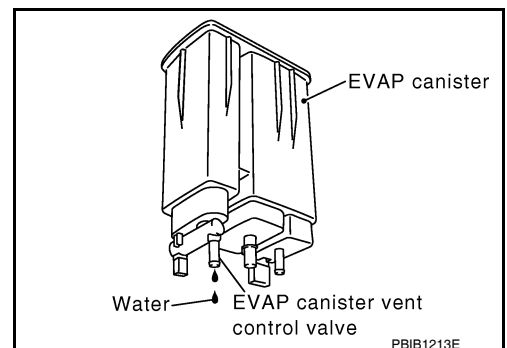
- OK >> GO TO 4.
- NG >> Replace EVAP canister vent control valve. Refer to [FL-14](#).

4. CHECK IF EVAP CANISTER SATURATED WITH WATER

- Remove EVAP canister with EVAP canister vent control valve attached.
- Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 5.
- No >> GO TO 7.



DTC P0448 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

5. 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 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

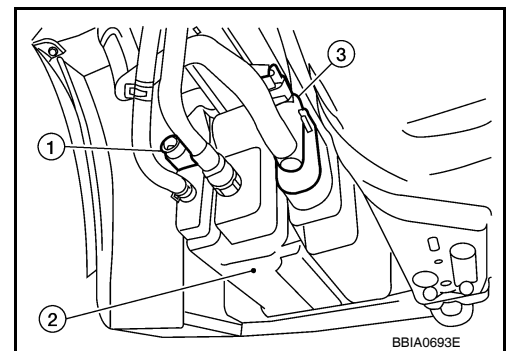
Check the following.

- 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-14](#).

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check connectors for water.



Water should not exist.

OK or NG

- OK >> GO TO 8.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-932](#). "[Component Inspection](#)".

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580652

EVAP CANISTER VENT CONTROL VALVE

Ⓜ WITH CONSULT-III

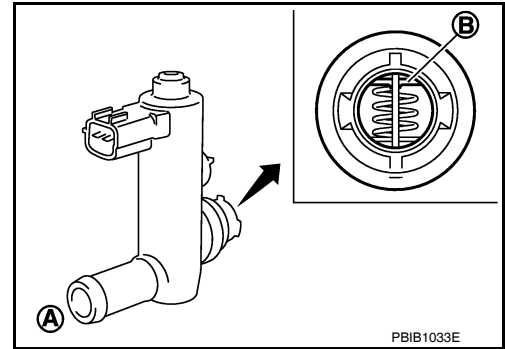
1. Remove EVAP canister vent control valve from EVAP canister.

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Check portion **B** of EVAP canister vent control valve for being rusted.
If NG, replace EVAP canister vent control valve. Refer to [FL-14](#).
If OK, go to next step.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.



5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. Check air passage continuity and operation delay time.
Make sure new O-ring is installed properly.

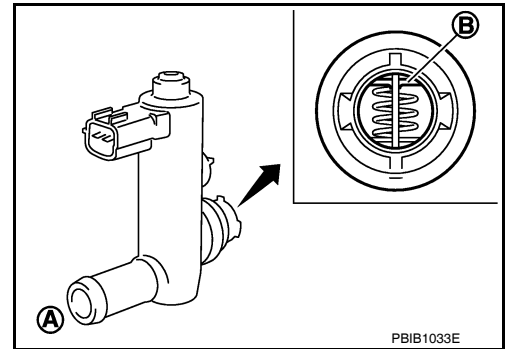
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.
If NG, go to next step.

7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.
If NG, replace EVAP canister vent control valve. Refer to [FL-14](#).

⊗ WITHOUT CONSULT-III

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

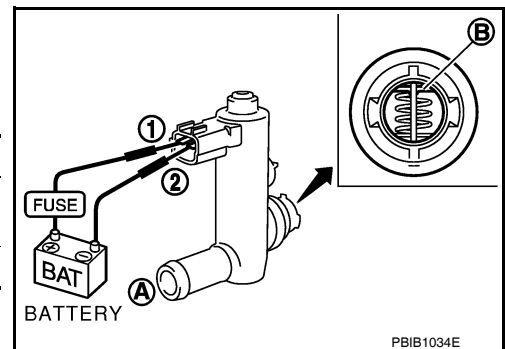


3. Check air passage continuity and operation delay time under the following conditions.
Make sure new O-ring is installed properly.

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.
If NG, go to next step.

4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
5. Perform step 3 again.
If NG, replace EVAP canister vent control valve. Refer to [FL-14](#).



DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

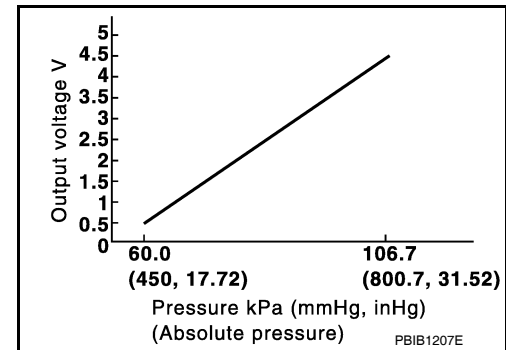
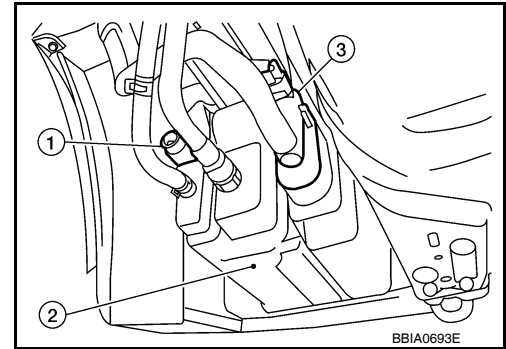
DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

Component Description

INFOID:000000006580653

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

- This illustration is a view from under vehicle
- EVAP canister (2)
- EVAP canister vent control valve (3)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580654

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	• Ignition switch: ON	Approx. 1.8 - 4.8 V

On Board Diagnosis Logic

INFOID:000000006580655

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0451 0451	EVAP control system pressure sensor performance	ECM detects a sloshing signal from the EVAP control system pressure sensor	<ul style="list-style-type: none"> • Harness or connectors [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor

DTC Confirmation Procedure

INFOID:000000006580656

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Start engine and wait at least 40 seconds.

NOTE:

Do not depress accelerator pedal even slightly.

DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-917, "Diagnosis Procedure"](#).

Diagnosis Procedure

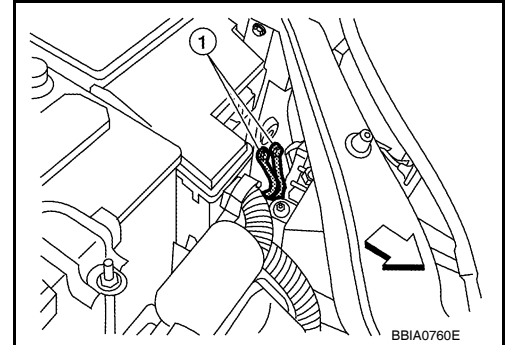
INFOID:000000006580657

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↶ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



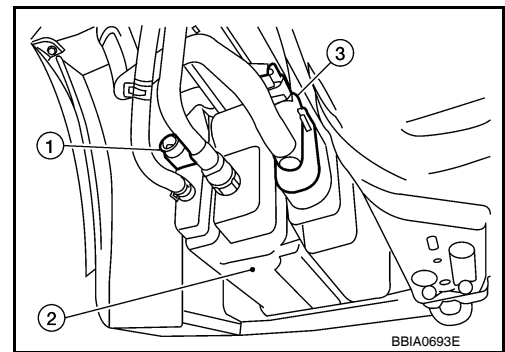
2. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR FOR WATER

1. Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check sensor harness connector for water.

Water should not exist.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace harness connector.



3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-918, "Component Inspection"](#).

OK or NG

- OK >> GO TO 4.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

4. CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-1098, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-863, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-921, "Wiring Diagram"
102	APP sensor terminal 5	EC-1041, "Wiring Diagram"

OK or NG

- OK >> GO TO 5.
- NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace refrigerant pressure sensor. Refer to [MTC-92](#).

DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

6. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-925, "Component Inspection"](#).

OK or NG

OK >> GO TO 7.

NG >> Replace crankshaft position sensor (POS). Refer to [EM-80](#).

7. CHECK APP SENSOR

Refer to [EC-1044, "Component Inspection"](#).

OK or NG

OK >> GO TO 9.

NG >> GO TO 8.

8. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4](#).

>> **INSPECTION END**

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

For wiring diagram, refer to [EC-921, "Wiring Diagram"](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580658

EVAP CONTROL SYSTEM PRESSURE SENSOR

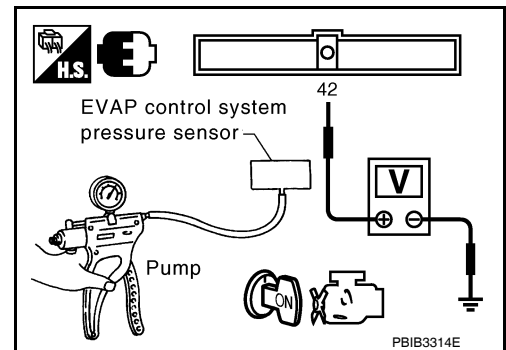
1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage
Not applied	1.8 - 4.8 V
-26.7 (-200, -7.87)	2.1 to 2.5 V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).

4. If NG, replace EVAP control system pressure sensor. Refer to [FL-14](#).



DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

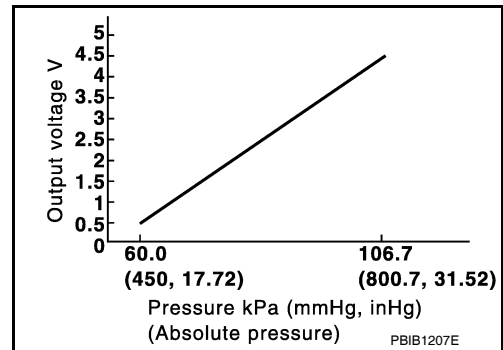
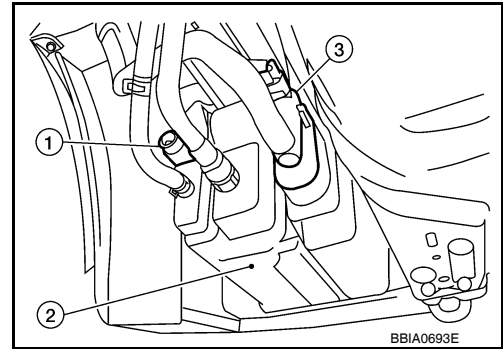
DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

Component Description

INFOID:000000006580659

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

- This illustration is a view from under vehicle
- EVAP canister (2)
- EVAP canister vent control valve (3)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580660

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	• Ignition switch: ON	Approx. 1.8 - 4.8 V

On Board Diagnosis Logic

INFOID:000000006580661

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0452 0452	EVAP control system pressure sensor low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is open or sorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor

DTC Confirmation Procedure

INFOID:000000006580662

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

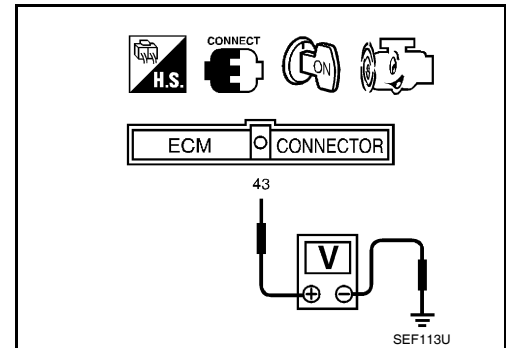
[MR20DE (EXCEPT FOR CALIFORNIA)]

Ⓟ WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-922. "Diagnosis Procedure"](#).

Ⓢ WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 43 (Fuel tank temperature sensor signal) and ground is less than 4.2 V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select Service \$07 with GST.
If 1st trip DTC is detected, go to [EC-922. "Diagnosis Procedure"](#).



DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

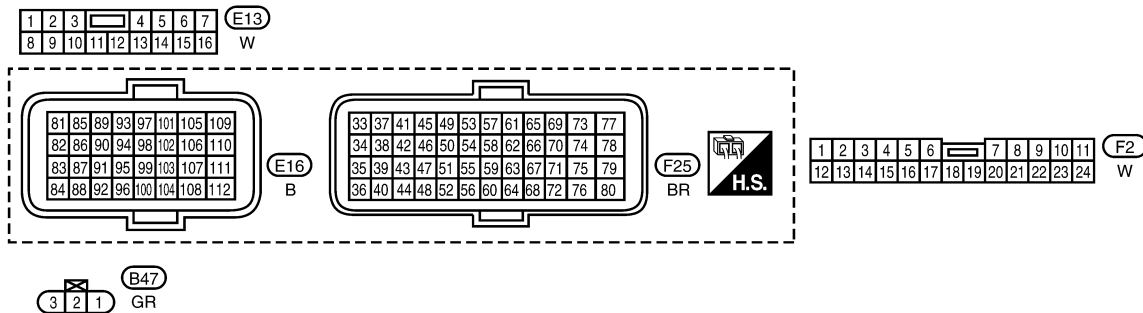
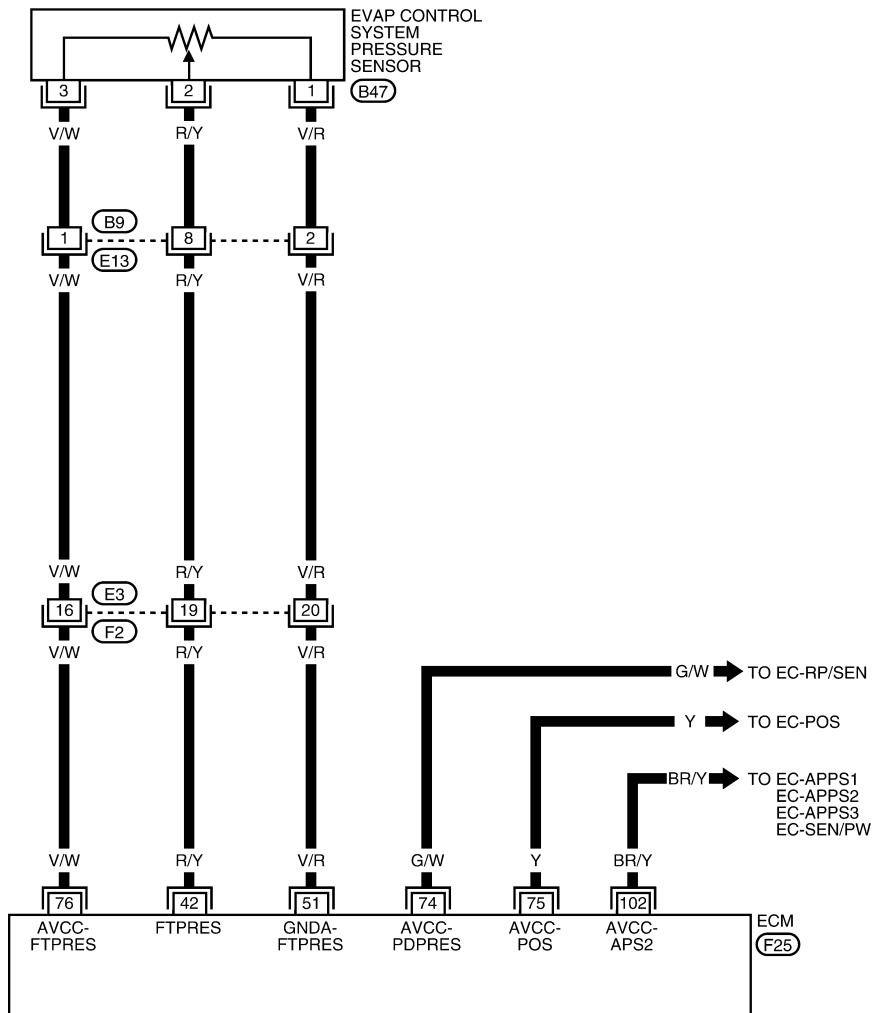
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580663

EC-PRE/SE-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
42	R/Y	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8 V
51	V/R	Sensor ground (EVAP control system pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

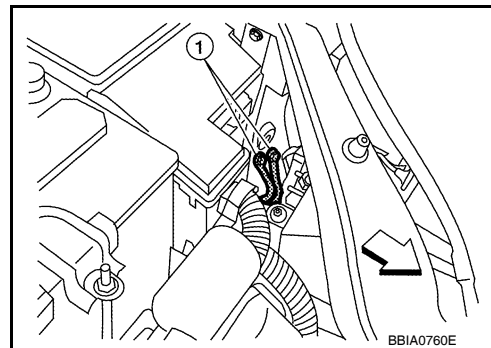
INFOID:000000006580664

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ⇐ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



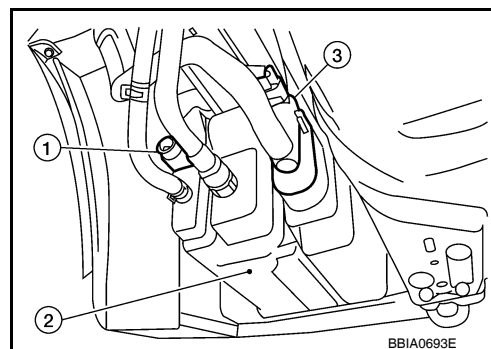
2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check sensor harness connector for water.

Water should not exist.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace harness connector.



3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

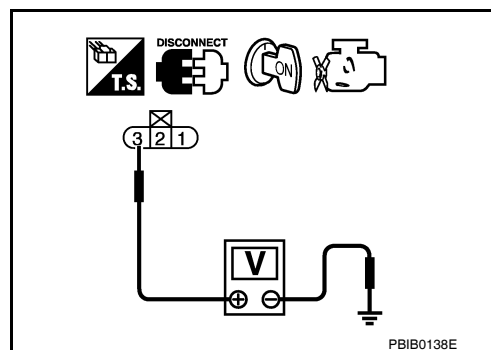
[MR20DE (EXCEPT FOR CALIFORNIA)]

2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 11.
- NG >> GO TO 4.



4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 3 and ECM terminal 76. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open between EVAP control system pressure sensor and ECM

>> Repair open circuit.

6. CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-1098, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-863, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-921, "Wiring Diagram"
102	APP sensor terminal 5	EC-1041, "Wiring Diagram"

OK or NG

- OK >> GO TO 7.
- NG >> Repair short to ground or short to power in harness or connectors.

7. CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace refrigerant pressure sensor. Refer to [MTC-94](#).

8. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-925, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace crankshaft position sensor (POS). Refer to [EM-80](#).

9. CHECK APP SENSOR

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Refer to [EC-1044. "Component Inspection"](#).

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4](#).

>> **INSPECTION END**

11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 51. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 13.
- NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 42 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-925. "Component Inspection"](#).

OK or NG

- OK >> GO TO 16.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

16. CHECK INTERMITTENT INCIDENT

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Refer to [EC-701](#).

>> INSPECTION END

Component Inspection

INFOID:000000006580665

A

EC

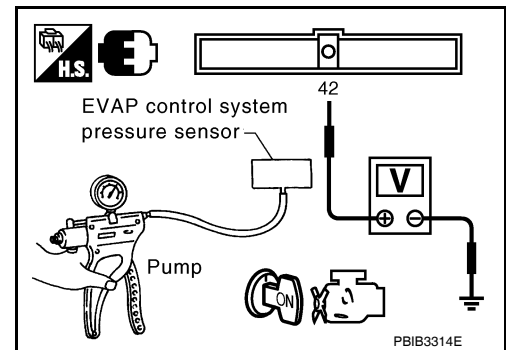
EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage
Not applied	1.8 - 4.8 V
-26.7 (-200, -7.87)	2.1 to 2.5 V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
 - Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).
4. If NG, replace EVAP control system pressure sensor. Refer to [FL-14](#).



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DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

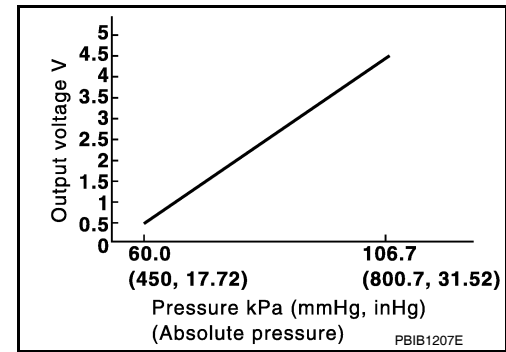
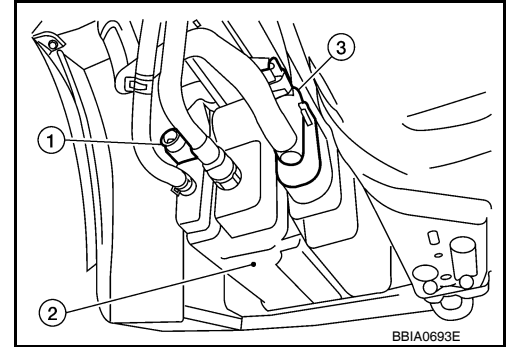
DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

Component Description

INFOID:000000006580666

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

- This illustration is a view from under vehicle
- EVAP canister (2)
- EVAP canister vent control valve (3)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580667

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	• Ignition switch: ON	Approx. 1.8 - 4.8 V

On Board Diagnosis Logic

INFOID:000000006580668

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0453 0453	EVAP control system pressure sensor high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is open or sorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • EVAP canister vent control valve • EVAP canister • Drain filter • Rubber hose to EVAP canister vent control valve

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC Confirmation Procedure

INFOID:000000006580669

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

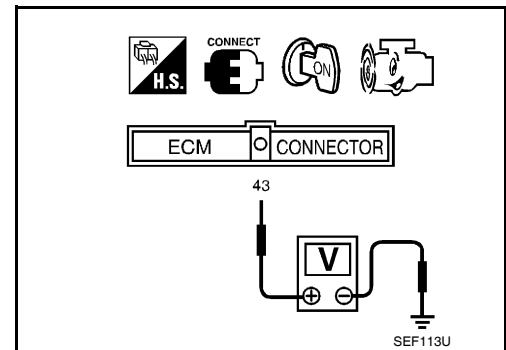
Always perform test at a temperature of 5°C (41°F) or more.

① WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "DATA MONITOR" mode with CONSULT-III.
5. Make sure that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Wait at least 10 seconds.
7. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-929, "Diagnosis Procedure"](#).

② WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 43 (Fuel tank temperature sensor signal) and ground is less than 4.2 V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Wait at least 10 seconds.
5. Select Service \$07 with GST.
If 1st trip DTC is detected, go to [EC-929, "Diagnosis Procedure"](#).



DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

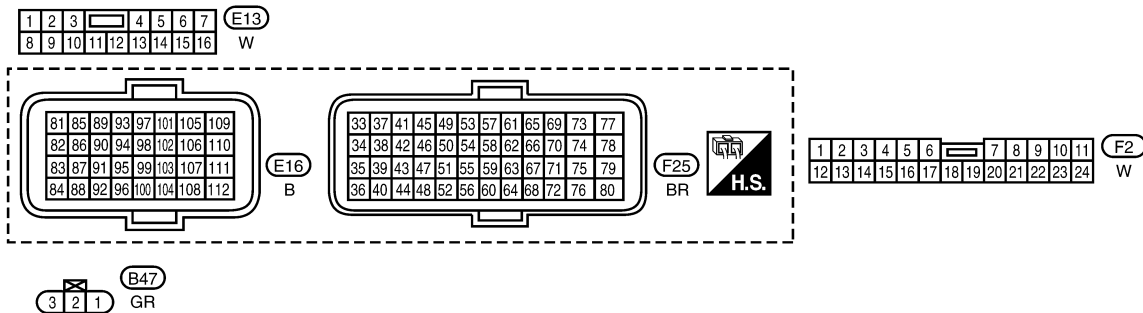
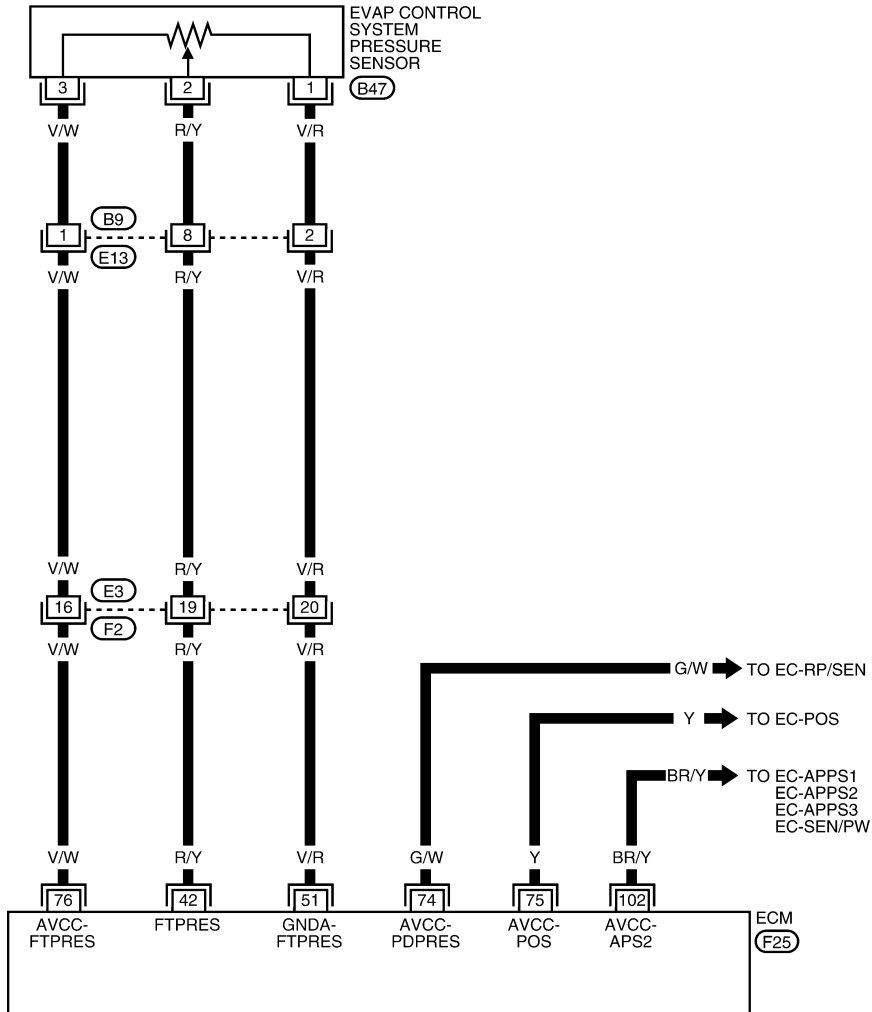
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580670

EC-PRE/SE-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
42	R/Y	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8 V
51	V/R	Sensor ground (EVAP control system pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

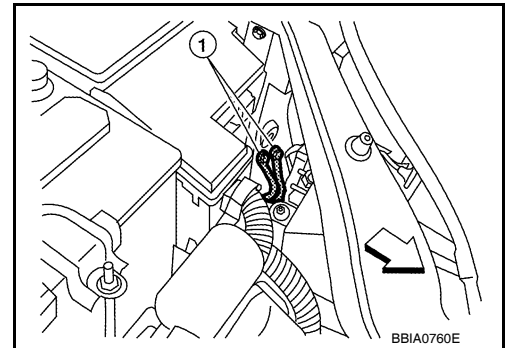
INFOID:000000006580671

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



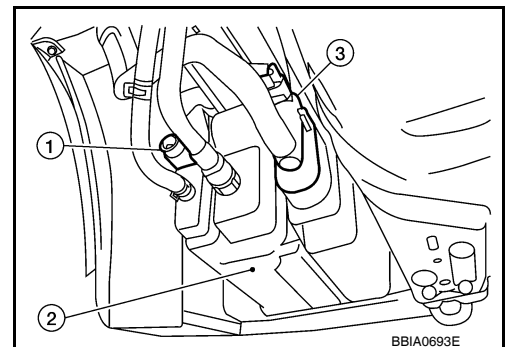
2. CHECK CONNECTOR

- Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
- Check sensor harness connector for water.

Water should not exist.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace harness connector.



3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-I

- Turn ignition switch ON.

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

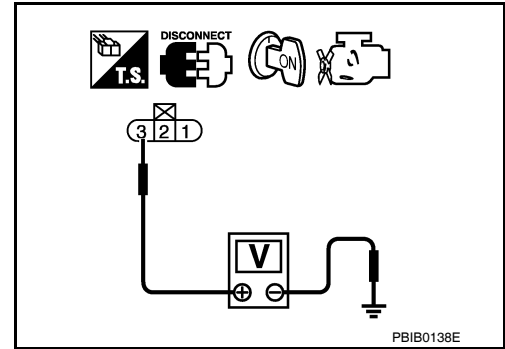
[MR20DE (EXCEPT FOR CALIFORNIA)]

2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 11.
- NG >> GO TO 4.



4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 3 and ECM terminal 76. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open between EVAP control system pressure sensor and ECM

>> Repair open circuit.

6. CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-1098, "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-863, "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-921, "Wiring Diagram"
102	APP sensor terminal 5	EC-1041, "Wiring Diagram"

OK or NG

- OK >> GO TO 7.
- NG >> Repair short to ground or short to power in harness or connectors.

7. CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace refrigerant pressure sensor. Refer to [MTC-92](#).

8. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-925, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace crankshaft position sensor (POS). Refer to [EM-80](#).

9. CHECK APP SENSOR

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Refer to [EC-1044, "Component Inspection"](#).

OK or NG

OK >> GO TO 22.

NG >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4](#).

>> **INSPECTION END**

11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 51. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 42 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 15.

NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness connectors B9, E13
- Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK RUBBER TUBE

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging, vent and kinked.

OK or NG

OK >> GO TO 16.

NG >> Clean the rubber tube using an air blower, repair or replace rubber tube.

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

16. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-908, "Component Inspection"](#).

OK or NG

OK >> GO TO 17.

NG >> Replace EVAP canister vent control valve. Refer to [FL-14](#).

17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-932, "Component Inspection"](#).

OK or NG

OK >> GO TO 18.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

18. CHECK DRAIN FILTER

Refer to [EC-882, "Component Inspection"](#).

OK or NG

OK >> GO TO 19.

NG >> Replace drain filter. Refer to [FL-14](#).

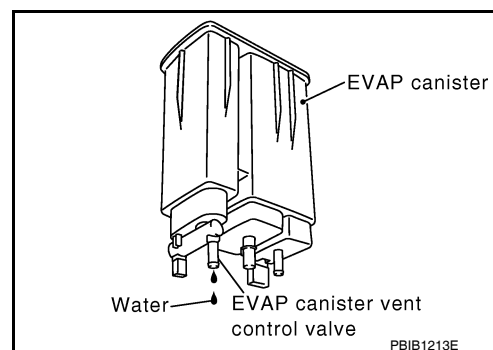
19. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 20.

No >> GO TO 22.



20. 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 1.9 kg (4.2 lb).

OK or NG

OK >> GO TO 22.

NG >> GO TO 21.

21. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose connected to EVAP canister for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to [FL-14](#).

22. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580672

EVAP CONTROL PRESSURE SENSOR

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

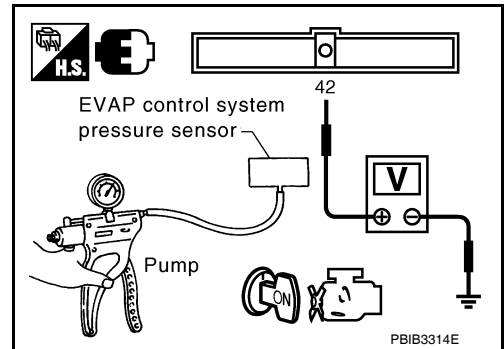
1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage
Not applied	1.8 - 4.8 V
-26.7 (-200, -7.87)	2.1 to 2.5 V lower than above value

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).

4. If NG, replace EVAP control system pressure sensor. Refer to [FL-14](#).



A

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DTC P0455 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

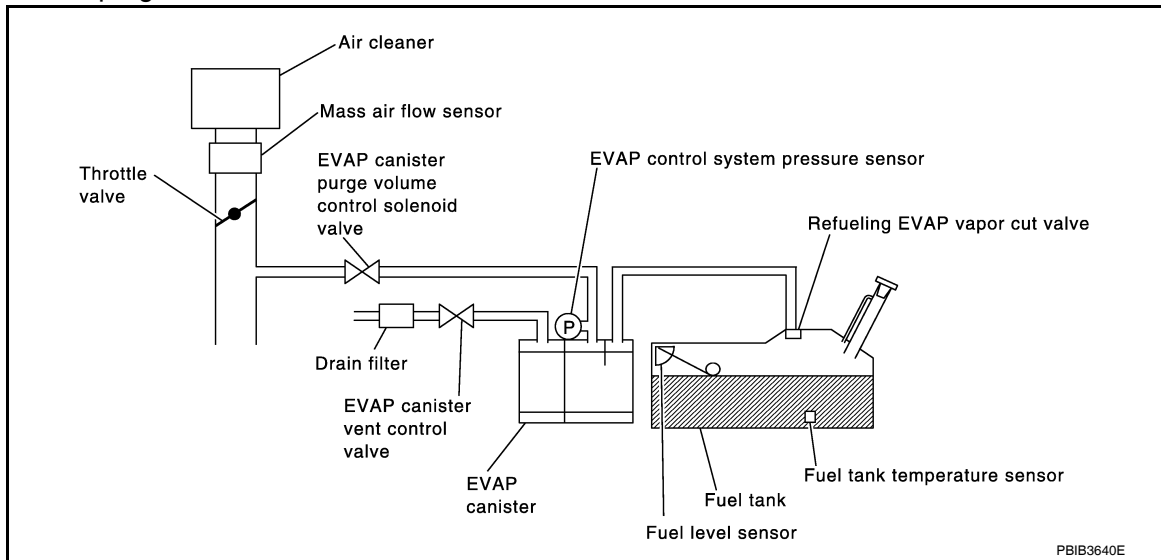
[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0455 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

INFOID:000000006580673

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in EVAP system between the fuel tank and EVAP canister purge volume control solenoid valve.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0455 0455	EVAP control system gross leak detected	<ul style="list-style-type: none"> • EVAP control system has a very large leak such as fuel filler cap fell off. • EVAP control system does not operate properly. 	<ul style="list-style-type: none"> • Fuel filler cap remains open or fails to close. • Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Foreign matter caught in fuel filler cap • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent. • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • Drain filter • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged. • EVAP control system pressure sensor • Refueling EVAP vapor cut valve • ORVR system leaks

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC Confirmation Procedure

INFOID:000000006580674

CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

DTC P0455 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedure.

Ⓜ WITH CONSULT-III

1. Tighten fuel filler cap securely until reteaching sound is heard.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
5. Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 100°C (32 - 212°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
6. Select “EVP SML LEAK P0442/P1442” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-III.
Follow the instruction displayed.
NOTE:
If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-642. "Basic Inspection"](#).
7. Make sure that “OK” is displayed.
If “NG” is displayed, select “SELF-DIAG RESULTS” mode with CONSULT-III and make sure that “EVAP GROSS LEAK [P0455]” is displayed. If it is displayed, refer to [EC-935. "Diagnosis Procedure"](#).
If P0442 is displayed, perform Diagnostic Procedure for DTC P0442, [EC-884. "Diagnosis Procedure"](#).

Ⓜ WITH GST

NOTE:

Be sure to read the explanation of Driving Pattern on [EC-609. "Emission-related Diagnostic Information"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to Driving Pattern, [EC-609. "Emission-related Diagnostic Information"](#).
3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ignition switch ON.
5. Select SERVICE \$07 with GST.
 - If P0441 is displayed on the screen, go to [EC-879. "Diagnosis Procedure"](#) for DTC P0441.
 - If P0442 is displayed on the screen, go to [EC-884. "Diagnosis Procedure"](#) for DTC P0442.
 - If P0455 is displayed on the screen, go to [EC-935. "Diagnosis Procedure"](#).

Diagnosis Procedure

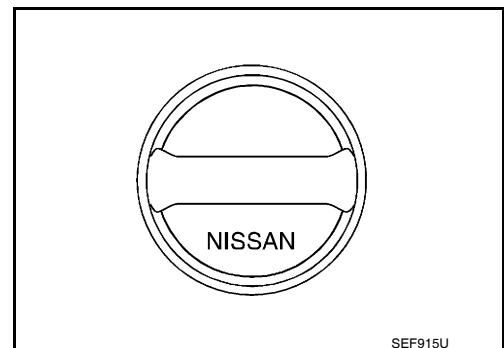
INFOID:000000006580675

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap.



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

DTC P0455 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until rereaching sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-595, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

5. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection.

Refer to [EC-593](#).

OK or NG

- OK >> GO TO 6.
NG >> Repair or reconnect the hose.

6. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 7.

7. CHECK DRAIN FILTER

Refer to [EC-940, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
NG >> Replace drain filter. Refer to [FL-14](#).

8. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control is installed properly.
Refer to [FL-14](#).
- EVAP canister vent control valve.
Refer to [FL-14](#).

OK or NG

- OK >> GO TO 9.
NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14](#).

9. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely. For the location of EVAP service port (2), refer to [EC-593, "Description"](#).

- EVAP canister purge volume control solenoid valve (1)

DTC P0455 EVAP CONTROL SYSTEM

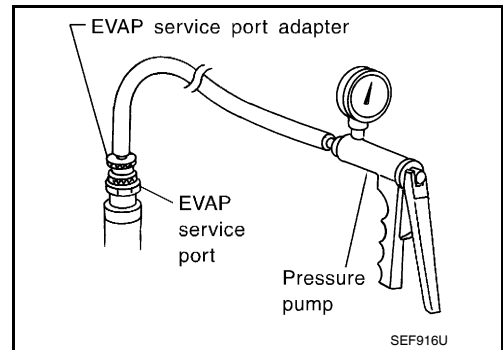
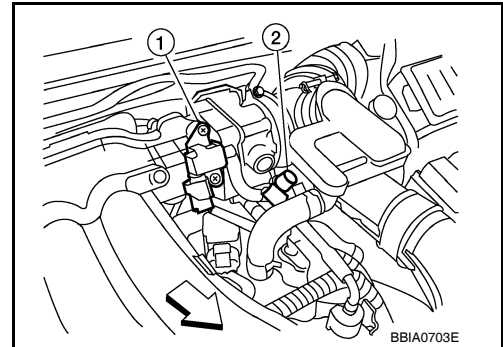
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- ⇐: Vehicle front

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



With CONSULT-III>>GO TO 10.
Without CONSULT-III>>GO TO 11.

10. CHECK FOR EVAP LEAK

Ⓜ With CONSULT-III

1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-III.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

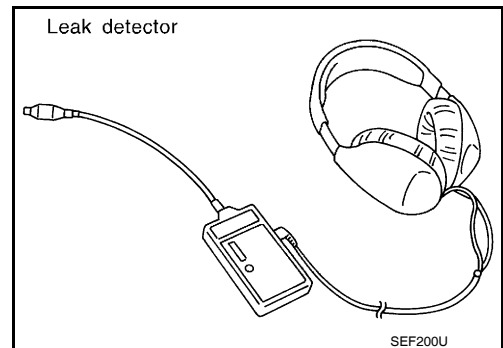
CAUTION:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.
Refer to [EC-593, "Description"](#).

OK or NG

- OK >> GO TO 12.
NG >> Repair or replace.



11. CHECK FOR EVAP LEAK

ⓧ Without CONSULT-III

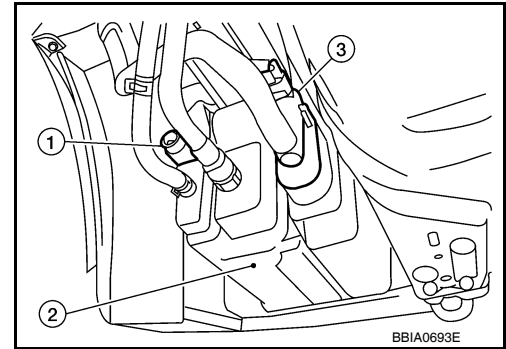
1. Turn ignition switch OFF.

DTC P0455 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Apply 12 volts DC to EVAP canister vent control valve (3). The valve will close. (Continue to apply 12 volts until the end of test.)
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)



3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

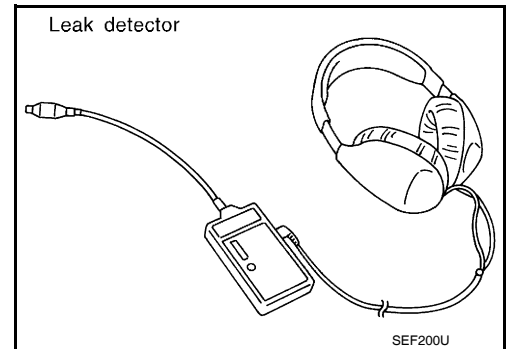
CAUTION:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-593, "Description"](#).

OK or NG

- OK >> GO TO 13.
- NG >> Repair or replace.



12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓟ With CONSULT-III

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

ⓧ Without CONSULT-III

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.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 14.

14. CHECK VACUUM HOSE

DTC P0455 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Check vacuum hoses for clogging or disconnection. Refer to [EC-670. "Vacuum Hose Drawing"](#).

OK or NG

- OK (With CONSULT-III)>>GO TO 15.
- OK (Without CONSULT-III)>>GO TO 16.
- NG >> Repair or reconnect the hose.

15.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

 **With CONSULT-III**

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 16.

16.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-903. "Component Inspection"](#).

OK or NG

- OK >> GO TO 17.
- NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18](#).

17.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-835. "Component Inspection"](#).

OK or NG

- OK >> GO TO 18.
- NG >> Replace fuel level sensor unit.

18.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-925. "Component Inspection"](#).

OK or NG

- OK >> GO TO 19.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

19.CHECK EVAP/ORVR LINE

Check refueling EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-597](#).

OK or NG

- OK >> GO TO 20.
- NG >> Repair or replace hoses and tubes.

20.CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

- OK >> GO TO 21.
- NG >> Repair or replace hoses, tubes or filler neck tube. Refer to [EM-36](#).

21.CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-600. "Component Inspection"](#).

OK or NG

- OK >> GO TO 22.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-14](#).

22.CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

DTC P0455 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

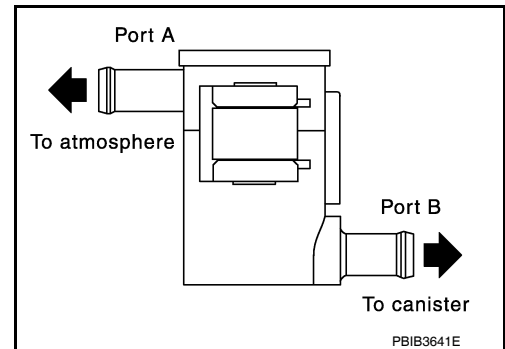
>> INSPECTION END

Component Inspection

INFOID:000000006580676

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter.



DTC P0456 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0456 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

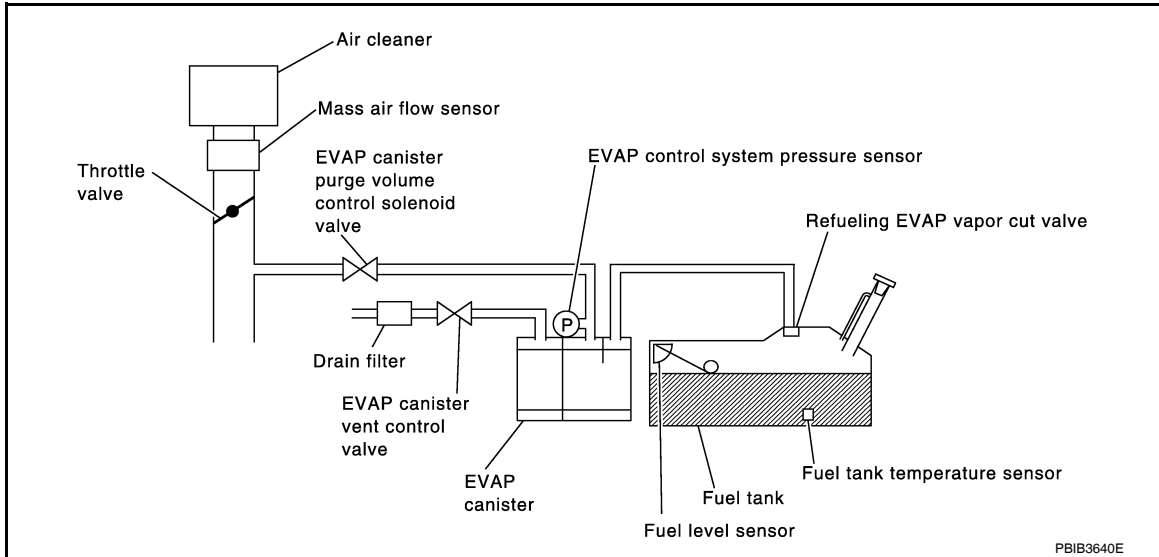
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This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold vacuum in the same way as conventional EVAP small leak diagnosis.

If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.

If ECM judges there are no leaks, the diagnosis will be OK.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0456 0456	Evaporative emission control system very small leak (negative pressure check)	<ul style="list-style-type: none"> EVAP system has a very small leak. EVAP system does not operate properly. 	<ul style="list-style-type: none"> Incorrect fuel tank vacuum relief valve Incorrect fuel filler cap used Fuel filler cap remains open or fails to close. Foreign matter caught in fuel filler cap Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. Foreign matter caught in EVAP canister vent control valve EVAP canister or fuel tank leaks EVAP purge line (pipe and rubber tube) leaks EVAP purge line rubber tube bent Loose or disconnected rubber tube EVAP canister vent control valve and the circuit EVAP canister purge volume control solenoid valve and the circuit Fuel tank temperature sensor Drain filter O-ring of EVAP canister vent control valve is missing or damaged EVAP canister is saturated with water EVAP control system pressure sensor Refueling EVAP vapor cut valve ORVR system leaks Fuel level sensor and the circuit Foreign matter caught in EVAP canister purge volume control solenoid valve

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

DTC P0456 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

DTC Confirmation Procedure

INFOID:000000006580678

NOTE:

- If DTC P0456 is displayed with P0442, first perform trouble diagnosis for DTC P0456.
- After repair, make sure that the hoses and clips are installed properly.
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Open engine hood before conducting following procedure.
- If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.
 - Fuel filler cap is removed.
 - Refilled or drained the fuel.
 - EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

Ⓜ WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Make sure the following conditions are met.
 - FUEL LEVEL SE: 0.25 - 1.4 V**
 - COOLAN TEMP/S: 0 - 32°C (32 - 90°F)**
 - FUEL T/TMP SE: 0 - 35°C (32 - 95°F)**
 - INT/A TEMP SE: More than 0°C (32°F)**If NG, turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "EVP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.
6. Make sure that "OK" is displayed.
If "NG" is displayed, refer to [EC-943, "Diagnosis Procedure"](#).

NOTE:

If the engine speed cannot be maintained within the range displayed on CONSULT-III screen, go to [EC-642, "Basic Inspection"](#).

Overall Function Check

INFOID:000000006580679

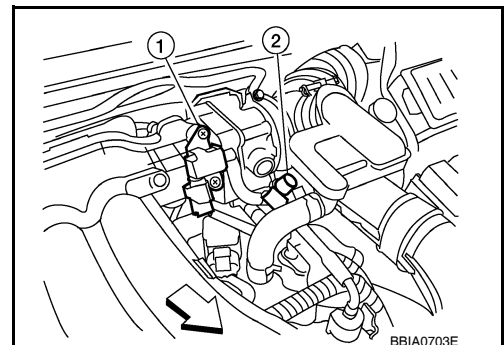
Ⓜ WITH GST

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a 1st trip DTC might not be confirmed.

CAUTION:

- Never use compressed air, doing so may damage the EVAP system.
- Do not start engine.
- Do not exceeded 4.12 kPa (0.042 kg/cm², 0.6 psi).

1. Attach the EVAP service port adapter securely to the EVAP service port (2).
 - EVAP canister purge volume control solenoid valve (1)
 - ↶: Vehicle front



DTC P0456 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Set the pressure pump and a hose.
3. Also set the pressure pump with pressure gauge to the EVAP service port adapter.
4. Turn ignition switch ON.
5. Connect GST and select Service \$08.
6. Using Service \$08 control the EVAP canister vent control valve (close).
7. Apply pressure and make sure the following conditions are satisfied.

Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)

Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg).

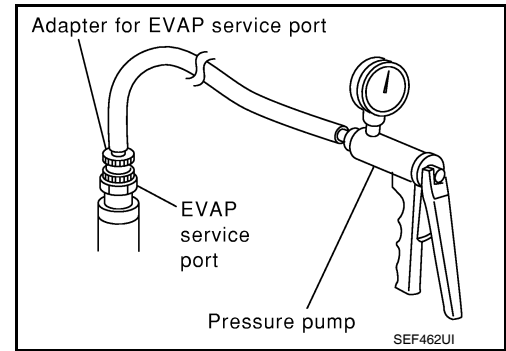
If NG, go to [EC-943, "Diagnosis Procedure"](#).

If OK, go to next step.

8. Disconnect GST.
9. Start engine and warm it up to normal operating temperature.
10. Turn ignition switch OFF and wait at least 10 seconds.
11. Restart engine and let it idle for 90 seconds.
12. Keep engine speed at 2,000 rpm for 30 seconds.
13. Turn ignition switch OFF.

NOTE:

For more information, refer to GST Instruction Manual.



Diagnosis Procedure

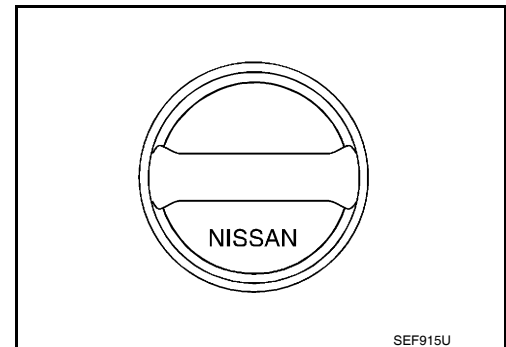
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1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap.



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until reteaching sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-595, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

DTC P0456 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

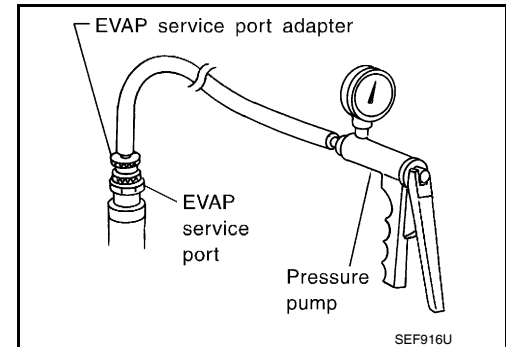
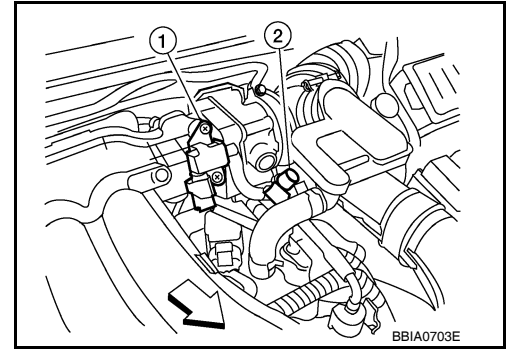
5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely. For the location of EVAP service port (2), refer to [EC-593, "Description"](#).

- EVAP canister purge volume control solenoid valve (1)
- ↵: Vehicle front

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



With CONSULT-III>>GO TO 6.
Without CONSULT-III>>GO TO 7.

6. CHECK FOR EVAP LEAK

With CONSULT-III

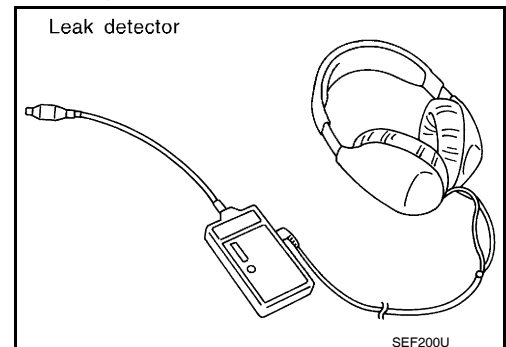
1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-III.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

CAUTION:

- **Never use compressed air or a high pressure pump.**
 - **Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.**
4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-593, "Description"](#).

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace.



7. CHECK FOR EVAP LEAK

Without CONSULT-III

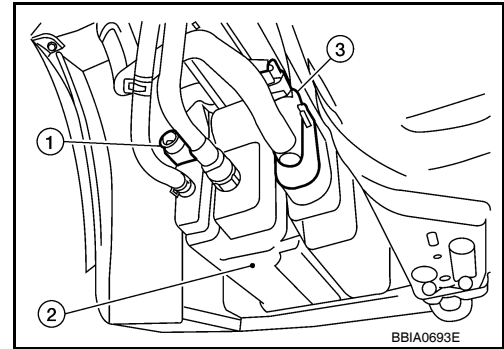
1. Turn ignition switch OFF.

DTC P0456 EVAP CONTROL SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Apply 12 V DC to EVAP canister vent control valve (3). The valve will close. (Continue to apply 12 V until the end of test.)
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)



3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

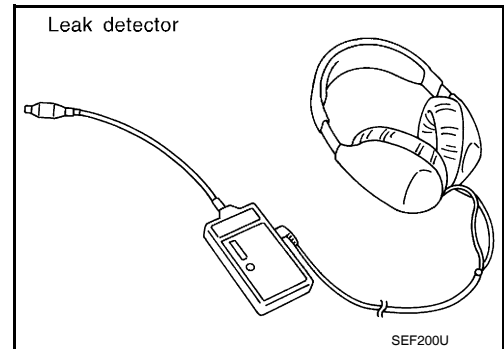
CAUTION:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-593](#), "Description".

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace.



8. CHECK DRAIN FILTER

Refer to [EC-948](#), "Component Inspection".

OK or NG

- OK >> GO TO 9.
- NG >> Replace drain filter. Refer to [FL-14](#).

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly. Refer to [FL-14](#).
- EVAP canister vent control valve. Refer to [FL-14](#).

OK or NG

- OK >> GO TO 10.
- NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14](#).

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

DTC P0456 EVAP CONTROL SYSTEM

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< SERVICE INFORMATION >

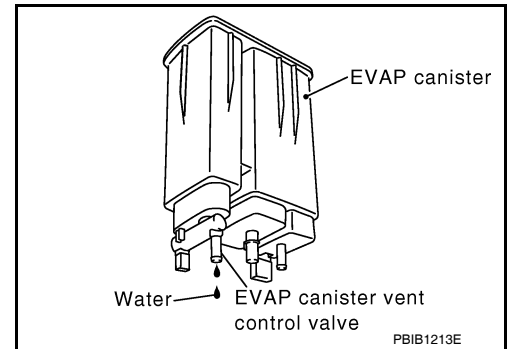
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 11.

No (With CONSULT-III)>>GO TO 13.

No (Without CONSULT-III)>>GO TO 14.



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 1.9 kg (4.2 lb).

OK or NG

OK (With CONSULT-III)>>GO TO 13.

OK (Without CONSULT-III)>>GO TO 14.

NG >> 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-14](#).

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

OK >> GO TO 16.

NG >> GO TO 15.

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-III

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.

OK or NG

OK >> GO TO 17.

NG >> GO TO 15.

15. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-670, "Vacuum Hose Drawing"](#).

OK or NG

DTC P0456 EVAP CONTROL SYSTEM

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- OK >> GO TO 16.
- NG >> Repair or reconnect the hose.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-903. "Component Inspection"](#).

OK or NG

- OK >> GO TO 17.
- NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-18](#).

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-835. "Component Inspection"](#).

OK or NG

- OK >> GO TO 18.
- NG >> Replace fuel level sensor unit. Refer to [FL-6](#).

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-925. "Component Inspection"](#).

OK or NG

- OK >> GO TO 19.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#).

19. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-593. "Description"](#).

OK or NG

- OK >> GO TO 20.
- NG >> Repair or reconnect the hose.

20. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 21.

21. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-597](#).

OK or NG

- OK >> GO TO 22.
- NG >> Repair or replace hoses and tubes.

22. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

- OK >> GO TO 23.
- NG >> Repair or replace hose, tube or filler neck tube. Refer to [FL-14](#).

23. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-600. "Component Inspection"](#).

OK or NG

- OK >> GO TO 24.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-14](#).

24. CHECK FUEL LEVEL SENSOR

Refer to [FL-6](#).

OK or NG

- OK >> GO TO 25.

DTC P0456 EVAP CONTROL SYSTEM

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NG >> Replace fuel level sensor unit. Refer to [FL-6](#).

25. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

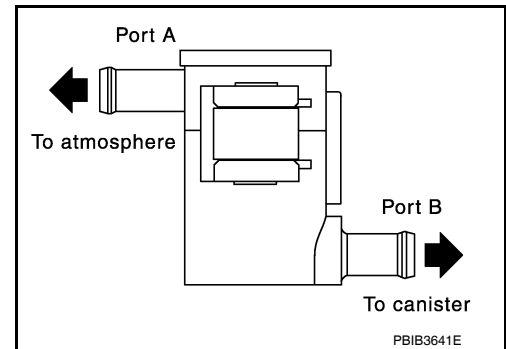
>> **INSPECTION END**

Component Inspection

INFOID:000000006580681

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter.



DTC P0460 FUEL LEVEL SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

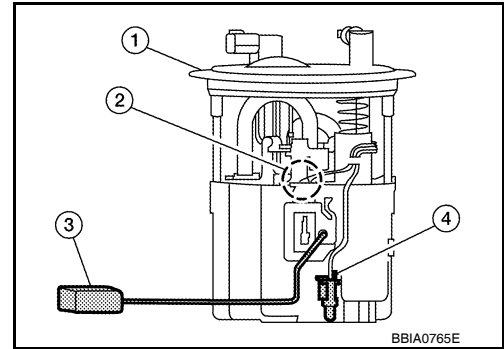
DTC P0460 FUEL LEVEL SENSOR

Component Description

INFOID:000000006580682

The fuel level sensor (3) 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 through 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 level mechanical float.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel tank temperature sensor (4)



On Board Diagnosis Logic

INFOID:000000006580683

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 [EC-968](#).

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0460 0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Fuel level sensor circuit is open or shorted)• Combination meter• Fuel level sensor

DTC Confirmation Procedure

INFOID:000000006580684

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Start engine and wait maximum of 2 consecutive minutes.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-949, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580685

1. CHECK FUEL GAUGE OPERATION

Refer to [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

OK or NG

OK >> GO TO 2.

NG >> Follow the instruction of [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to [DI-19, "Fuel Level Sensor Signal Inspection"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning parts.

DTC P0460 FUEL LEVEL SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> INSPECTION END

DTC P0461 FUEL LEVEL SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0461 FUEL LEVEL SENSOR

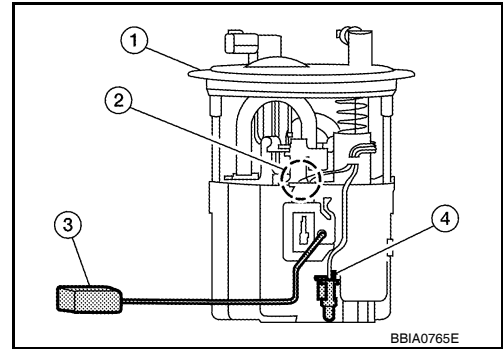
Component Description

INFOID:000000006580687

The fuel level sensor (3) 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 through 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 level mechanical float.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel tank temperature sensor (4)



On Board Diagnosis Logic

INFOID:000000006580688

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 [EC-968](#).

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven. Driving long distances naturally affect fuel gauge level.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461 0461	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 distance.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Fuel level sensor circuit is open or shorted)• Combination meter• Fuel level sensor

Overall Function Check

INFOID:000000006580689

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

WARNING:

When performing following procedure, be sure to observe the handling of the fuel.

Refer to [FL-10, "Component"](#).

TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

Diagnosis Procedure

INFOID:000000006580690

1. CHECK FUEL GAUGE OPERATION

Refer to [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

OK or NG

OK >> GO TO 2.

NG >> Follow the instruction of [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to [DI-19, "Fuel Level Sensor Signal Inspection"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning parts.

DTC P0461 FUEL LEVEL SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> INSPECTION END

DTC P0462, P0463 FUEL LEVEL SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

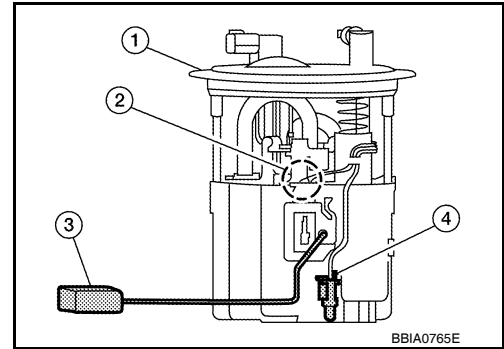
DTC P0462, P0463 FUEL LEVEL SENSOR

Component Description

INFOID:000000006580692

The fuel level sensor (3) 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 through 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 level mechanical float.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel tank temperature sensor (4)



On Board Diagnosis Logic

INFOID:000000006580693

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 [EC-968](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Fuel level sensor circuit is open or shorted)• Combination meter• Fuel level sensor
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006580694

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at ignition switch ON.

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-953, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580695

1. CHECK FUEL GAUGE OPERATION

Refer to [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

OK or NG

OK >> GO TO 2.

NG >> Follow the instruction of [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to [DI-19, "Fuel Level Sensor Signal Inspection"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning parts.

DTC P0462, P0463 FUEL LEVEL SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> INSPECTION END

DTC P0500 VSS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0500 VSS

Description

INFOID:000000006580697

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-968](#).

The vehicle speed signal is sent from "ABS actuator and electric unit (control unit)" or combination meter through CAN communication line.

On Board Diagnosis Logic

INFOID:000000006609101

DTC No.	Trouble diagnosis	DTC detecting condition	Possible cause
P0500	Vehicle speed sensor	At 20 km/h (13 MPH), ECM detects the following status continuously for 5 seconds or more: The difference between a vehicle speed calculated by a secondary speed sensor transmitted from TCM to ECM via CAN communication and the vehicle speed indicated on the combination meter exceeds 15km/h (10 MPH).	<ul style="list-style-type: none"> • Harness or connector (The CAN communication line is open or shorted.) • Combination meter • ABS actuator and electric unit (control unit) • Wheel sensor • TCM • Secondary speed sensor

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode.

Detected item	Engine operating condition in fail-safe mode
Vehicle speed sensor	When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (High) while engine is running.

DTC Confirmation Procedure

INFOID:000000006609102

1. 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.

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

1. Start engine.
2. Shift the selector lever to D range and wait at least for 2 seconds.
3. 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 [EC-955, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006610232

1. CHECK DTC WITH TCM

DTC P0500 VSS

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Check DTC with TCM. Refer to [CVT-47, "CONSULT-III Function \(TRANSMISSION\)"](#).

Is the inspection result normal?

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 [BRC-20, "CONSULT-III Function \(ABS\)"](#) (ABS models) or [BRC-58, "CONSULT-III Function \(ABS\)"](#) (VDC models).

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 [DI-15, "CONSULT-III Function \(METER/M&A\)"](#).

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 [CVT-78, "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-25, "Wheel Sensor System"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [EC-153, "Diagnosis Procedure"](#).

NO >> Replace or replace error-detected parts.

DTC P0506 ISC SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0506 ISC SYSTEM

Description

INFOID:000000006580702

NOTE:

If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

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 ECM calculates the actual engine speed from signals of crankshaft position sensor (POS) and camshaft position sensor (PHASE).

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.).

On Board Diagnosis Logic

INFOID:000000006580703

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0506 0506	Idle speed control system RPM lower than expected	The idle speed is less than the target idle speed by 100 rpm or more.	<ul style="list-style-type: none">• Electric throttle control actuator• Intake air leak

DTC Confirmation Procedure

INFOID:000000006580704

NOTE:

- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform [EC-649, "Idle Air Volume Learning"](#), before conducting DTC Confirmation Procedure. For the target idle speed, refer to the [EC-1104](#).**

TESTING CONDITION:

- **Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.**
- **Always perform the test at a temperature above -10°C (14°F).**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and run it for at least 1 minute at idle speed.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-957, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580705

1. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 2.
- NG >> Discover air leak location and repair.

2. REPLACE ECM

1. Stop engine.
2. Replace ECM.
3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-171, "ECM Re-communicating Function"](#).
4. Perform [EC-648, "VIN Registration"](#).
5. Perform [EC-648, "Accelerator Pedal Released Position Learning"](#).
6. Perform [EC-648, "Throttle Valve Closed Position Learning"](#).
7. Perform [EC-649, "Idle Air Volume Learning"](#).

DTC P0506 ISC SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

>> INSPECTION END

DTC P0507 ISC SYSTEM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0507 ISC SYSTEM

Description

INFOID:000000006580706

NOTE:

If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

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 ECM calculates the actual engine speed from signals of camshaft position sensor (POS) and camshaft position sensor (PHASE).

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.).

On Board Diagnosis Logic

INFOID:000000006580707

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0507 0507	Idle speed control system RPM higher than expected	The idle speed is more than the target idle speed by 200 rpm or more.	<ul style="list-style-type: none">• Electric throttle control actuator• Intake air leak• PCV system

DTC Confirmation Procedure

INFOID:000000006580708

NOTE:

- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform [EC-649, "Idle Air Volume Learning"](#), before conducting DTC Confirmation Procedure. For the target idle speed, refer to the [EC-1104](#).**

TESTING CONDITION:

- **Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.**
- **Always perform the test at a temperature above -10°C (14°F).**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and run it for at least 1 minute at idle speed.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-959, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580709

1.CHECK PCV HOSE CONNECTION

Confirm that PCV hose is connected correctly.

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace.

2.CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 3.
- NG >> Discover air leak location and repair.

3.REPLACE ECM

1. Stop engine.
2. Replace ECM.

DTC P0507 ISC SYSTEM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).
4. Perform [EC-648, "VIN Registration"](#).
5. Perform [EC-648, "Accelerator Pedal Released Position Learning"](#).
6. Perform [EC-648, "Throttle Valve Closed Position Learning"](#).
7. Perform [EC-649, "Idle Air Volume Learning"](#).

>> INSPECTION END

DTC P050A, P050B, P050E COLD START CONTROL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P050A, P050B, P050E COLD START CONTROL

Description

INFOID:000000006609089

ECM controls ignition timing and engine idle speed when engine is started with prewarming up condition. This control promotes the activation of three way catalyst by heating the catalyst and reduces emissions.

On Board Diagnosis Logic

INFOID:000000006609090

If DTC P050A, P050B or 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 050A	Cold start idle air control system performance	ECM does not control engine idle speed properly when engine is started with pre-warming up condition.	<ul style="list-style-type: none">• Lack of intake air volume• Fuel injection system• ECM
P050B 050B	Cold start ignition timing performance	ECM does not control ignition timing properly when engine is started with pre-warming up condition.	
P050E 050E	Cold start engine exhaust temperature 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.	

DTC Confirmation Procedure

INFOID:000000006609091

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

1. PERFORM DTC CONFIRMATION PROCEDURE-I

WITH CONSULT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Select "DATA MONITOR" mode with CONSULT-III.
4. Check the indication of "COOLAN TEMP/S".

WITH GST

Follow the procedure "WITH CONSULT-III" above.

Is the value of "COOLAN TEMP/S" between 4°C (39°F) and 36°C (97°F)?

YES >> GO TO 2.

NO-1 [If it is below 4°C (39°F)]>>Warm up the engine unit the value of "COOLAN TEMP/S" reaches 4°C (39°F) or more. Retry from step 1.

NO-2 [If it is above 36°C (97°F)]>>Cool engine down to less than 36°C (97°F). Retry from step 1.

2. PERFORM DTC CONFIRMATION PROCEDURE-II

WITH CONSULT-III

1. Set the select lever in N range.
2. Start the engine and warm up in idle with the value of "COOLAN TEMP/S" between 4°C (39°F) and 40°C (104°F) for more than 15 seconds.
3. Check 1st trip DTC.

WITH GST

Follow the procedure "WITH CONSULT-III" above.

Is 1st trip DTC detected?

YES >> Go to [EC-962, "Diagnosis Procedure"](#).

NO >> INSPECTION END

DTC P050A, P050B, P050E COLD START CONTROL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Diagnosis Procedure

INFOID:00000006609092

1. PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-99, "Idle Air Volume Learning"](#).

Is Idle Air Volume Learning carried out successfully?

Yes or No

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

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning part

3. CHECK FUEL INJECTION SYSTEM FUNCTION

Perform [EC-272, "DTC Confirmation Procedure"](#) for DTC P0171.

OK or NG

OK >> GO TO 4.

NG >> Go to [EC-275, "Diagnosis Procedure"](#) for DTC P0171.

4. PERFORM DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. **Perform DTC Confirmation Procedure.**
See [EC-961, "DTC Confirmation Procedure"](#).
3. Is the 1st trip DTC P050A, P050B, P050E displayed again?

Yes or No

Yes >> GO TO 5.

No >> **INSPECTION END**

5. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).
3. Perform [EC-98, "VIN Registration"](#).
4. Perform [EC-98, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-98, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-99, "Idle Air Volume Learning"](#).

>> **INSPECTION END**

DTC P0603 ECM POWER SUPPLY

< SERVICE INFORMATION >

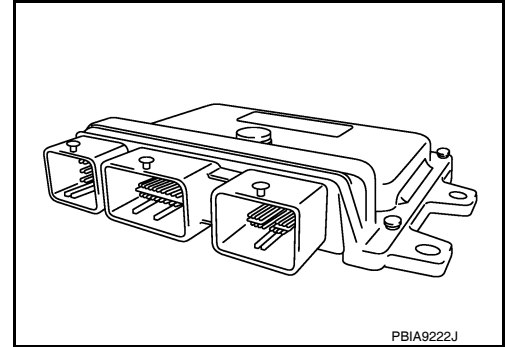
[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0603 ECM POWER SUPPLY

Component Description

INFOID:000000006580710

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.



On Board Diagnosis Logic

INFOID:000000006580711

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0603 0603	ECM power supply circuit	ECM back-up RAM system does not function properly.	<ul style="list-style-type: none">• Harness or connectors [The ECM power supply (back-up) circuit is open or shorted.]• ECM

DTC Confirmation Procedure

INFOID:000000006580712

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON and wait at least 10 seconds.
2. Turn ignition switch OFF and wait at least 5 minutes.
3. Turn ignition switch ON and wait at least 10 seconds.
4. Repeat steps 2 and 3 for five times.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-965, "Diagnosis Procedure"](#).

DTC P0603 ECM POWER SUPPLY

[MR20DE (EXCEPT FOR CALIFORNIA)]

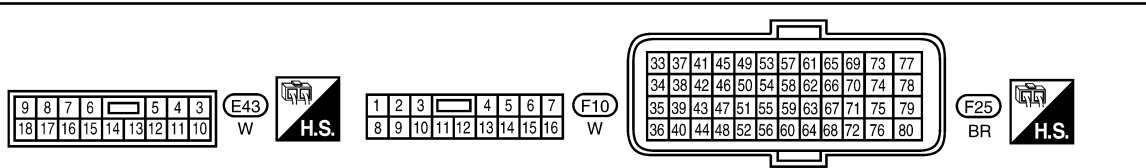
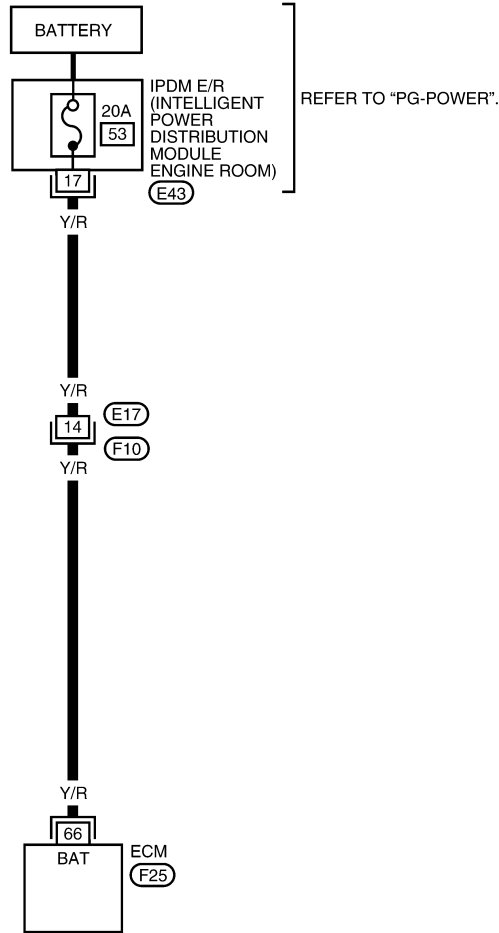
< SERVICE INFORMATION >

INFOID:000000006580713

Wiring Diagram

EC-ECM/PW-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



AABWA0301GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0603 ECM POWER SUPPLY

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
66	Y/R	Power supply for ECM (Back-up)	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14V)

Diagnosis Procedure

INFOID:000000006580714

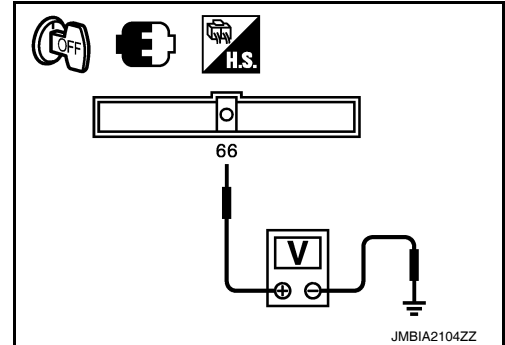
1. CHECK ECM POWER SUPPLY

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal 66 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- 20 A fuse
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-153](#).

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace harness or connectors.

4. PERFORM DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform DTC Confirmation Procedure.
See [EC-963. "DTC Confirmation Procedure"](#).
3. Is the 1st trip DTC P0603 displayed again?

Yes or No

- Yes >> GO TO 5.
- No >> **INSPECTION END**

5. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171. "ECM Re-communicating Function"](#).
3. Perform [EC-98. "VIN Registration"](#).
4. Perform [EC-98. "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-98. "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-99. "Idle Air Volume Learning"](#).

>> **INSPECTION END**

DTC P0605 ECM

< SERVICE INFORMATION >

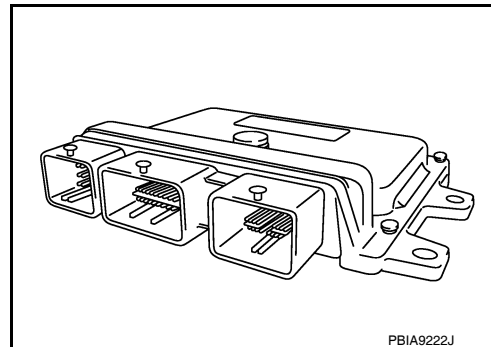
[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0605 ECM

Component Description

INFOID:000000006580715

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



On Board Diagnosis Logic

INFOID:000000006580716

This self-diagnosis has one or two trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	• ECM
		B)	ECM EEPROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

FAIL-SAFE MODE

ECM enters fail-safe mode when malfunction A is detected.

Detected items	Engine operation condition in fail-safe mode
Malfunction A	<ul style="list-style-type: none">• ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.• ECM deactivates ASCD operation.

DTC Confirmation Procedure

INFOID:000000006580717

Perform PROCEDURE FOR MALFUNCTION A first. If the 1st trip DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B. If there is no malfunction on PROCEDURE FOR MALFUNCTION B, perform PROCEDURE FOR MALFUNCTION C.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

1. Turn ignition switch ON.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-967. "Diagnosis Procedure"](#).

PROCEDURE FOR MALFUNCTION B

1. Turn ignition switch ON and wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Check 1st trip DTC.
4. If 1st trip DTC is detected, go to [EC-967. "Diagnosis Procedure"](#).

PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Repeat step 2 for 32 times.

DTC P0605 ECM

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-967, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580718

1.INSPECTION START

1. Erase DTC.
2. **Perform DTC Confirmation Procedure.**
See [EC-966, "DTC Confirmation Procedure"](#).
3. Is the 1st trip DTC P0605 displayed again?

Yes or No

- Yes >> GO TO 2.
No >> **INSPECTION END**

2.REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS(NATS) system and registration of all NVIS(NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).
3. Perform [EC-648, "VIN Registration"](#).
4. Perform [EC-648, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-648, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-649, "Idle Air Volume Learning"](#).

>> **INSPECTION END**

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DTC P0607 ECM

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0607 ECM

Description

INFOID:000000006580719

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.

On Board Diagnosis Logic

INFOID:000000006580720

**This self-diagnosis has the one trip detection logic (CVT).
The MIL will not light up for this self-diagnosis (M/T).**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0607 0607	CAN communication bus	When detecting error during the initial diagnosis for CAN controller of each control unit.	• ECM

DTC Confirmation Procedure

INFOID:000000006580721

1. Turn ignition switch ON.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-968, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580722

1.INSPECTION START

1. Erase DTC.
2. Perform DTC Confirmation Procedure.
See [EC-968, "DTC Confirmation Procedure"](#).
3. Is the 1st trip DTC P0607 displayed again?

Yes or No

Yes >> GO TO 2.

No >> **INSPECTION END**

2.REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).
3. Perform [EC-648, "VIN Registration"](#).
4. Perform [EC-648, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-648, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-649, "Idle Air Volume Learning"](#).

>> **INSPECTION END**

DTC P0643 SENSOR POWER SUPPLY

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0643 SENSOR POWER SUPPLY

On Board Diagnosis Logic

INFOID:000000006580723

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0643 0643	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	<ul style="list-style-type: none">• Harness or connectors (APP sensor 1 circuit is shorted.) (Throttle position sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.]• Accelerator pedal position sensor• Throttle position sensor• Camshaft position sensor (PHASE)

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006580724

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-971. "Diagnosis Procedure"](#).

DTC P0643 SENSOR POWER SUPPLY

< SERVICE INFORMATION >

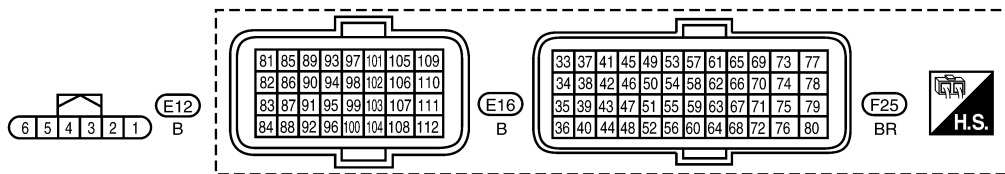
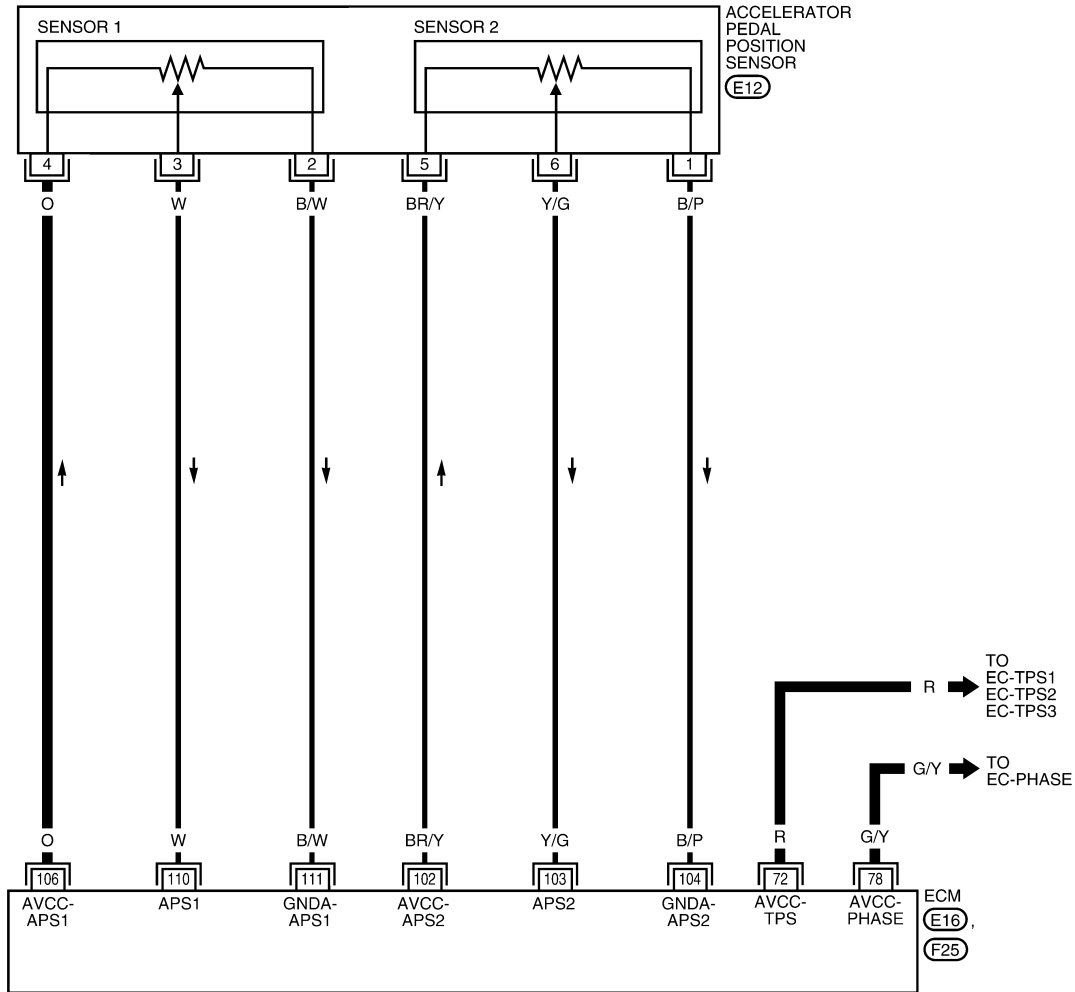
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580725

EC-SEN/PW-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



ABBWA0647GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0643 SENSOR POWER SUPPLY

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
72	R	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V
78	G/Y	Sensor power supply [Camshaft position sensor (PHASE)]	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
103	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	B/P	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
106	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
110	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006580726

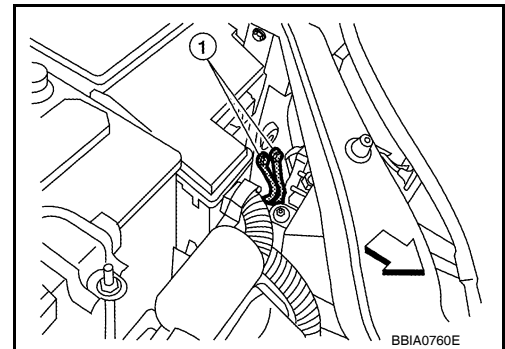
1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-706. "Ground Inspection"](#).

- ⇐ : Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



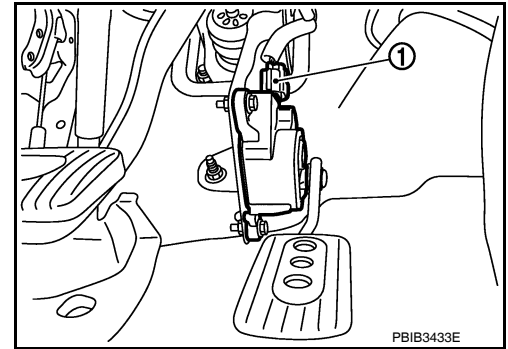
2. CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

DTC P0643 SENSOR POWER SUPPLY

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

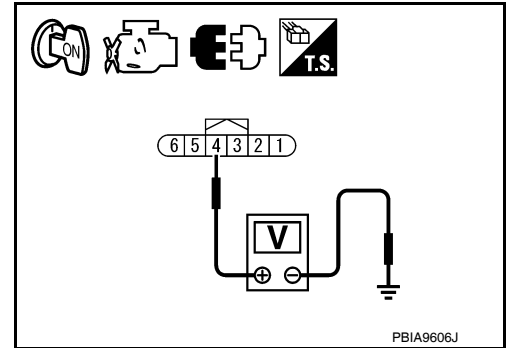


3. Check voltage between APP sensor terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 8.
NG >> GO TO 3.



3.CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
72	Throttle position sensor terminal 1	EC-1047. "Wiring Diagram"
78	Camshaft position sensor (PHASE) terminal 1	EC-869. "Wiring Diagram"
106	APP sensor terminal 4	EC-970. "Wiring Diagram"

OK or NG

- OK >> GO TO 4.
NG >> Repair short to ground or short to power in harness or connectors.

4.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-872. "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace camshaft position sensor (PHASE). Refer to [EM-50](#).

5.CHECK THROTTLE POSITION SENSOR

Refer to [EC-1049. "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18](#).

>> **INSPECTION END**

7.CHECK APP SENSOR

Refer to [EC-1057. "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.

DTC P0643 SENSOR POWER SUPPLY

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

NG >> GO TO 8.

8. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4](#).

>> INSPECTION END

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> INSPECTION END

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DTC P0850 PNP SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P0850 PNP SWITCH

Component Description

INFOID:000000006580727

When the shift lever position is Neutral, park/neutral position (PNP) switch is ON. (M/T)
When the shift lever position is P or N, transmission range switch is ON. (CVT)
ECM detects the position because the continuity of the line (the ON signal) exists.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580728

Specification data are reference values.

Monitor item	Condition	Specification
P/N POSI SW	• Ignition switch: ON	Shift lever: P or N (CVT), Neutral (M/T) ON
		Shift lever: Except above OFF

On Board Diagnosis Logic

INFOID:000000006580729

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0850 0850	Park/neutral position switch	The park/neutral position (PNP) signal is not changed in the process of engine starting and driving.	<ul style="list-style-type: none">• Harness or connectors [Park/neutral position (PNP) signal circuit is open or shorted.]• Park/neutral position (PNP) switch (M/T)• Transmission range switch (CVT)

DTC Confirmation Procedure

INFOID:000000006580730

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

④ WITH CONSULT-III

1. Turn ignition switch ON.
2. Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT-III. Then check the "P/N POSI SW" signal under the following conditions.

Position (Shift lever)	Known-good signal
N or P position (CVT) Neutral position (M/T)	ON
Except above	OFF

If NG, go to [EC-977, "Diagnosis Procedure"](#).

If OK, go to following step.

3. Select "DATA MONITOR" mode with CONSULT-III.
4. Start engine and warm it up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	More than 1,100 rpm (CVT) More than 1,500 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	2.0 - 31.8 msec
VHCL SPEED SE	More than 64km/h (29 MPH)
Shift lever	Suitable position

6. Check 1st trip DTC.

DTC P0850 PNP SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

7. If 1st trip DTC is detected, go to [EC-977, "Diagnosis Procedure"](#).

Overall Function Check

INFOID:000000006580731

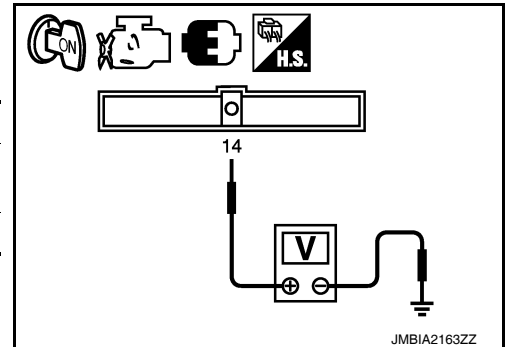
Use this procedure to check the overall function of the park/neutral position (PNP) signal circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 14 (PNP signal) and ground under the following conditions.

Condition (Shift lever)	Voltage (Known-good data)
P or N position (CVT) Neutral position (M/T)	BATTERY VOLTAGE (11 - 14 V)
Except above	Approx. 0 V

3. If NG, go to [EC-977, "Diagnosis Procedure"](#).



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DTC P0850 PNP SWITCH

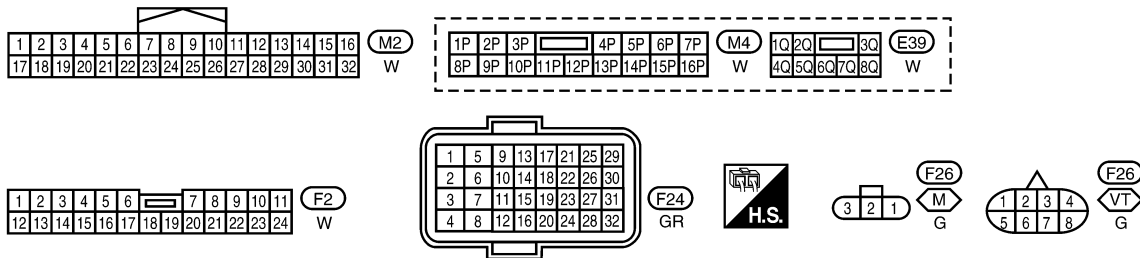
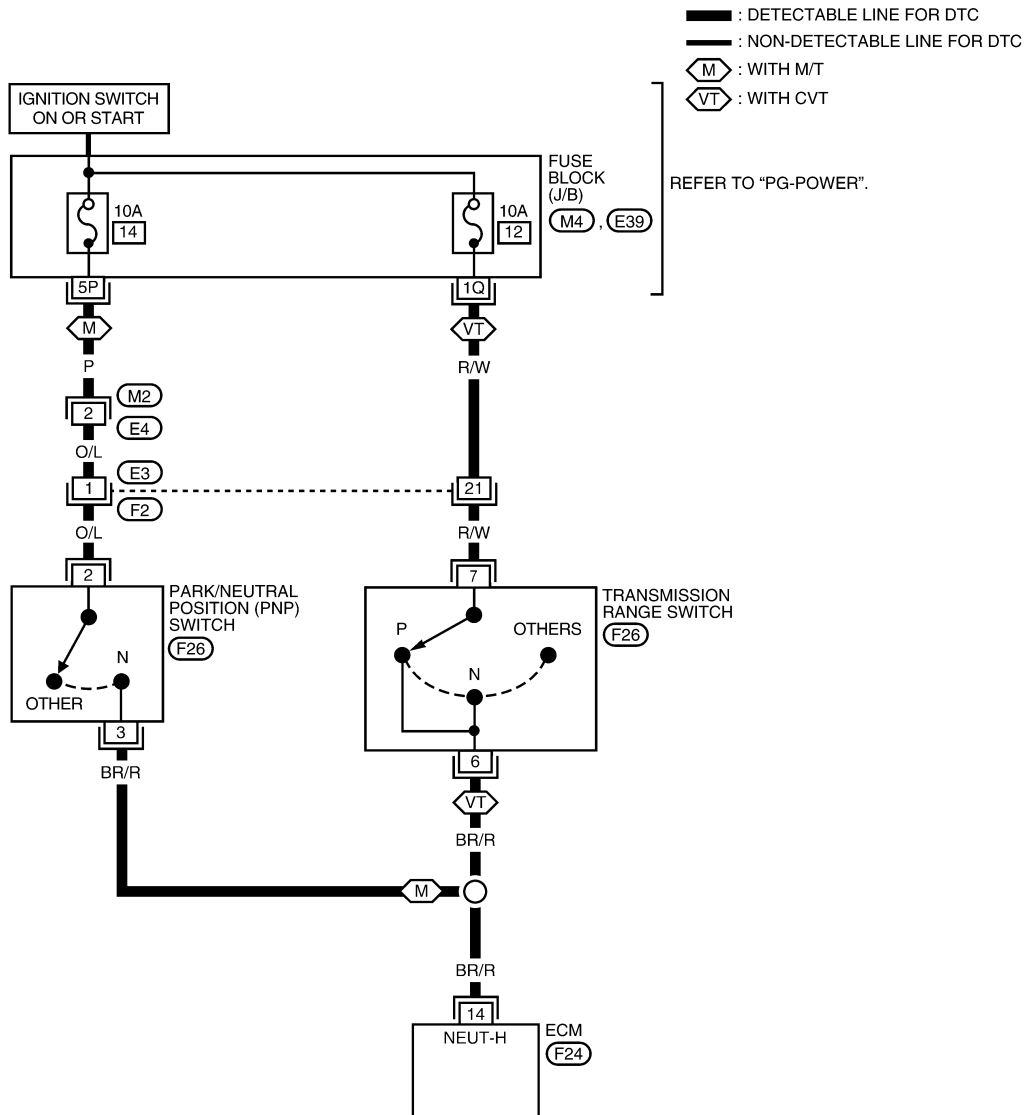
< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580732

EC-TR/SW-01



ABBWA0648GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0850 PNP SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	BR/R	PNP signal	[Ignition switch: ON] • Shift lever: P or N (CVT), Neutral (M/T)	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON] • Except above	Approximately 0 V

Diagnosis Procedure

INFOID:000000006580733

M/T MODELS

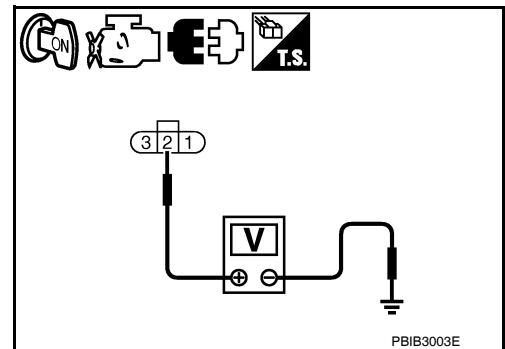
1. CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect PNP switch harness connector.
3. Turn ignition switch ON.
4. Check voltage between PNP switch terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M2, E4
- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between PNP switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between PNP switch terminal 3 and ECM terminal 14. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK PNP SWITCH

Refer to [MT-144](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace PNP switch. Refer to [MT-149](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

DTC P0850 PNP SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

>> **INSPECTION END**

CVT MODELS

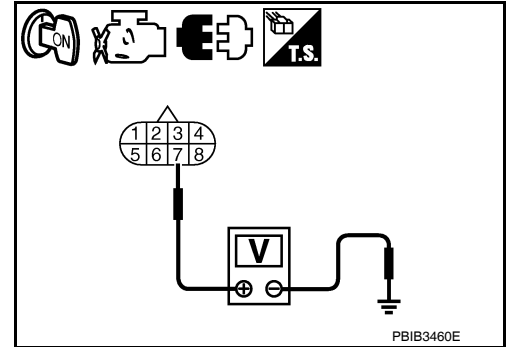
1. CHECK TRANSMISSION RANGE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect transmission range switch harness connector.
3. Turn ignition switch ON.
4. Check voltage between transmission range switch terminal 7 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between transmission range switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK PNP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between transmission range switch terminal 6 and ECM terminal 14. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK TRANSMISSION RANGE SWITCH

Refer to [CVT-61](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace transmission range switch. Refer to [CVT-185](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

DTC P1148 CLOSED LOOP CONTROL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P1148 CLOSED LOOP CONTROL

On Board Diagnosis Logic

INFOID:000000006580734

This self-diagnosis has the one trip detection logic.

A

EC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1148 1148	Closed loop control function	The closed loop control function does not operate even when vehicle is driving in the specified condition.	<ul style="list-style-type: none">• Harness or connectors [Air fuel ratio (A/F) sensor 1 circuit is open or shorted.]• Air fuel ratio (A/F) sensor 1• Air fuel ratio (A/F) sensor 1 heater

C

D

NOTE:

DTC P1148 is displayed with another DTC for air fuel ratio (A/F) sensor 1. Perform the trouble diagnosis for the corresponding DTC.

E

F

G

H

I

J

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L

M

N

O

P

DTC P1212 TCS COMMUNICATION LINE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P1212 TCS COMMUNICATION LINE

Description

INFOID:000000006580735

NOTE:

- If DTC P1212 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to [EC-712](#).
- If DTC P1212 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-980](#).

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.

On Board Diagnosis Logic

INFOID:000000006580736

Freeze frame data is not stored in the ECM for this self-diagnosis.

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212 1212	TCS communication line	ECM can not receive the information from “ABS actuator and electric unit (control unit)” continuously.	<ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted.)• ABS actuator and electric unit (control unit)• Dead (Weak) battery

DTC Confirmation Procedure

INFOID:000000006580737

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

1. Start engine and let it idle for at least 10 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-980. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006580738

Go to [BRC-45. "How to Perform Trouble Diagnosis for Quick and Accurate Repair"](#).

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P1217 ENGINE OVER TEMPERATURE

System Description

INFOID:000000006580739

SYSTEM DESCRIPTION

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 [EC-968](#).

Cooling Fan Control

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed* ¹	Cooling fan control	<ul style="list-style-type: none"> • IPDM E/R (Cooling fan relays-1, -2 and -3) • Cooling fan relays-4 and -5
Battery	Battery voltage* ¹		
ABS actuator and electric unit (control unit) Combination meter	Vehicle speed* ²		
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner ON signal* ²		
Refrigerant pressure sensor	Refrigerant pressure		

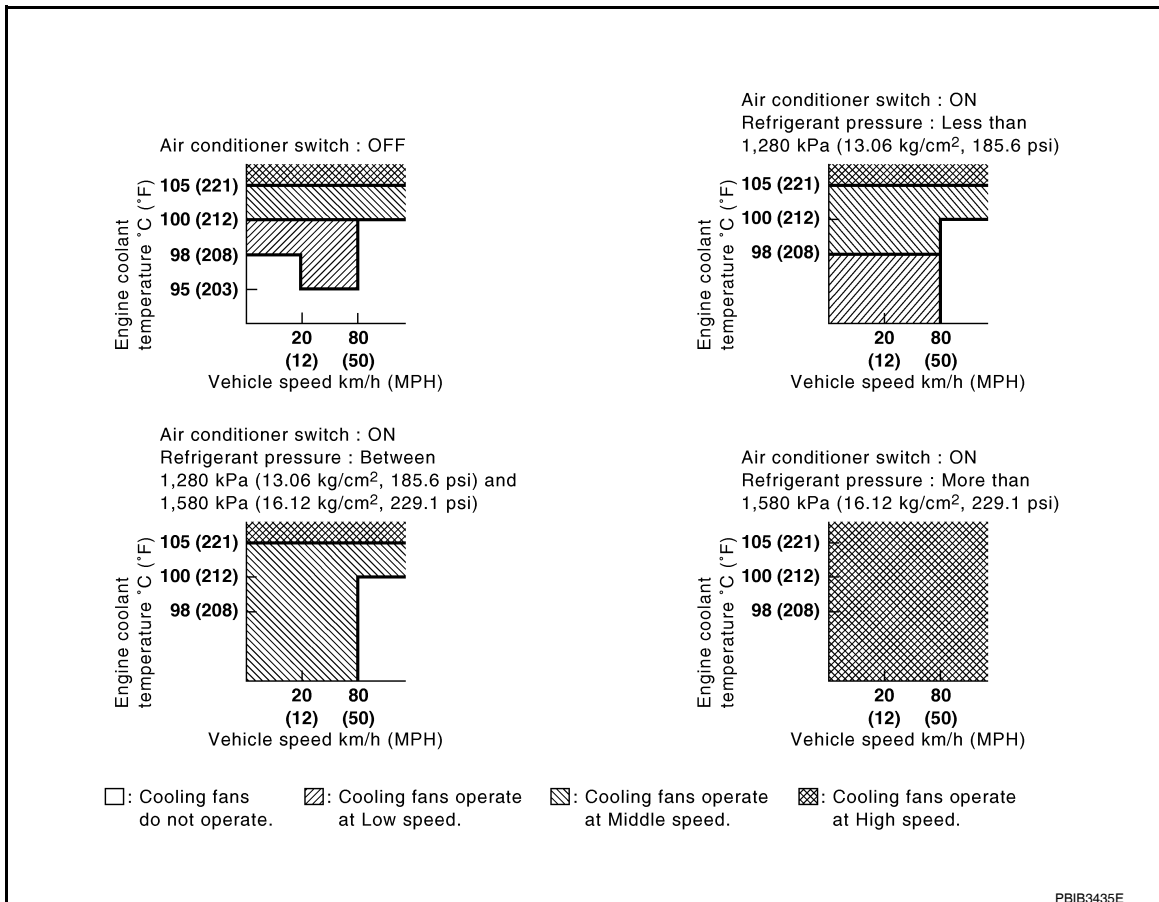
*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to ECM through CAN communication line.

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

Models with A/C

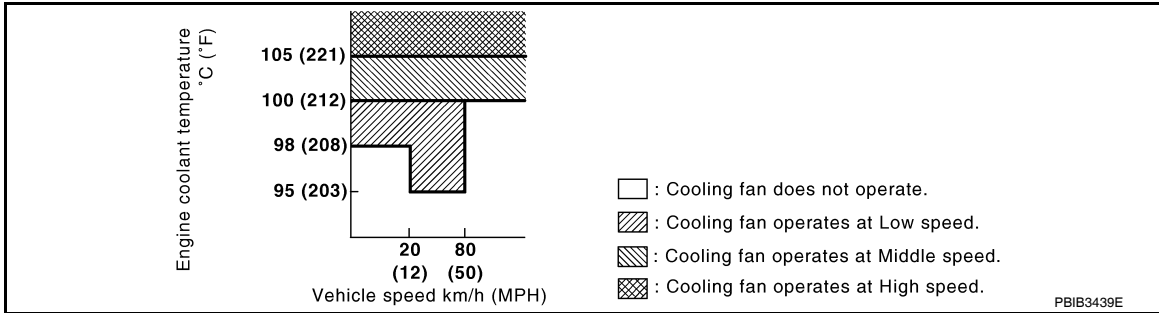


DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Models without A/C



Cooling Fan Relay Operation

The ECM controls cooling fan relays through CAN communication line.

Cooling fan speed	Cooling fan relay				
	1	2	3	4	5
Stop (OFF)	OFF	OFF	OFF	OFF	OFF
Low (LOW)	OFF	OFF	OFF	ON	OFF
Middle (MID)	ON	OFF	OFF	OFF	ON
High (HI)	ON	ON	ON	OFF	ON

COMPONENT DESCRIPTION

Cooling Fan Motor

The cooling fan operates at each speed when the current flows in the cooling fan motor as follows.

Cooling fan speed	Cooling fan motor terminals	
	(+)	(-)
Middle (MID)	1	3 and 4
	2	3 and 4
	1 and 2	3
	1 and 2	4
High (HI)	1 and 2	3 and 4

The cooling fan operates at low (LOW) speed when cooling fan motors-1 and -2 are circuited in series under middle speed condition.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580740

Specification data are reference values.

Monitor item	Condition	Specification
AIR COND SIG	Air conditioner switch: OFF	OFF
	Air conditioner switch: ON (Compressor operates.)	ON
COOLING FAN	Engine coolant temperature: 97°C (207°F) or less	OFF
	Engine coolant temperature: Between 98°C (208°F) and 99°C (210°F).	LOW
	Engine coolant temperature: Between 100°C (212°F) and 104°C (219°F).	MIDDLE
	Engine coolant temperature: 105°C (221°F) or more	HIGH

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

On Board Diagnosis Logic

INFOID:000000006580741

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.

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 1217	Engine over temperature (Overheat)	<ul style="list-style-type: none"> Cooling fan does not operate properly (Overheat). Cooling fan system does not operate properly (Overheat). Engine coolant was not added to the system using the proper filling method. Engine coolant is not within the specified range. 	<ul style="list-style-type: none"> Harness or connectors (Cooling fan circuit is open or shorted.) Cooling fan motor IPDM E/R (Cooling fan relays-1, -2 and -3) Cooling fan relays-4 and -5 Radiator hose Radiator Reservoir tank Radiator cap Water pump Thermostat Water control valve <p>For more information, refer to EC-991, "Main 13 Causes of Overheating".</p>

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [MA-19, "ENGINE COOLANT : Changing Engine Coolant"](#). Also, replace the engine oil. Refer to [MA-23, "ENGINE OIL : Changing Engine Oil"](#).

- Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-16, "Engine Cooling System"](#).
- After refilling coolant, run engine to ensure that no water-flow noise is emitted.

Overall Function Check

INFOID:000000006580742

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

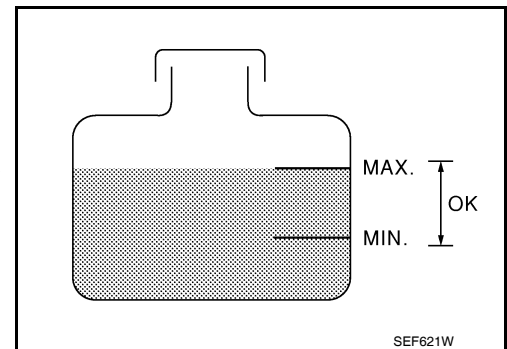
WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the reservoir tank or the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

WITH CONSULT-III

- Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-987, "Diagnosis Procedure"](#).
- Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-987, "Diagnosis Procedure"](#).
- Turn ignition switch ON.



- Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III.
- If the results are NG, go to [EC-987, "Diagnosis Procedure"](#).

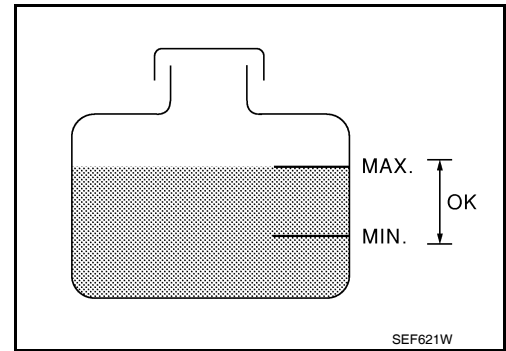
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DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

1. Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-987, "Diagnosis Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-987, "Diagnosis Procedure"](#).
3. Perform IPDM E/R auto active test and check cooling fan motor operation. Refer to [PG-21, "Auto Active Test"](#).
4. If NG, go to [EC-987, "Diagnosis Procedure"](#).



DTC P1217 ENGINE OVER TEMPERATURE




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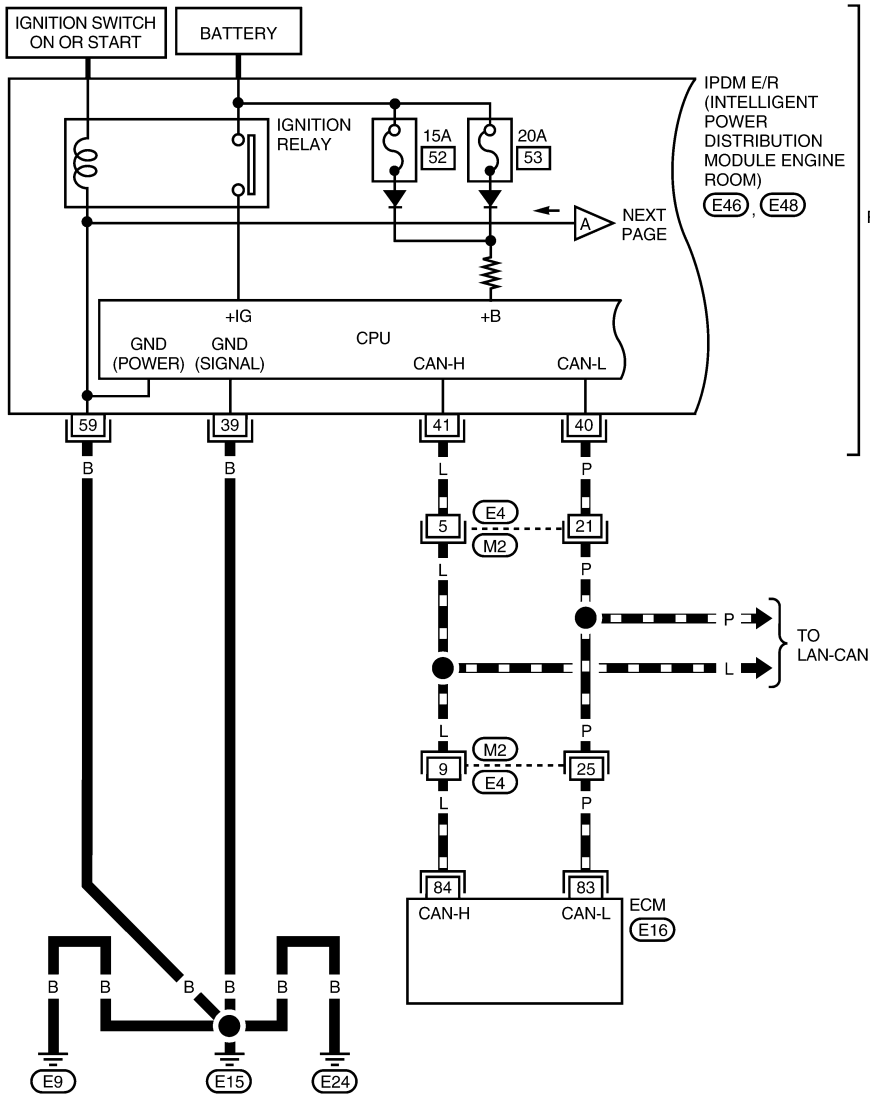
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Wiring Diagram

EC-COOL/F-01

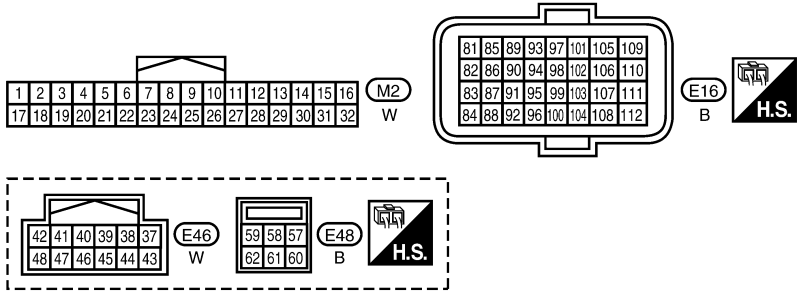
-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



REFER TO PG-POWER .

IPDM E/R
(INTELLIGENT
POWER
DISTRIBUTION
MODULE ENGINE
ROOM)
E46, E48

NEXT
PAGE



BBWA2891E

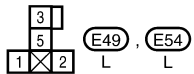
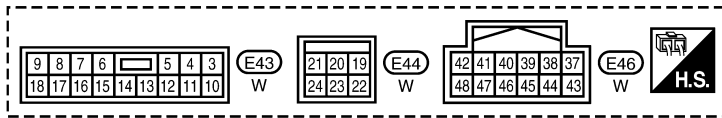
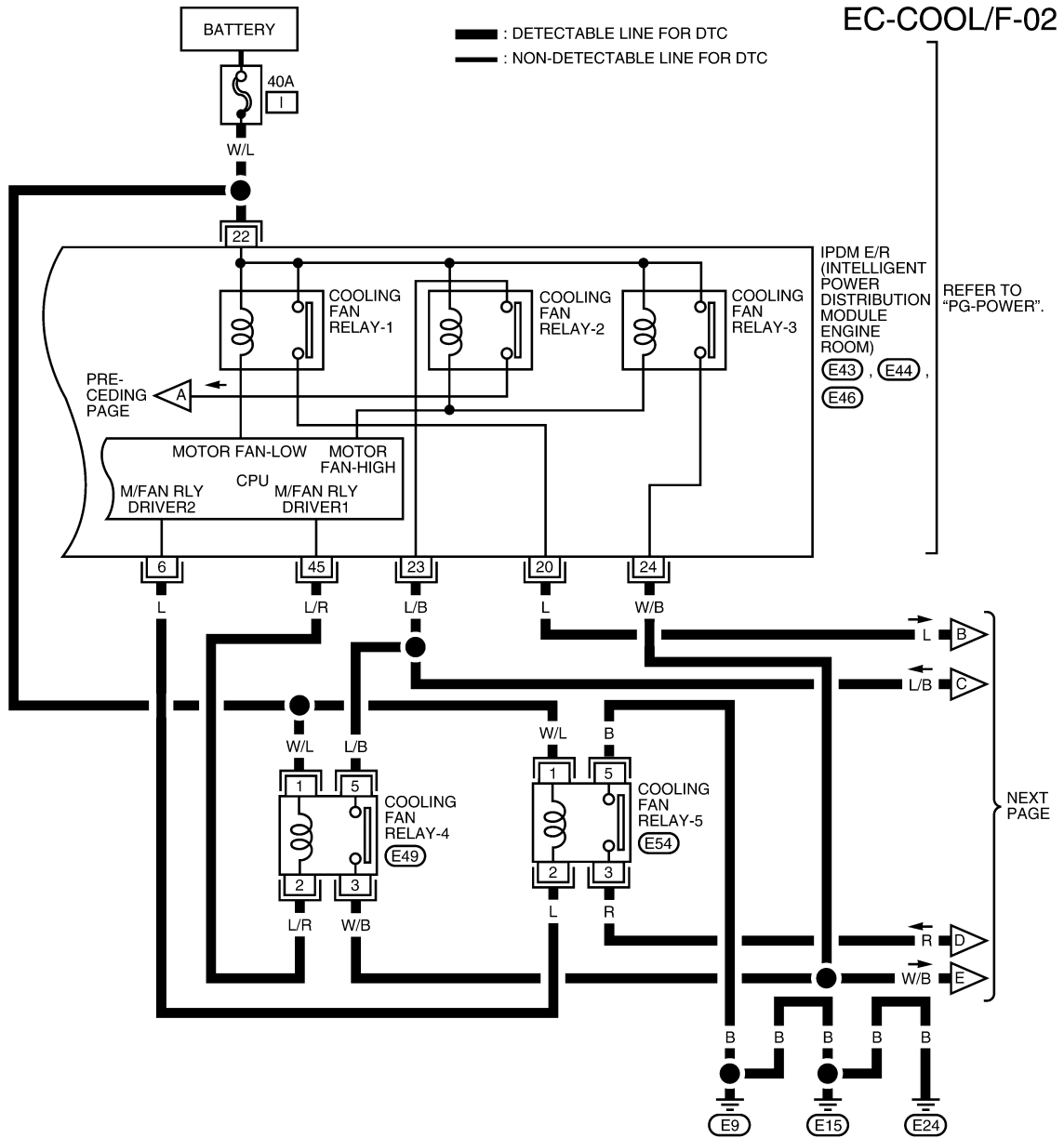
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DTC P1217 ENGINE OVER TEMPERATURE

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[MR20DE (EXCEPT FOR CALIFORNIA)]



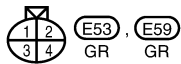
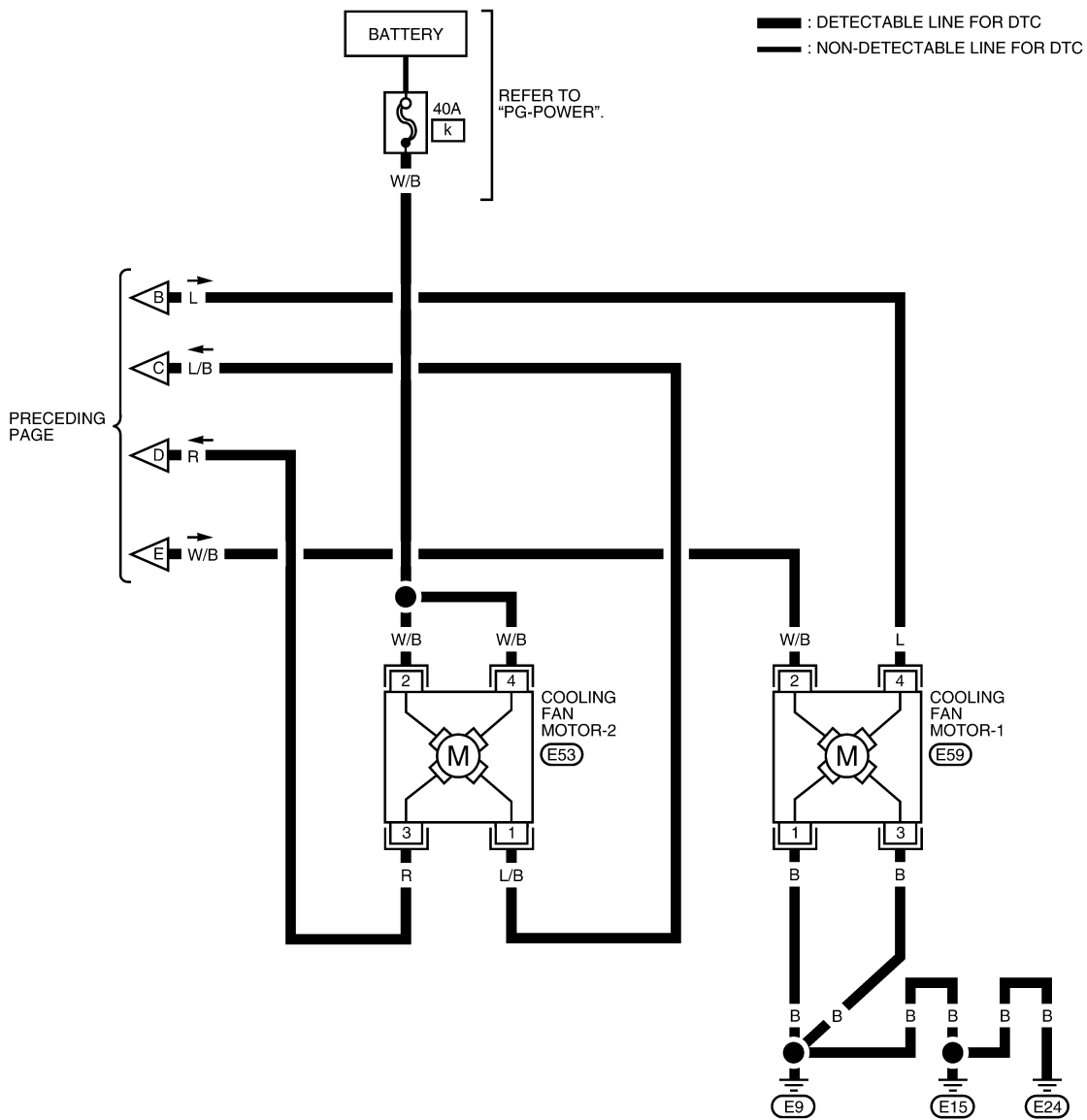
BBWA2892E

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

EC-COOL/F-03



BBWA2893E

INFOID:000000006580744

Diagnosis Procedure

1. INSPECTION START

Do you have CONSULT-III?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

2. CHECK COOLING FAN OPERATION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that cooling fans-1 and -2 operates at each speed (LOW/MID/HI).

OK or NG

OK >> GO TO 4.

NG >> Check cooling fan control circuit. (Refer to "PROCEDURE A".)

3. CHECK COOLING FAN OPERATION

Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motor operation.
Refer to [PG-21, "Auto Active Test"](#).
2. Make sure that cooling fans-1 and -2 operates at each speed (Low/Middle/High).

OK or NG

OK >> GO TO 4.

NG >> Check cooling fan control circuit. (Refer to "PROCEDURE A".)

4. CHECK COOLING SYSTEM FOR LEAK

Refer to [CO-9](#).

OK or NG

OK >> GO TO 5.

NG >> Check the following for leak.

- Hose
- Radiator
- Water pump

5. CHECK RADIATOR CAP

Refer to [CO-15](#).

OK or NG

OK >> GO TO 6.

NG >> Replace radiator cap. Refer to [CO-15](#).

6. CHECK COMPONENT PARTS

Check the following.

- Thermostat. (Refer to [CO-21](#).)
- Water control valve. (Refer to [CO-24](#).)
- Engine coolant temperature sensor. (Refer to [CO-24](#).)

OK or NG

OK >> GO TO 7.

NG >> Replace malfunctioning component parts.

7. CHECK MAIN 13 CAUSES

If the cause cannot be isolated, go to [EC-991, "Main 13 Causes of Overheating"](#).

>> **INSPECTION END**

PROCEDURE A

1. CHECK IPDM E/R POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E44.

DTC P1217 ENGINE OVER TEMPERATURE

[MR20DE (EXCEPT FOR CALIFORNIA)]

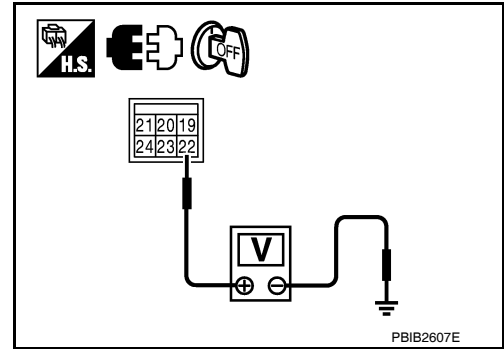
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3. Check voltage between IPDM E/R terminal 22 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

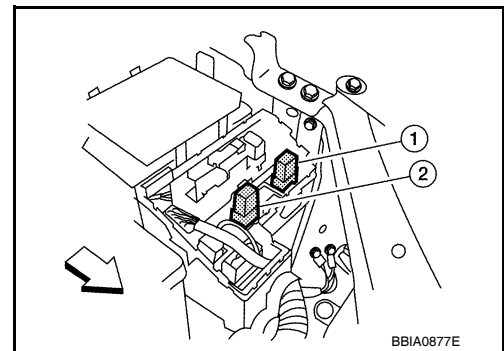
Check the following.

- 40 A fusible link
- Harness for open or short between IPDM E/R and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK COOLING FAN RELAYS POWER SUPPLY CIRCUIT

1. Disconnect cooling fan relays-4 (2) and -5 (1).
- ⇐: Vehicle front

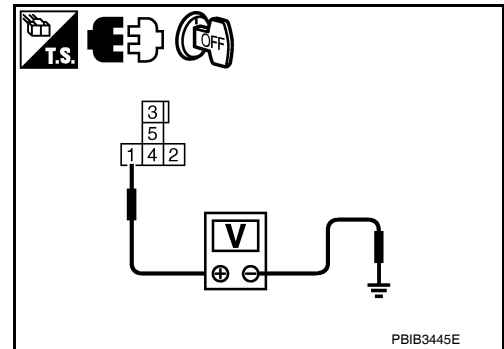


2. Check voltage between cooling fan relays-4, -5 terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

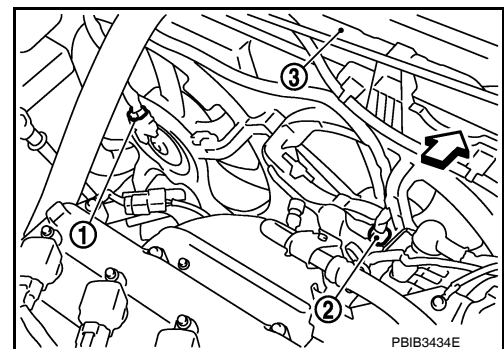
OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to power or short to ground in harness or connectors.



4. CHECK COOLING FAN MOTORS POWER SUPPLY CIRCUIT

1. Disconnect cooling fan motor-2 harness connector (2).
- ⇐: Vehicle front
 - Cooling fan motor-1 harness connector (1)
 - Radiator (3)



DTC P1217 ENGINE OVER TEMPERATURE

[MR20DE (EXCEPT FOR CALIFORNIA)]

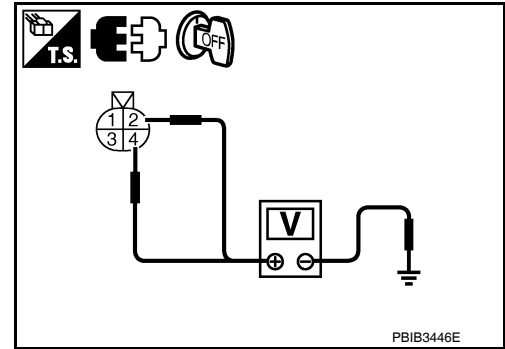
< SERVICE INFORMATION >

2. Check voltage between cooling fan motor-2 terminal 2, 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

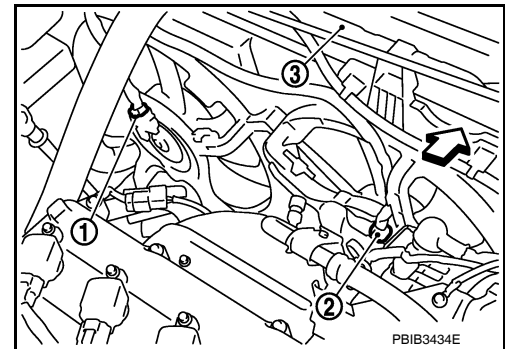
Check the following.

- 40 A fusible link
- Harness for open or short between cooling fan motor-2 and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK COOLING FAN MOTORS CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connectors E46 and E48.
3. Disconnect cooling fan motor-1 harness connector (1).
 - ⇐: Vehicle front
 - Cooling fan motor-2 harness connector (2)
 - Radiator (3)
4. Check harness continuity between the following;
cooling fan relay-4 terminal 2 and IPDM E/R terminal 45,
cooling fan relay-4 terminal 5 and IPDM E/R terminal 23,
cooling fan relay-5 terminal 2 and IPDM E/R terminal 6,
cooling fan relay-5 terminal 5 and ground,
cooling fan relay-4 terminal 3 and cooling fan motor-1 terminal 2,
cooling fan motor-1 terminal 2 and IPDM E/R terminal 24,
cooling fan motor-1 terminal 4 and IPDM E/R terminal 20,
cooling fan motor-1 terminal 1, 3 and ground.
IPDM E/R terminal 39, 59 and ground.



Continuity should exist.

cooling fan relay-4 terminal 5 and cooling fan motor-2 terminal 1,
cooling fan relay-5 terminal 3 and cooling fan motor-2 terminal 3,
cooling fan motor-2 terminal 1 and cooling fan relay-4 terminal 5,
Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between cooling fan relay-4 and IPDM E/R
- Harness for open or short between cooling fan relay-5 and IPDM E/R
- Harness for open or short between cooling fan relay-4 and cooling fan motor-1
- Harness for open or short between cooling fan relay-4 and cooling fan motor-2
- Harness for open or short between cooling fan relay-5 and cooling fan motor-2
- Harness for open or short between cooling fan relay-5 and ground
- Harness for open or short between cooling fan motor-1 and ground

DTC P1217 ENGINE OVER TEMPERATURE

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- Harness for open or short between IPDM E/R and ground

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK GROUND CONNECTIONS

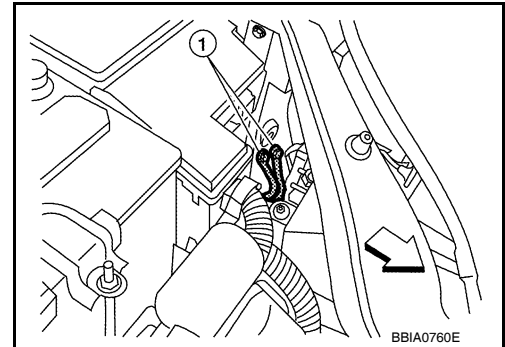
Loosen and retighten ground screw on the body.

Refer to [EC-706, "Ground Inspection"](#).

- ⇐: Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 9.
- NG >> Repair or replace ground connections.



9. CHECK COOLING FAN RELAYS-4 AND -5

Refer to [EC-992, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
- NG >> Replace malfunctioning cooling fan relay. Refer to [PG-56](#).

10. CHECK COOLING FAN MOTORS-1 AND -2

Refer to [EC-992, "Component Inspection"](#).

OK or NG

- OK >> GO TO 11.
- NG >> Replace malfunctioning cooling fan motor. Refer to [CO-17](#).

11. CHECK INTERMITTENT INCIDENT

Perform [EC-701](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-28](#).
- NG >> Repair or replace harness or connector.

Main 13 Causes of Overheating

INFOID:000000006580745

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> • Blocked radiator • Blocked condenser • Blocked radiator grille • Blocked bumper 	<ul style="list-style-type: none"> • Visual 	No blocking	—
	2	<ul style="list-style-type: none"> • Coolant mixture 	<ul style="list-style-type: none"> • Coolant tester 	See MA-16, "Engine Cooling System" .	
	3	<ul style="list-style-type: none"> • Coolant level 	<ul style="list-style-type: none"> • Visual 	Coolant up to MAX level in reservoir tank and radiator filler neck	See CO-11, "Inspection" .
	4	<ul style="list-style-type: none"> • Radiator cap 	<ul style="list-style-type: none"> • Pressure tester 	See CO-11, "Inspection" .	
ON*2	5	<ul style="list-style-type: none"> • Coolant leaks 	<ul style="list-style-type: none"> • Visual 	No leaks	See CO-11, "Inspection" .
ON*2	6	<ul style="list-style-type: none"> • Thermostat 	<ul style="list-style-type: none"> • Touch the upper and lower radiator hoses 	Both hoses should be hot	See CO-21 , and CO-15
ON*1	7	<ul style="list-style-type: none"> • Cooling fan 	<ul style="list-style-type: none"> • CONSULT-III 	Operating	See trouble diagnosis for DTC P1217 (EC-987, "Diagnosis Procedure").
OFF	8	<ul style="list-style-type: none"> • Combustion gas leak 	<ul style="list-style-type: none"> • Color checker chemical tester 4 Gas analyzer 	Negative	—

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Engine	Step	Inspection item	Equipment	Standard	Reference page
ON*3	9	• Coolant temperature gauge	• Visual	Gauge less than 3/4 when driving	—
		• Coolant overflow to reservoir tank	• Visual	No overflow during driving and idling	See CO-12 .
OFF*4	10	• Coolant return from reservoir tank to radiator	• Visual	Should be initial level in reservoir tank	See CO-11 .
OFF	11	• Water control valve	• Remove and inspect the valve	Within the specified value	See CO-24
OFF	12	• Cylinder head	• Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-65 .
	13	• Cylinder block and pistons	• Visual	No scuffing on cylinder walls or piston	See EM-80 .

*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-7](#).

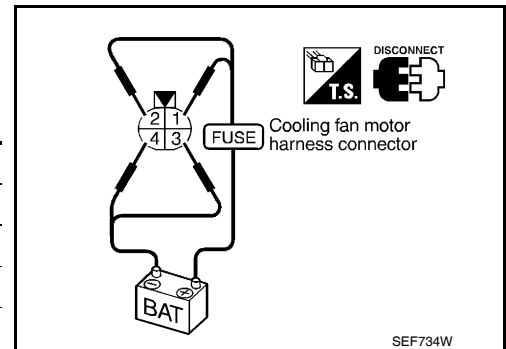
Component Inspection

INFOID:000000006580746

COOLING FAN MOTORS-1 AND -2

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

Cooling fan speed	Cooling fan motor terminals	
	(+)	(-)
Middle (MID)	1	3 and 4
	2	3 and 4
	1 and 2	3
	1 and 2	4
High (HI)	1 and 2	3 and 4



Cooling fan motor should operate.

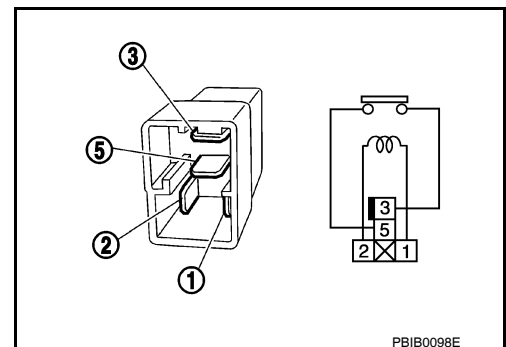
If NG, replace cooling fan motor. Refer to [CO-17](#).

COOLING FAN RELAYS-4 AND -5

Check continuity between terminals 3 and 4.

Conditions	Continuity
12 V direct current supply between terminal 1 and 2	Yes
No current supply	No

If NG, replace cooling fan motor. Refer to [CO-17](#).



DTC P1225 TP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

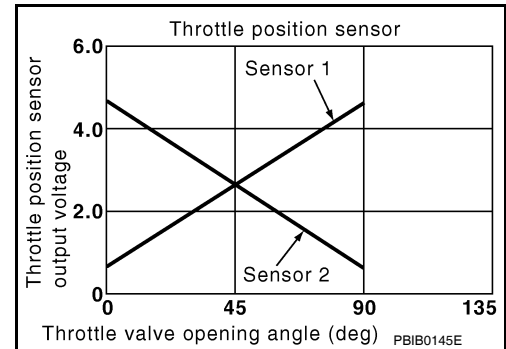
DTC P1225 TP SENSOR

Component Description

INFOID:000000006580747

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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.



On Board Diagnosis Logic

INFOID:000000006580748

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance	Closed throttle position learning value is excessively low.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

INFOID:000000006580749

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Check 1st trip DTC.
4. If 1st trip DTC is detected, go to [EC-993, "Diagnosis Procedure"](#).

Diagnosis Procedure

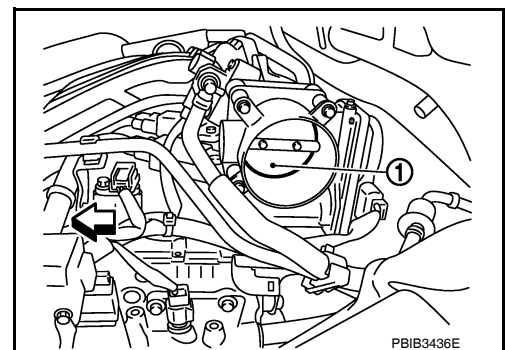
INFOID:000000006580750

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - ↖: Vehicle front
 - Illustration shows the view with intake air duct removed.

OK or NG

- OK >> GO TO 2.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EM-18](#).



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18](#).

>> INSPECTION END

DTC P1226 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

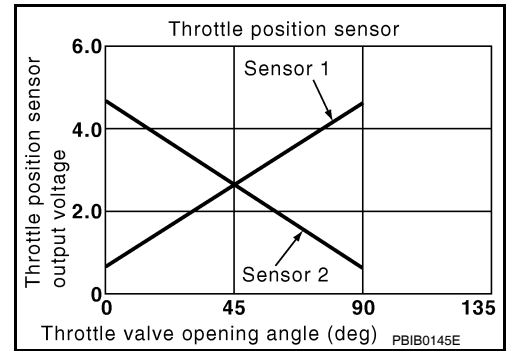
DTC P1226 TP SENSOR

Component Description

INFOID:000000006580752

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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.



On Board Diagnosis Logic

INFOID:000000006580753

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance	Closed throttle position learning is not performed successfully, repeatedly.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

INFOID:000000006580754

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Repeat steps 1 and 2 for 32 times.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-994, "Diagnosis Procedure"](#).

Diagnosis Procedure

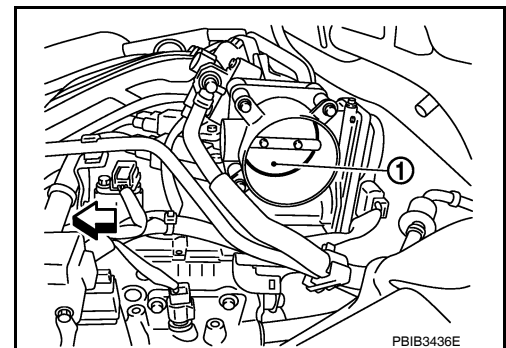
INFOID:000000006580755

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - Vehicle front
 - Illustration shows the view with intake air duct removed.

OK or NG

- OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EM-18](#).



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18](#).

>> INSPECTION END

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

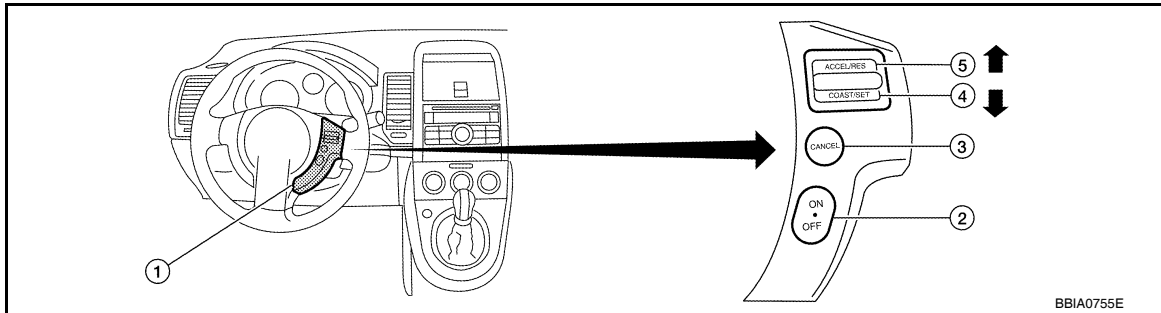
[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P1564 ASCD STEERING SWITCH

Component Description

INFOID:000000006580761

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.



1. ASCD steering switch
2. MAIN switch
3. CANCEL switch
4. SET/COAST switch
5. RESUME/ACCELERATE switch

Refer to [EC-590](#) for the ASCD function.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580762

Specification data are reference values.

Monitor item	Condition	Specification	
MAIN SW	• Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	• Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	• Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF

On Board Diagnosis Logic

INFOID:000000006580763

- This self-diagnosis has the one trip detection logic.
- The MIL will not light up for this self-diagnosis.

NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605.

Refer to [EC-966](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1564 1564	ASCD steering switch	<ul style="list-style-type: none"> • An excessively high voltage signal from the ASCD steering switch is sent to ECM. • ECM detects that input signal from the ASCD steering switch is out of the specified range. • ECM detects that the ASCD steering switch is stuck ON. 	<ul style="list-style-type: none"> • Harness or connectors (ASCD switch circuit is open or shorted.) • ASCD steering switch • ECM

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC Confirmation Procedure

INFOID:000000006580764

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON.
2. Wait at least 10 seconds.
3. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
4. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Check DTC.
8. If DTC is detected, go to [EC-998, "Diagnosis Procedure"](#).

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

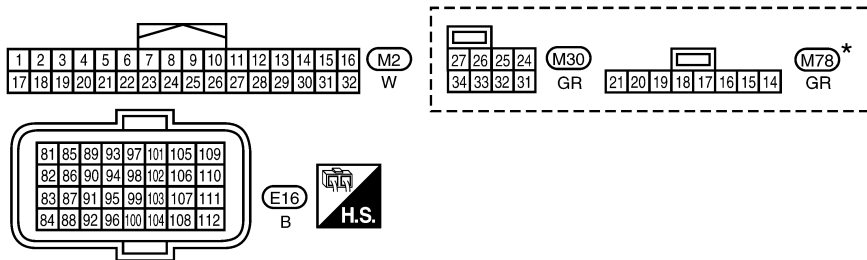
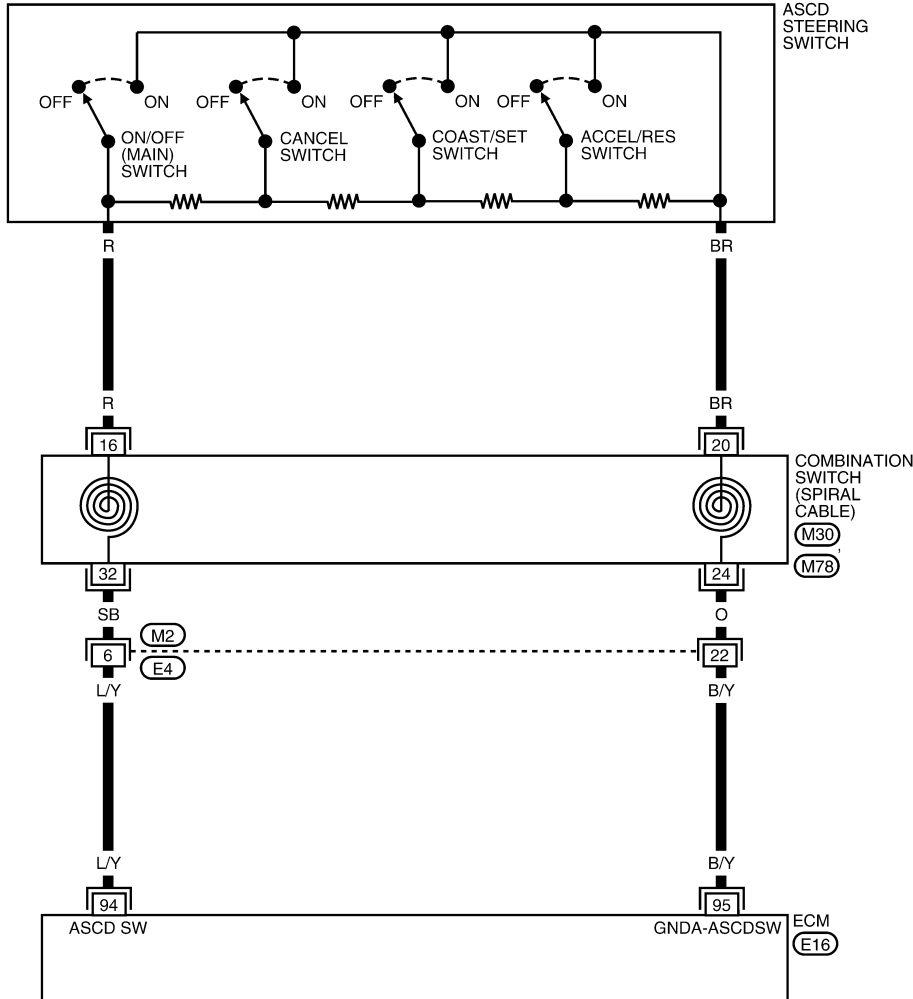
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580765

EC-ASC/SW-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

ABBWA0649GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
94	L/Y	ASCD steering switch	[Ignition switch: ON] • ASCD steering switch: OFF	Approximately 4 V
			[Ignition switch: ON] • MAIN switch: Pressed	Approximately 0 V
			[Ignition switch: ON] • CANCEL switch: Pressed	Approximately 1 V
			[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	Approximately 3 V
			[Ignition switch: ON] • SET/COAST switch: Pressed	Approximately 2 V
95	B/Y	Sensor ground	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

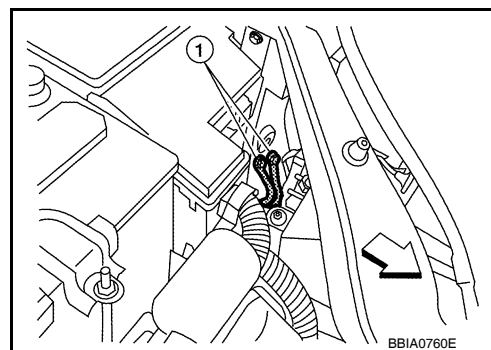
INFOID:000000006580766

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ⇐: Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.



2. CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT-III

- Turn ignition switch ON.
- Select "MAIN SW", "RESUME/ACC SW", "SET SW and "CANCEL SW" in "DATA MONITOR" mode with CONSULT-III.
- Check each item indication under the following conditions.

Switch	Monitor item	Condition	Indication
MAIN switch	MAIN SW	Pressed	ON
		Released	OFF
CANCEL switch	CANCEL SW	Pressed	ON
		Released	OFF
RESUME/AC- CELERATE switch	RESUME/ACC SW	Pressed	ON
		Released	OFF
SET/COAST switch	SET SW	Pressed	ON
		Released	OFF

Without CONSULT-III

- Turn ignition switch ON.

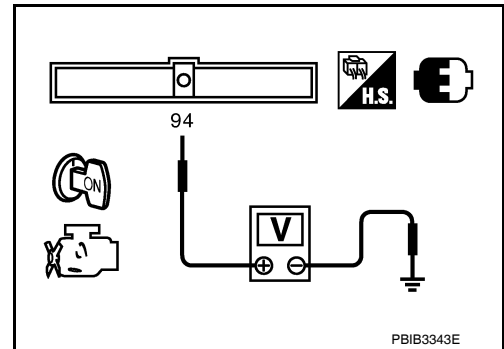
DTC P1564 ASCD STEERING SWITCH

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Check voltage between ECM terminal 94 and ground with pressing each button.

Switch	Condition	Voltage (V)
MAIN switch	Pressed	Approx. 0
	Released	Approx. 4.0
CANCEL switch	Pressed	Approx. 1.0
	Released	Approx. 4.0
RESUME/ACCELERATE switch	Pressed	Approx. 3.0
	Released	Approx. 4.0
SET/COAST switch	Pressed	Approx. 2.0
	Released	Approx. 4.0



OK or NG

- OK >> GO TO 8.
- NG >> GO TO 3.

3. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect combination switch harness connector M78.
3. Disconnect ECM harness connector.
4. Check harness continuity between combination switch terminal 20 (unit side) and ECM terminal 95. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M2, E4
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 94 and combination switch terminal 16. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M2, E4
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

7. CHECK ASCD STEERING SWITCH

Refer to [EC-1000](#), "Component Inspection".

OK or NG

OK >> GO TO 8.

NG >> Replace ASCD steering switch. Refer to [PS-6](#).

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

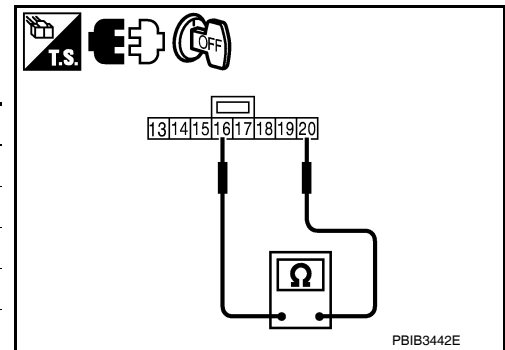
INFOID:000000006580767

ASC D STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector M78.
2. Check continuity between combination switch (spiral cable) terminals 16 and 20 with pushing each switch.

Switch	Condition	Resistance (Ω)
MAIN switch	Pressed	Approx. 0
	Released	Approx. 4,000
CANCEL switch	Pressed	Approx. 250
	Released	Approx. 4,000
RESUME/ACCELERATE switch	Pressed	Approx. 1,480
	Released	Approx. 4,000
SET/COAST switch	Pressed	Approx. 660
	Released	Approx. 4,000

If NG, replace ASCD steering switch. Refer to [PS-6](#).



DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

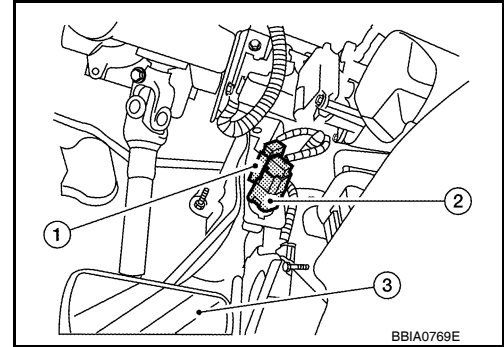
[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P1572 ASCD BRAKE SWITCH

Component Description

INFOID:000000006580768

When the brake pedal is depressed, ASCD brake switch (1) is turned OFF and stop lamp switch (2) is turned ON. ECM detects the state of the brake pedal (3) by this input of two kinds (ON/OFF signal). Refer to [EC-590](#) for the ASCD function.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580769

Specification data are reference values.

Monitor item	Condition	Specification
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	• Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)
		• Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)
BRAKE SW2 (Stop lamp switch)	• Ignition switch: ON	Brake pedal: Fully released
		Brake pedal: Slightly depressed

On Board Diagnosis Logic

INFOID:000000006580770

- This self-diagnosis has the one trip detection logic.
- The MIL will not light up for this self-diagnosis.

NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-966](#).
- 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
P1572 1572	ASCD brake switch	A) When the vehicle speed is above 30km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to ECM at the same time.	<ul style="list-style-type: none"> • Harness or connectors (Stop lamp switch circuit is shorted.) • Harness or connectors (ASCD brake switch circuit is shorted.) • Harness or connectors (ASCD clutch switch circuit is shorted.) (M/T)
		B) ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving	<ul style="list-style-type: none"> • Stop lamp switch • ASCD brake switch • ASCD clutch switch (M/T) • Incorrect stop lamp switch installation • Incorrect ASCD brake switch installation • Incorrect ASCD clutch switch installation (M/T) • ECM

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC Confirmation Procedure

INFOID:000000006580771

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- Procedure for malfunction 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.

TESTING CONDITION:

Steps 3 and 5 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.

1. Start engine.
2. Press MAIN switch and make sure that CRUISE indicator lights up.
3. Drive the vehicle for at least 5 consecutive seconds under the following condition.

Vehicle speed	More than 30 km/h (19 MPH)
Shift lever	Suitable position

4. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-1004, "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to the following step.
5. Drive the vehicle for at least 5 consecutive seconds under the following condition.

Vehicle speed	More than 30 km/h (19 MPH)
Shift lever	Suitable position
Driving location	Depress the brake pedal for more than 5 seconds so as not to come off from the above-mentioned vehicle speed.

6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-1004, "Diagnosis Procedure"](#).

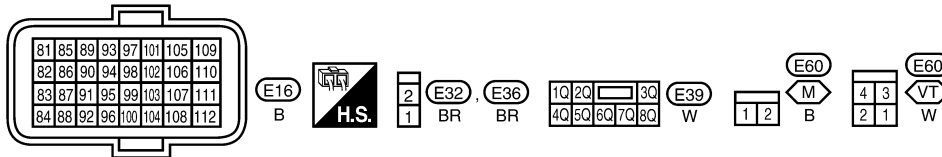
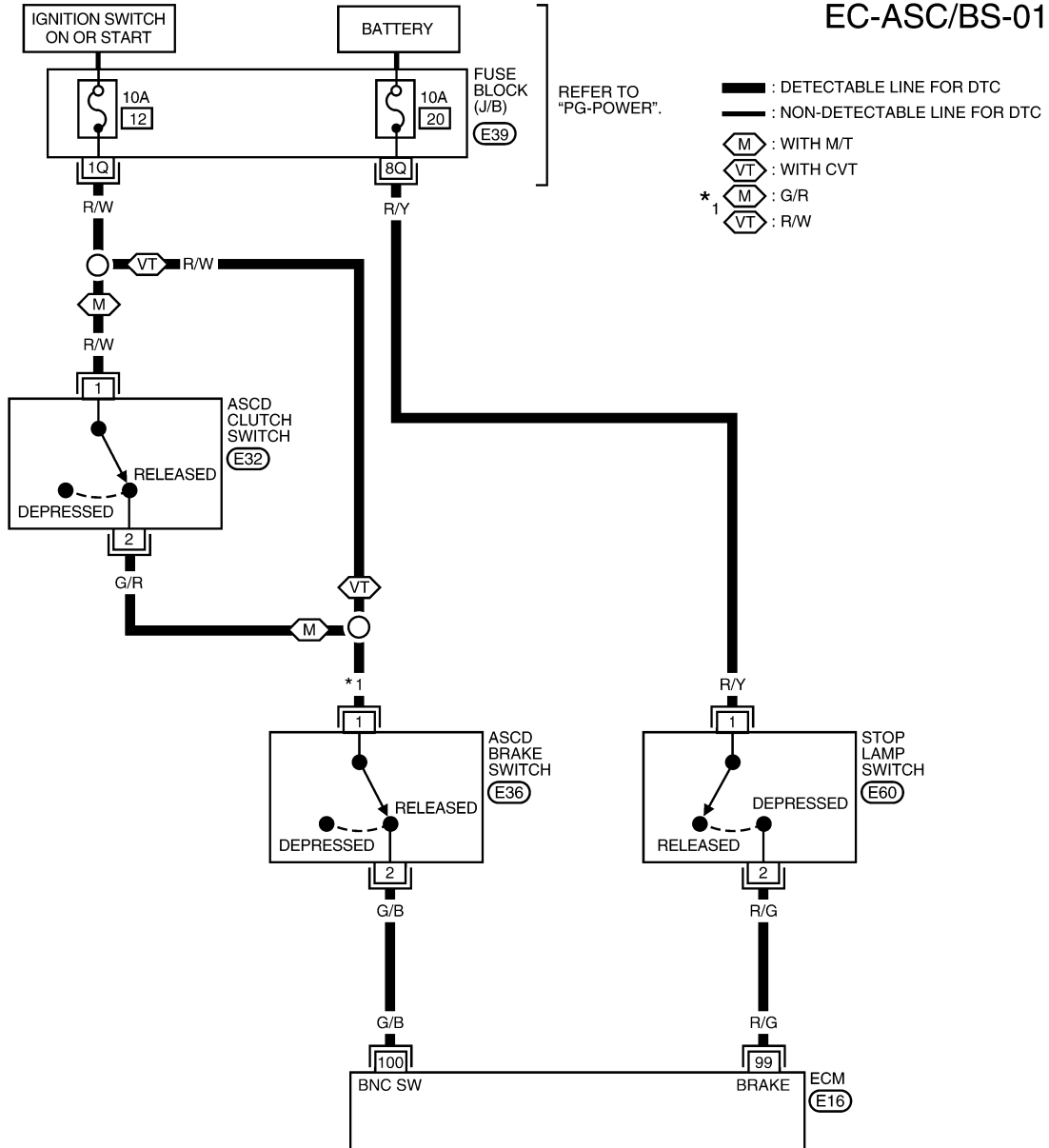
DTC P1572 ASCD BRAKE SWITCH

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006580772



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
99	R/G	Stop lamp switch	[Ignition switch: ON] • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)
100	G/B	ASCD brake switch	• Brake pedal: Slightly depressed (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14 V)
			• Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0 V

Diagnosis Procedure

INFOID:000000006580773

1. CHECK OVERALL FUNCTION-I

④ With CONSULT-III

1. Turn ignition switch ON.
2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-III.
3. Check "BRAKE SW1" indication under the following conditions.

M/T models

Condition	Indication
Clutch pedal and/or brake pedal: Slightly depressed	OFF
Clutch pedal and brake pedal: Fully released	ON

CVT models

Condition	Indication
Brake pedal: Slightly depressed	OFF
Brake pedal: Fully released	ON

⊗ Without CONSULT-III

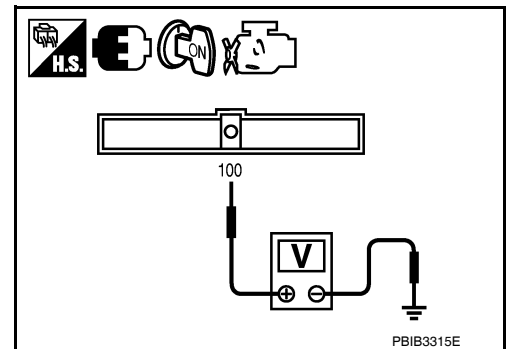
1. Turn ignition switch ON.
2. Check voltage between ECM terminal 100 and ground under the following conditions.

M/T models

Condition	Voltage
Clutch pedal and/or brake pedal: Slightly depressed	Approximately 0 V
Clutch pedal and brake pedal: Fully released	Battery voltage

CVT models

Condition	Voltage
Brake pedal: Slightly depressed	Approximately 0 V
Brake pedal: Fully released	Battery voltage



OK or NG

- OK >> GO TO 2.
- NG >> GO TO 3.

2. CHECK OVERALL FUNCTION-II

④ With CONSULT-III

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

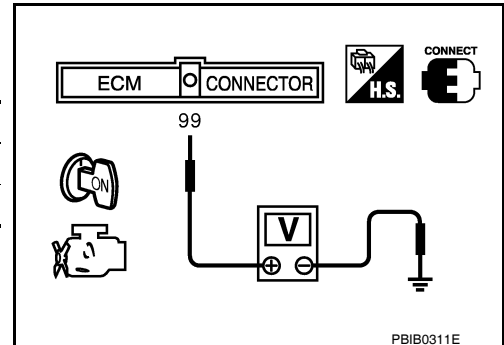
[MR20DE (EXCEPT FOR CALIFORNIA)]

Condition	Indication
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON

⊗ Without CONSULT-III

Check voltage between ECM terminal 99 and ground under the following conditions.

Condition	Voltage
Brake pedal: Fully released	Approximately 0 V
Brake pedal: Slightly depressed	Battery voltage

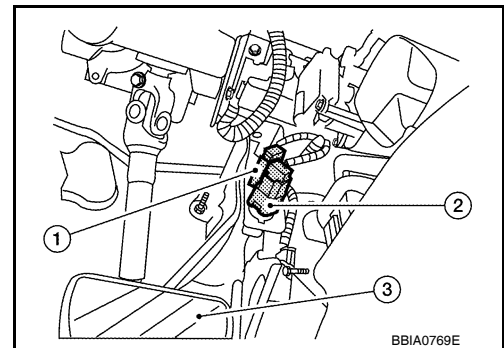


OK or NG

- OK >> GO TO 15.
- NG >> GO TO 11.

3. CHECK ASCD BRAKE SWITCH POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch (1) harness connector.
 - Stop lamp switch (2)
 - Brake pedal (3)
3. Turn ignition switch ON.

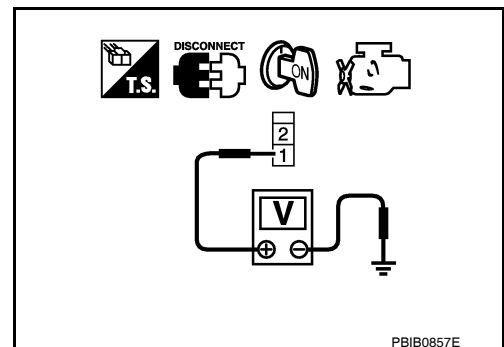


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 8.
- NG (M/T models)>>GO TO 4.
- NG (CVT models)>>GO TO 6.



4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

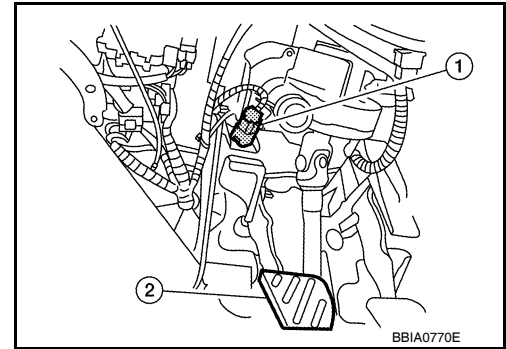
1. Turn ignition switch OFF.

DTC P1572 ASCD BRAKE SWITCH

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Disconnect ASCD clutch switch (1) harness connector.
 - Clutch pedal (2)
3. Turn ignition switch ON.

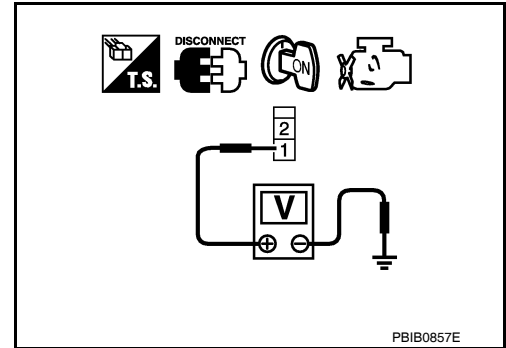


4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between ASCD clutch switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 1 and ASCD clutch switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 10.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 100 and ASCD brake switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

DTC P1572 ASCD BRAKE SWITCH

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK ASCD BRAKE SWITCH

Refer to [EC-1008, "Component Inspection"](#).

OK or NG

- OK >> GO TO 15.
- NG >> Replace ASCD brake switch. Refer to [BR-8](#).

10. CHECK ASCD CLUTCH SWITCH

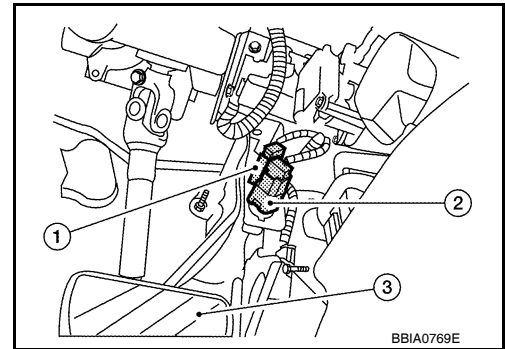
Refer to [EC-1008, "Component Inspection"](#)

OK or NG

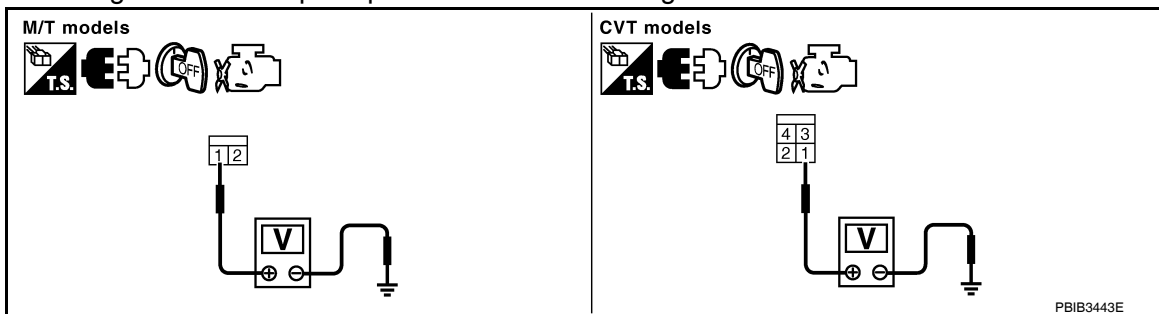
- OK >> GO TO 15.
- NG >> Replace ASCD clutch switch. Refer to [CL-7](#).

11. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch (2) harness connector.
 - ASCD brake switch (1)
 - Brake pedal (3)



3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -III or tester.



Voltage: Battery voltage

OK or NG

- OK >> GO TO 13.
- NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 99 and stop lamp switch terminal 2.
Refer to Wiring Diagram.

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK STOP LAMP SWITCH

Refer to [EC-1008, "Component Inspection"](#)

OK or NG

OK >> GO TO 15.

NG >> Replace stop lamp switch. Refer to [BR-8](#).

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

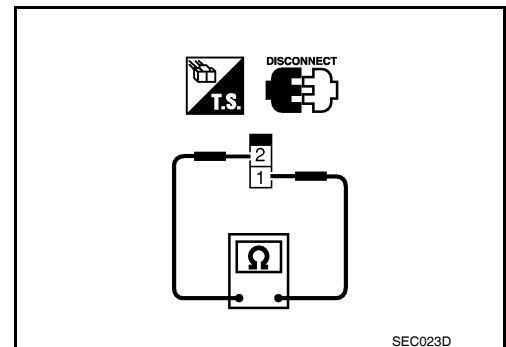
INFOID:000000006580774

ASCD BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Brake pedal: Fully released.	Should exist.
Brake pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-7](#), and perform step 3 again.

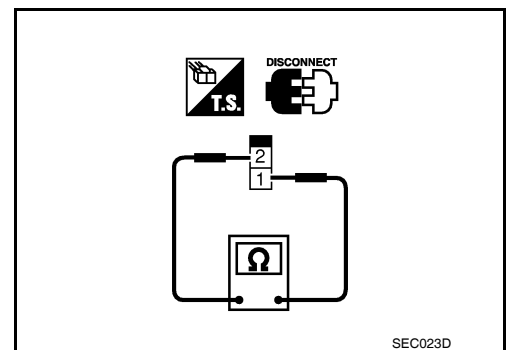


ASCD CLUTCH SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Clutch pedal: Fully released.	Should exist.
Clutch pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-6](#), and perform step 3 again.



STOP LAMP SWITCH

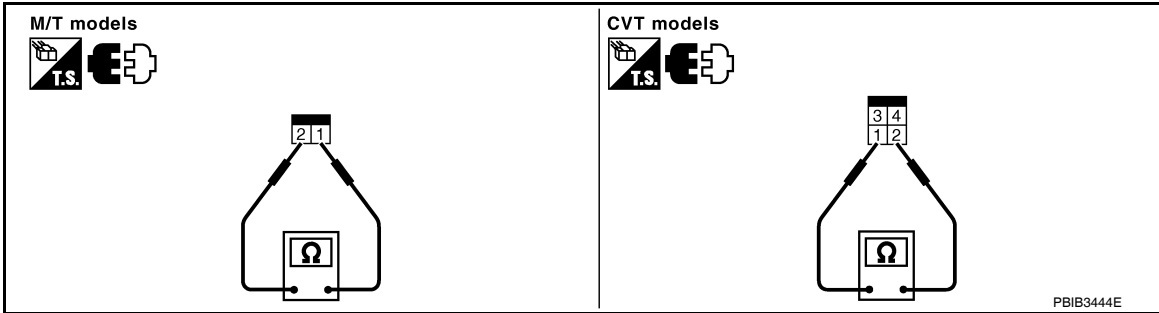
1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-7](#), and perform step 3 again.

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DTC P1574 ASCD VEHICLE SPEED SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P1574 ASCD VEHICLE SPEED SENSOR

Component Description

INFOID:000000006580775

The ECM receives two vehicle speed signals via CAN communication line. One is sent from “ABS actuator and electric unit (control unit)” or combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to [EC-590](#) for ASCD functions.

On Board Diagnosis Logic

INFOID:000000006580776

- This self-diagnosis has the one trip detection logic.
- The MIL will not light up for this self-diagnosis.

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 [EC-955](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-966](#).
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-968](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1574 1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted.)• TCM (CVT models)• ABS actuator and electric unit (control unit)• Combination meter• ECM

DTC Confirmation Procedure

INFOID:000000006580777

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Step 3 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 WITH CONSULT-III

1. Start engine.
2. Select “DATA MONITOR” mode with CONSULT-III.
3. Drive the vehicle at more than 40 km/h (25MPH).
4. Check DTC.
5. If DTC is detected, go to [EC-1010, "Diagnosis Procedure"](#).

④ WITH GST

Follow the procedure “WITH CONSULT-III” above.

Diagnosis Procedure

INFOID:000000006580778

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [CVT-25](#).

OK or NG

- OK >> GO TO 2.
- NG >> Perform trouble shooting relevant to DTC indicated.

2. CHECK DTC WITH “ABS ACTUATOR AND ELECTRIC UNIT”

DTC P1574 ASCD VEHICLE SPEED SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Refer to [BRC-45](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3.CHECK COMBINATION METER

Check combination meter function.

Refer to [DI-6](#).

>> **INSPECTION END**

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DTC P1715 INPUT SPEED SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P1715 INPUT SPEED SENSOR

Description

INFOID:000000006580779

ECM receives input speed sensor signal from TCM through CAN communication line. ECM uses this signal for engine control.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580780

Specification data are reference values.

Monitor item	Condition	Specification
I/P PULLY SPD	• Vehicle speed: More than 20 km/h (12MPH)	Almost the same speed as the tachometer indication

On Board Diagnosis Logic

INFOID:000000006580781

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 [EC-862](#).
- If DTC P1715 is displayed with DTC P0340 first perform the trouble diagnosis for DTC P0340. Refer to [EC-868](#).
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-966](#).
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-968](#).

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1715 1715	Input speed sensor (TCM output)	Input speed sensor signal is different from the theoretical value calculated by ECM from output speed sensor signal and engine rpm signal.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Input speed sensor circuit is open or shorted)• TCM

DTC Confirmation Procedure

INFOID:000000006580782

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

Ⓟ WITH CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Start engine.
4. Drive vehicle at a speed of more than 50 km/h (31 MPH) for at least 5 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-1012, "Diagnosis Procedure"](#).

Ⓟ WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

INFOID:000000006580783

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [CVT-25](#).

OK or NG

DTC P1715 INPUT SPEED SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK >> GO TO 2.

NG >> Perform trouble shooting relevant to DTC indicated.

2.REPLACE TCM

Replace TCM. Refer to [CVT-162](#).

>> INSPECTION END

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DTC P1805 BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P1805 BRAKE SWITCH

Description

INFOID:000000006580784

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580785

Specification data are reference values.

Monitor item	Condition		Specification
BRAKE SW	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

INFOID:000000006580786

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	<ul style="list-style-type: none">• Harness or connectors (Stop lamp switch circuit is open or shorted.)• Stop lamp switch

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters in fail-safe mode.

Engine operation condition in fail-safe mode

ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.

Vehicle condition	Driving condition
Engine: Idling	Normal
Accelerating	Poor acceleration

DTC Confirmation Procedure

INFOID:000000006580787

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-III.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-1016. "Diagnosis Procedure"](#).

DTC P1805 BRAKE SWITCH





[MR20DE (EXCEPT FOR CALIFORNIA)]

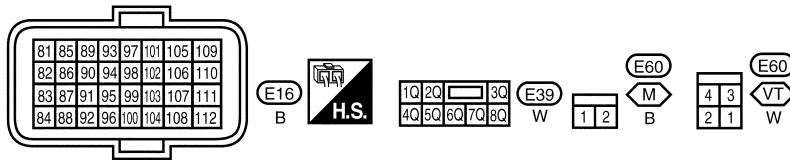
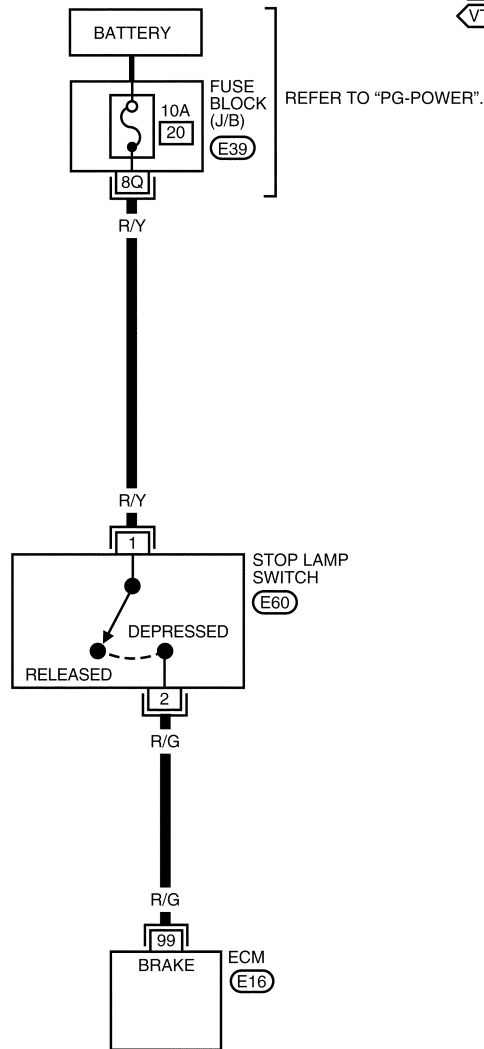
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006580788

EC-BRK/SW-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH M/T
-  : WITH CVT



BBWA2896E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P1805 BRAKE SWITCH

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
99	R/G	Stop lamp switch	[Ignition switch: OFF] • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580789

1. CHECK STOP LAMP SWITCH CIRCUIT

- Turn ignition switch OFF.
- Check the stop lamp when depressing and releasing the brake pedal.

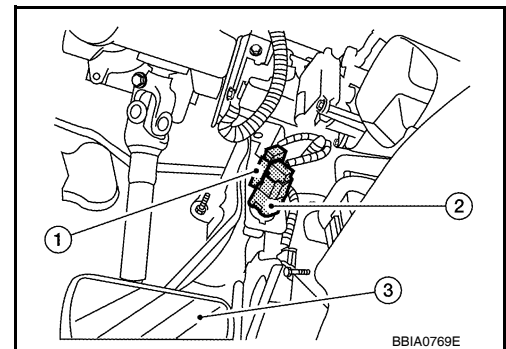
Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

OK or NG

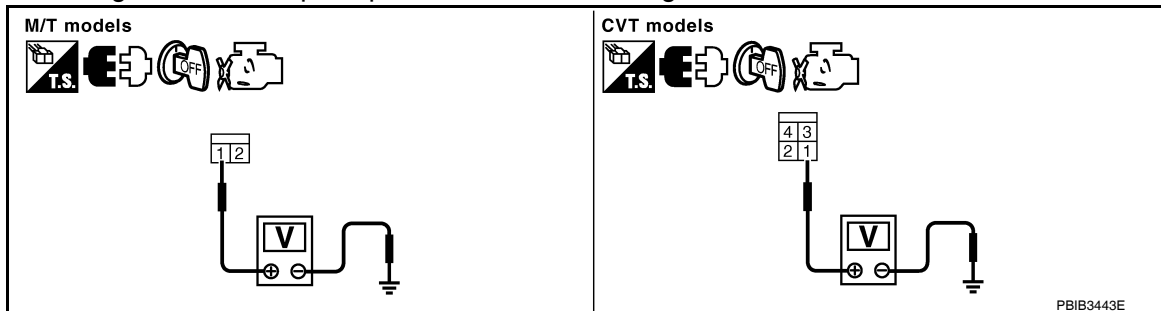
- OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

- Disconnect stop lamp switch (2) harness connector.
 - ASCD brake switch (1)
 - Brake pedal (3)



- Check voltage between stop lamp switch terminal 1 and ground with CONSULT-III or tester.



Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open and short between stop lamp switch and battery

DTC P1805 BRAKE SWITCH

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect stop lamp switch harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between stop lamp switch terminal 2 and ECM terminal 99.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness connectors.

5. CHECK STOP LAMP SWITCH

Refer to [EC-1017, "Component Inspection"](#).

OK or NG

OK >> GO TO 6.

NG >> Replace stop lamp switch. Refer to [BR-8](#).

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

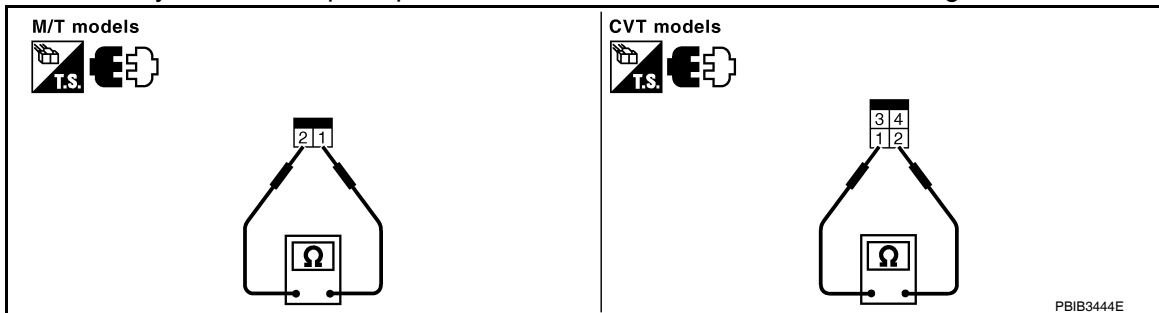
>> **INSPECTION END**

Component Inspection

INFOID:000000006580790

STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-7](#), and perform step 3 again.

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

Component Description

INFOID:000000006580791

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580792

Specification data are reference values.

Monitor item	Condition	Specification
THRTL RELAY	• Ignition switch: ON	ON

On Board Diagnosis Logic

INFOID:000000006580793

These self-diagnoses have one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2100 2100	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is open)• Throttle control motor relay
P2103 2103	Throttle control motor relay circuit short	ECM detects the throttle control motor relay is stuck ON.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is shorted)• Throttle control motor relay

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006580794

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR DTC P2100

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.
4. If DTC is detected, go to [EC-1020, "Diagnosis Procedure"](#).

PROCEDURE FOR DTC P2103

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1020, "Diagnosis Procedure"](#).

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

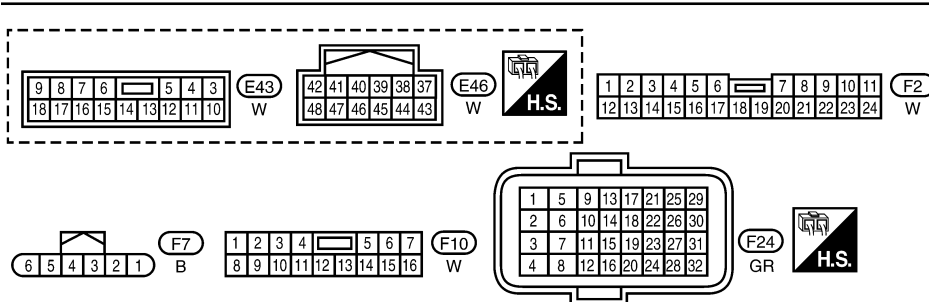
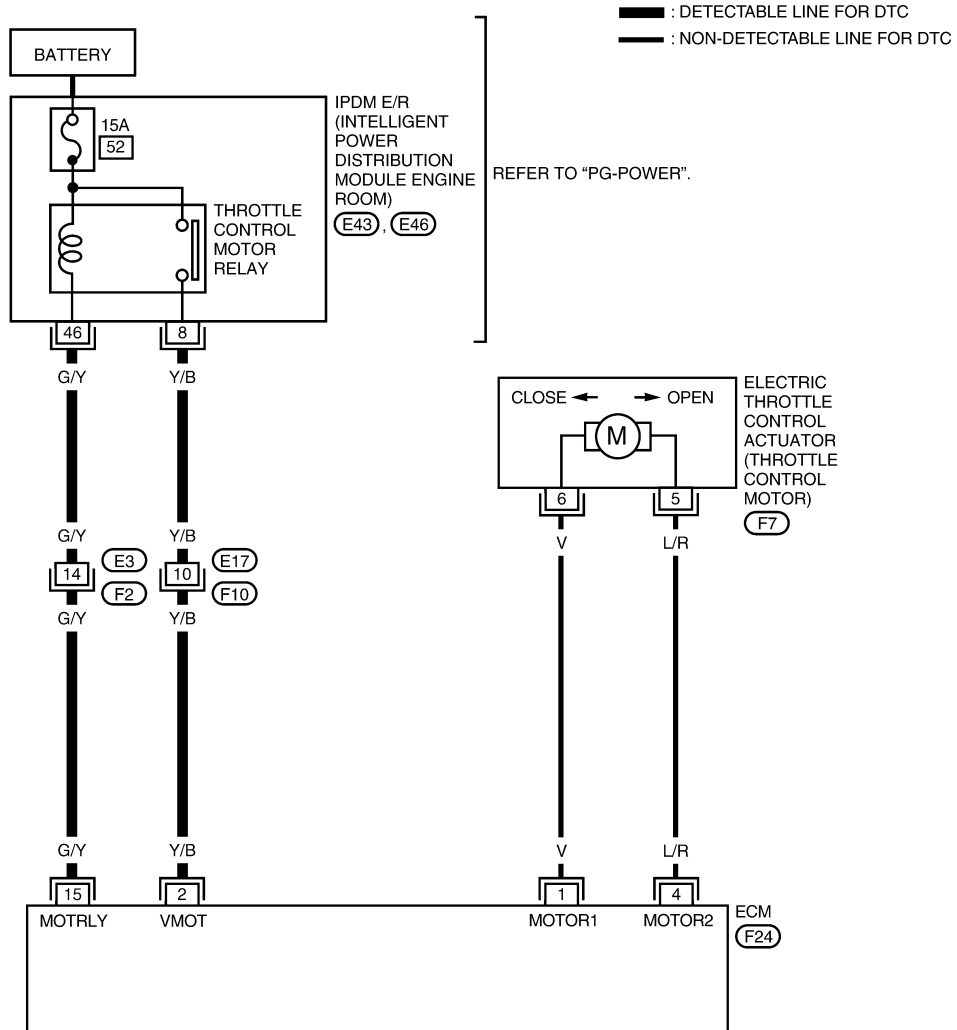
< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

INFOID:000000006580795

Wiring Diagram

EC-ETC2-01



AABWA0246GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

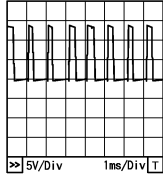
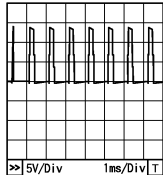
CAUTION:

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	V	Throttle control motor (Open)	[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed 	Approximately 3.2 V★  <small>PBIA8150J</small>
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
4	L/R	Throttle control motor (Close)	[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released 	Approximately 1.8 V★  <small>PBIA8149J</small>
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006580796

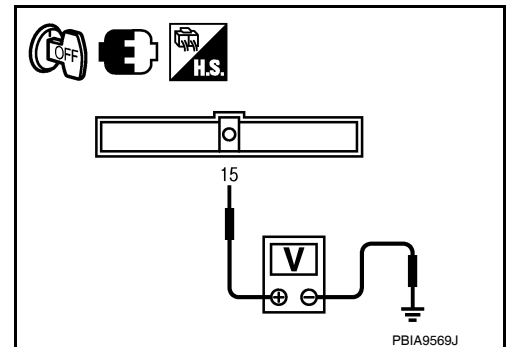
1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal 15 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 2.



2. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E46.
3. Check continuity between ECM terminal 15 and IPDM E/R terminal 46. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
 NG >> GO TO 3.

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUSE

1. Disconnect 15 A fuse.
2. Check 15 A fuse for blown.

OK or NG

- OK >> GO TO 8.
- NG >> Replace 15 A fuse.

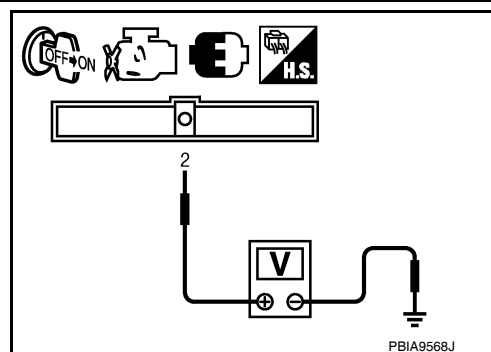
5. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

Check voltage between ECM terminal 2 and ground under the following conditions with CONSULT-III or tester.

Ignition switch	Voltage
OFF	Approximately 0 V
ON	Battery voltage (11 - 14 V)

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 6.



6. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E43.
4. Check continuity between ECM terminal 2 and IPDM E/R terminal 8.
Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-28](#).
- NG >> Repair or replace harness or connectors.

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:000000006580797

NOTE:

If DTC P2101 is displayed with DTC P2100 or P2119, first perform the trouble diagnosis for DTC P2100 or P2119. Refer to [EC-1018](#) or [EC-1032](#).

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.

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.

On Board Diagnosis Logic

INFOID:000000006580798

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2101 2101	Electric throttle control performance	Electric throttle control function does not operate properly.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor circuit is open or shorted)• Electric throttle control actuator

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006580799

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V when engine is running.

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.
4. If DTC is detected, go to [EC-1024, "Diagnosis Procedure"](#).

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580800

EC-ETC1-01

A

EC

C

D

E

F

G

H

I

J

K

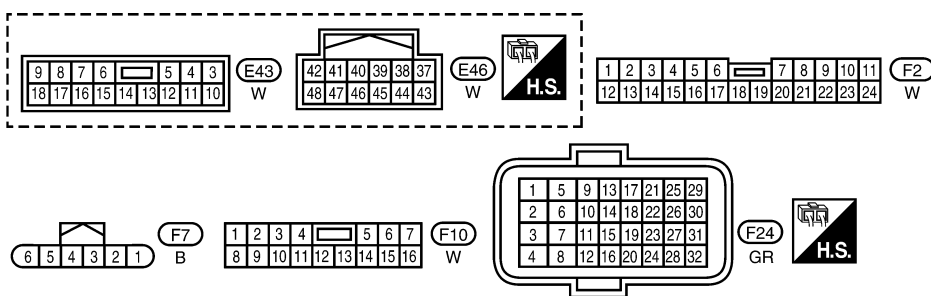
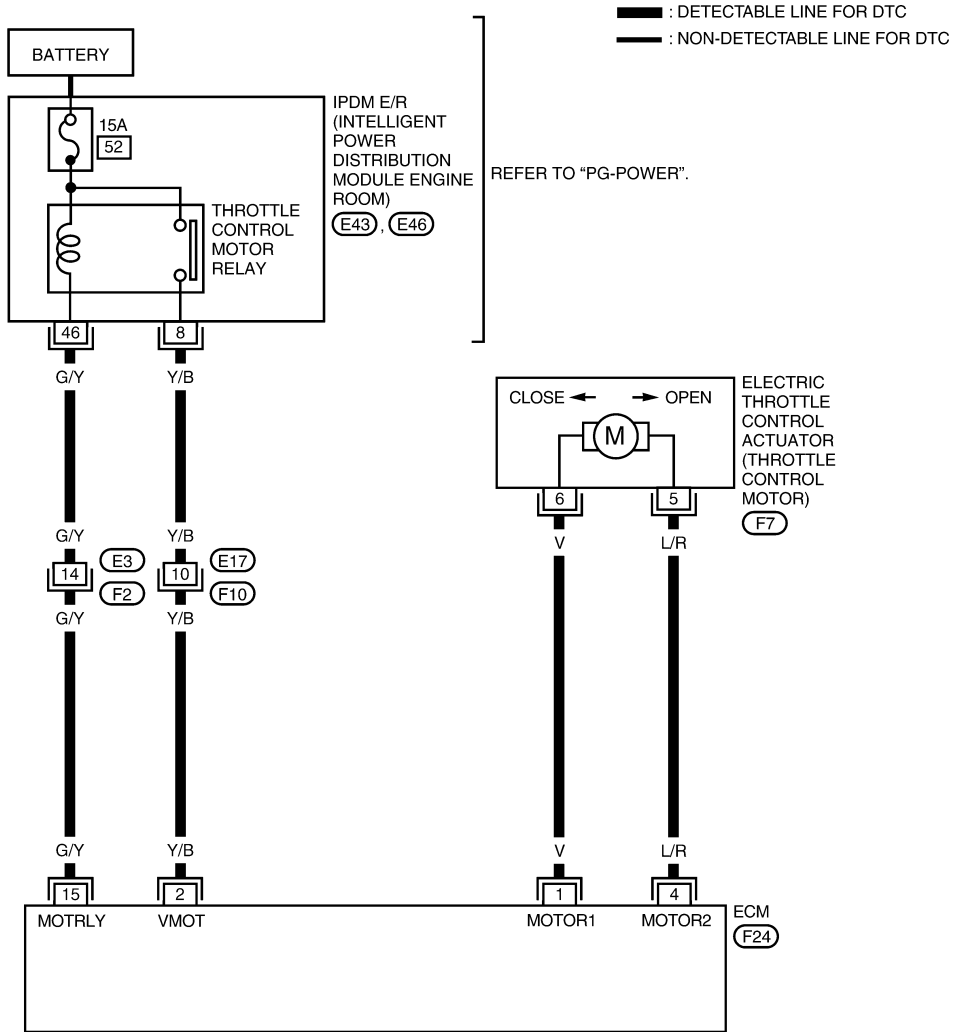
L

M

N

O

P



AABWA0245GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

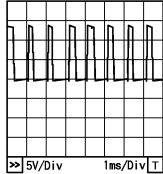
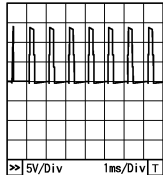
CAUTION:

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	V	Throttle control motor (Open)	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Approximately 3.2 V★  PBIAB150J
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
4	L/R	Throttle control motor (Close)	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Approximately 1.8 V★  PBIAB149J
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

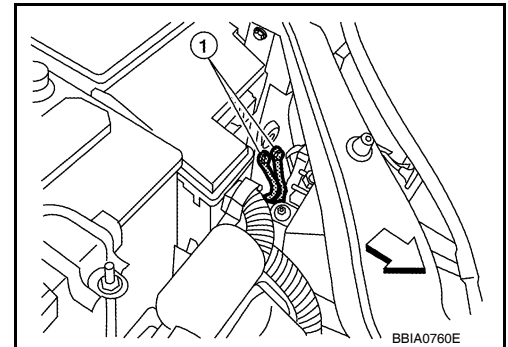
INFOID:000000006580801

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



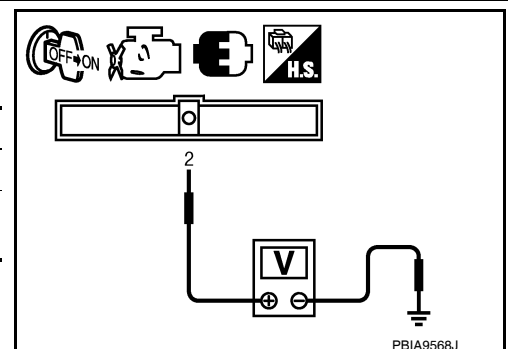
2. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

Check voltage between ECM terminal 2 and ground under the following conditions with CONSULT-III or tester.

Ignition switch	Voltage
OFF	Approximately 0 V
ON	Battery voltage (11 - 14 V)

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 3.



DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E43.
4. Check continuity between ECM terminal 2 and IPDM E/R terminal 8.
Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

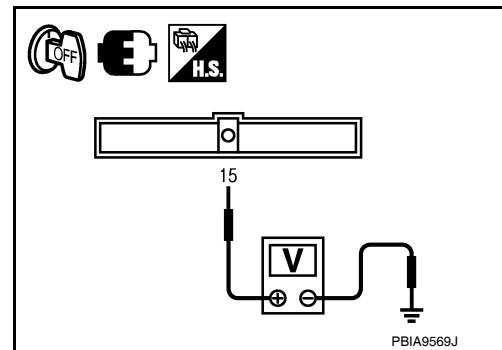
5. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Reconnect all harness connectors disconnected.
2. Check voltage between ECM terminal 15 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 6.



6. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E46.
3. Check harness continuity between ECM terminal 15 and IPDM E/R terminal 46.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK FUSE

1. Disconnect 15 A fuse.
2. Check 15 A fuse for blown.

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

OK or NG

- OK >> GO TO 9.
- NG >> Replace 15 A fuse.

9. CHECK INTERMITTENT INCIDENT

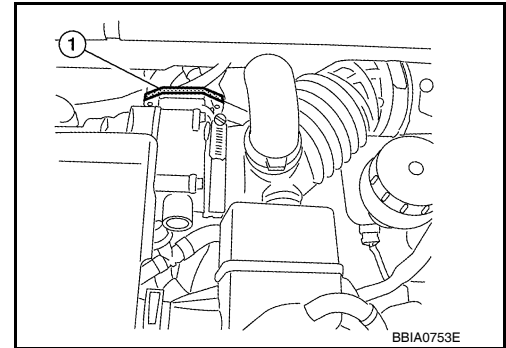
Refer to [EC-701](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-28](#).
- NG >> Repair or replace harness or connectors.

10. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator (1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.



Electric throttle control actuator terminal	ECM terminal	Continuity
5	1	Should not exist.
	4	Should exist.
6	1	Should exist.
	4	Should not exist.

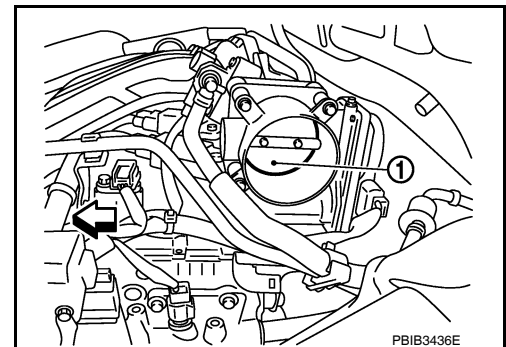
5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 11.
- NG >> Repair or replace.

11. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - ↶ : Vehicle front
 - Illustration shows the view with intake air duct removed.



OK or NG

- OK >> GO TO 12.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EM-18](#).

12. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-1027, "Component Inspection"](#).

OK or NG

- OK >> GO TO 13.
- NG >> GO TO 14.

13. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

OK or NG

- OK >> GO TO 14.
- NG >> Repair or replace harness or connectors.

14. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Replace the electric throttle control actuator. Refer to [EM-18](#).

>> INSPECTION END

Component Inspection

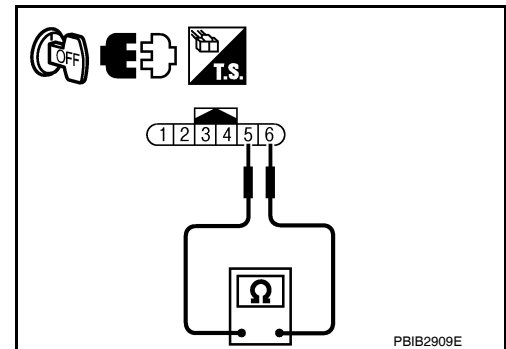
INFOID:000000006580802

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 5 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]

3. If NG, replace electric throttle control actuator and go to next step. Refer to [EM-18](#).



DTC P2118 THROTTLE CONTROL MOTOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P2118 THROTTLE CONTROL MOTOR

Component Description

INFOID:000000006580804

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.

On Board Diagnosis Logic

INFOID:000000006580805

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2118 2118	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor circuit is shorted.)• Electric throttle control actuator (Throttle control motor)

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006580806

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.
4. If DTC is detected, go to [EC-1030, "Diagnosis Procedure"](#).

DTC P2118 THROTTLE CONTROL MOTOR

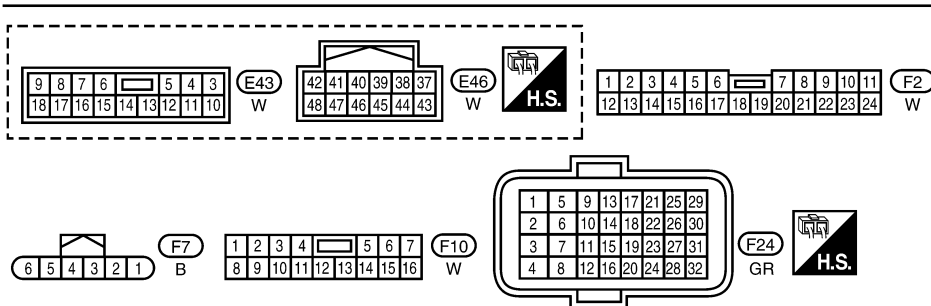
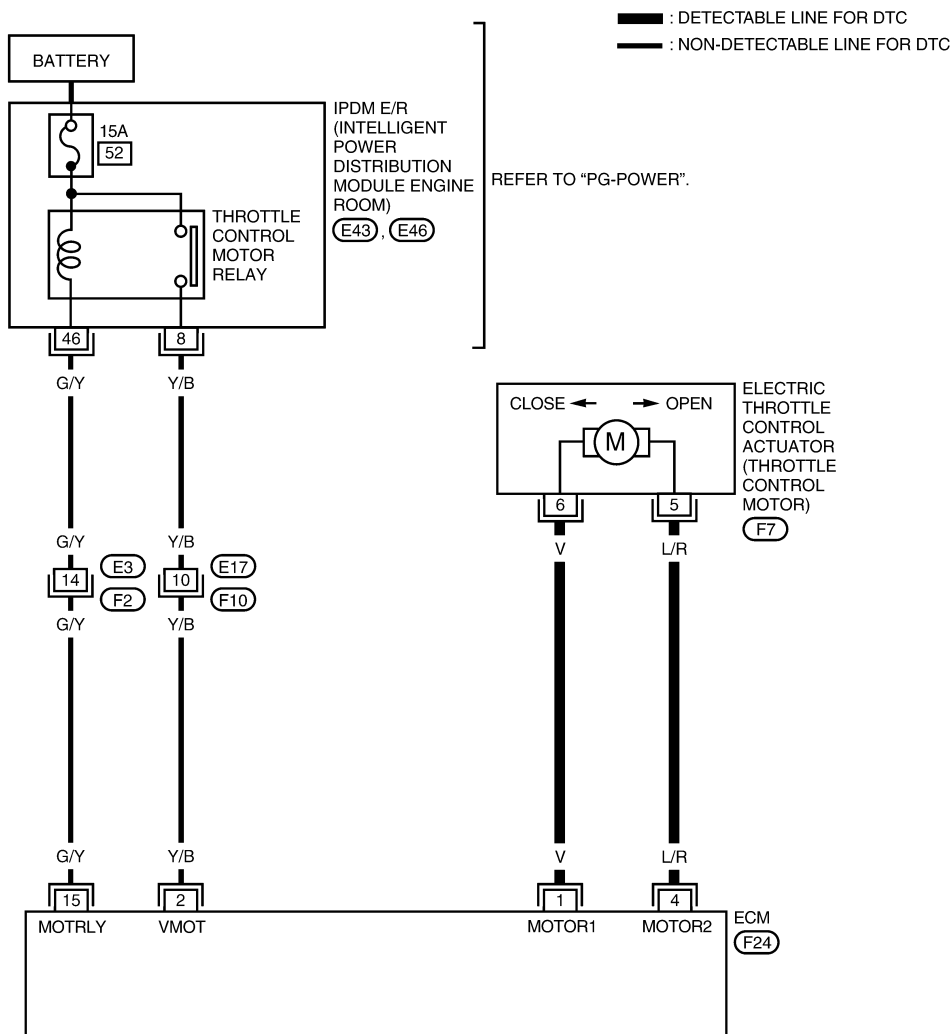
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

INFOID:00000006580807

Wiring Diagram

EC-ETC3-01



AABWA0247GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

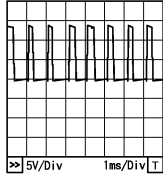
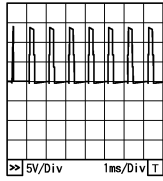
CAUTION:

DTC P2118 THROTTLE CONTROL MOTOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	V	Throttle control motor (Open)	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Approximately 3.2 V★  PBIAB150J
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
4	L/R	Throttle control motor (Close)	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Approximately 1.8 V★  PBIAB149J
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

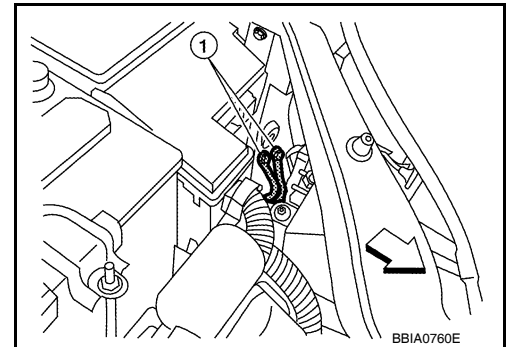
INFOID:000000006580808

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten engine screws on the body.
Refer to [EC-706, "Ground Inspection"](#).
- ↔ : Vehicle front
 - Body ground (1)

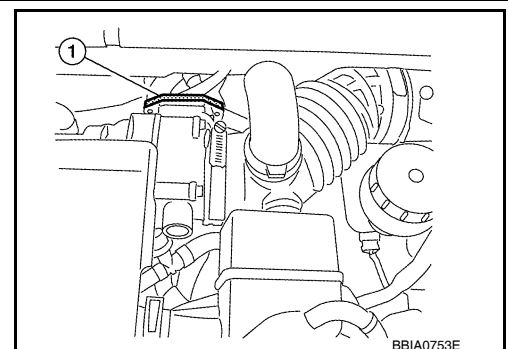
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

- Disconnect electric throttle control actuator (1) harness connector.
- Disconnect ECM harness connector.
- Check harness continuity between the following terminals.
Refer to Wiring Diagram.



Electric throttle control actuator terminal	ECM terminal	Continuity
5	1	Should not exist.
	4	Should exist.

DTC P2118 THROTTLE CONTROL MOTOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Electric throttle control actuator terminal	ECM terminal	Continuity
6	1	Should exist.
	4	Should not exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK THROTTLE CONTROL MOTOR

Refer to [EC-1031](#). "Component Inspection".

OK or NG

OK >> GO TO 4.

NG >> GO TO 5.

4.CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

OK or NG

OK >> GO TO 5.

NG >> Repair or replace harness or connectors.

5.REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18](#).

>> **INSPECTION END**

Component Inspection

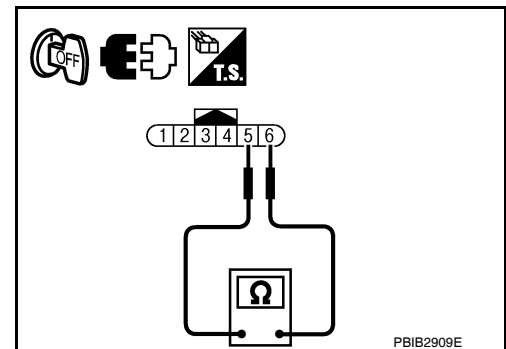
INFOID:0000000006580809

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 5 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]

3. If NG, replace electric throttle control actuator and go to next step. Refer to [EM-18](#).



DTC P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

Component Description

INFOID:000000006580811

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds 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.

On Board Diagnosis Logic

INFOID:000000006580812

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P2119 2119	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	• Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detects the throttle valve is stuck open.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	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.
Malfunction B	ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
Malfunction C	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P position (CVT), neutral (M/T), and engine speed will not exceed 1,000 rpm or more.

DTC Confirmation Procedure

INFOID:000000006580813

NOTE:

- Perform **PROCEDURE FOR MALFUNCTION A AND B** first. If the DTC cannot be confirmed, perform **PROCEDURE FOR MALFUNCTION C**.
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A AND B

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D position (CVT) or 1st position (M/T), and wait at least 3 seconds.
3. Set shift lever to P position (CVT) or Neutral position (M/T).
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition switch ON and wait at least 1 second.
6. Set shift lever to D position (CVT) or 1st position (M/T), and wait at least 3 seconds.
7. Set shift lever to P position (CVT) or Neutral position (M/T).
8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
9. Check DTC.
10. If DTC is detected, go to [EC-1033, "Diagnosis Procedure"](#).

PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Set shift lever to D position (CVT) or 1st position (M/T) and wait at least 3 seconds.

DTC P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Set shift lever to N, P position (CVT) or Neutral (M/T) position.
4. Start engine and let it idle for 3 seconds.
5. Check DTC.
6. If DTC is detected, go to [EC-1033. "Diagnosis Procedure"](#).

Diagnosis Procedure

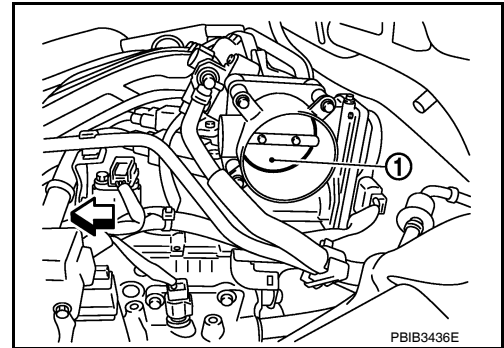
INFOID:000000006580814

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if a foreign matter is caught between the throttle valve (1) and the housing.
 - ↖ : Vehicle front
 - This illumination is shows the view with intake air duct removed.

OK or NG

- OK >> GO TO 2.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EM-18](#).



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18](#).

>> **INSPECTION END**

DTC P2122, P2123 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P2122, P2123 APP SENSOR

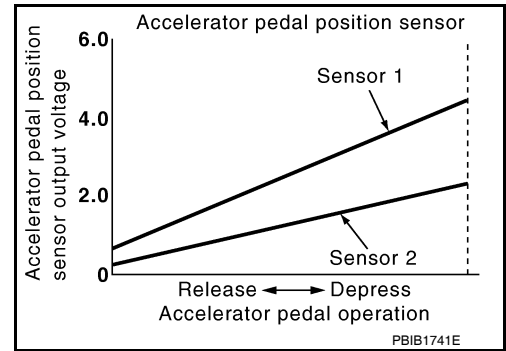
Component Description

INFOID:000000006580815

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580816

Specification data are reference values.

Monitor item	Condition	Specification
ACCEL SEN 1	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	ON
	Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:000000006580817

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-969](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122 2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (APP sensor 1 circuit is open or shorted.) • Accelerator pedal position sensor (APP sensor 1)
P2123 2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006580818

NOTE:

DTC P2122, P2123 APP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

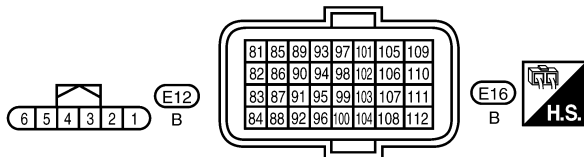
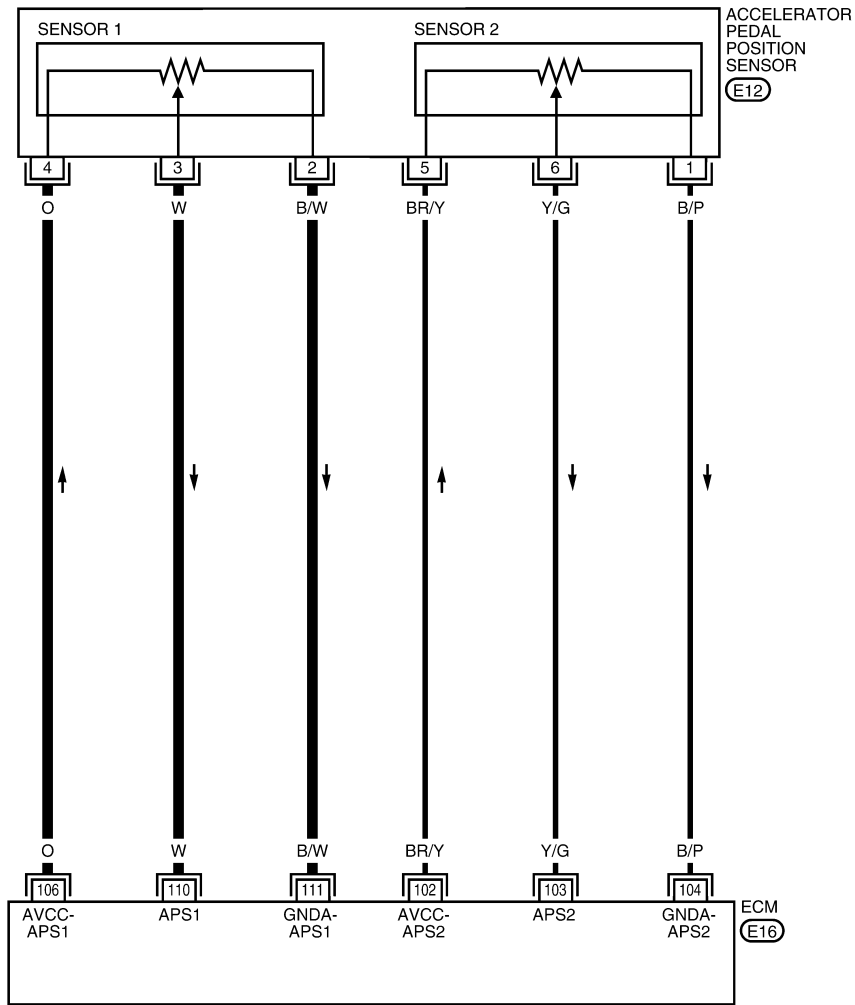
1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1036. "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006580819

EC-APPS1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



DTC P2122, P2123 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
103	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	B/P	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
106	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
110	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006580820

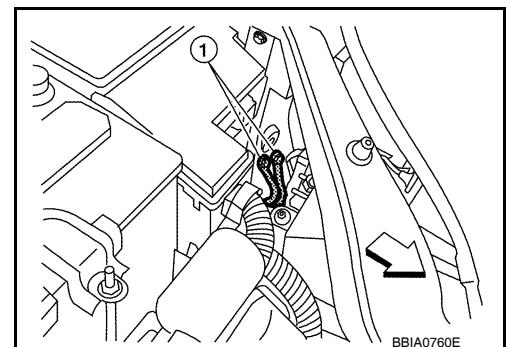
1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-706, "Ground Inspection"](#).

- ⇐ : Vehicle front
- Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



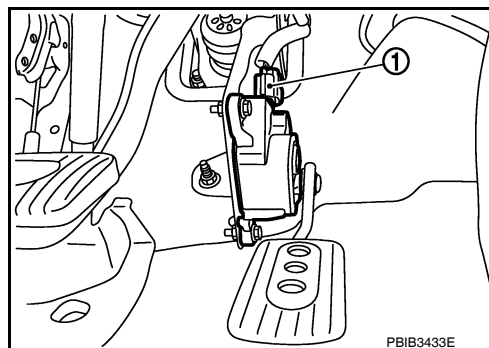
2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

DTC P2122, P2123 APP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

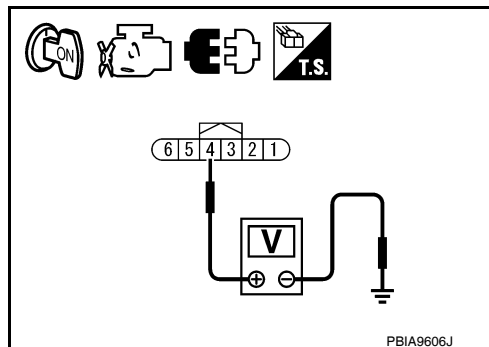


3. Check voltage between APP sensor terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3.CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 111 and APP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 110 and APP sensor terminal 3. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK APP SENSOR

Refer to [EC-1038. "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4](#).

>> **INSPECTION END**

DTC P2122, P2123 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

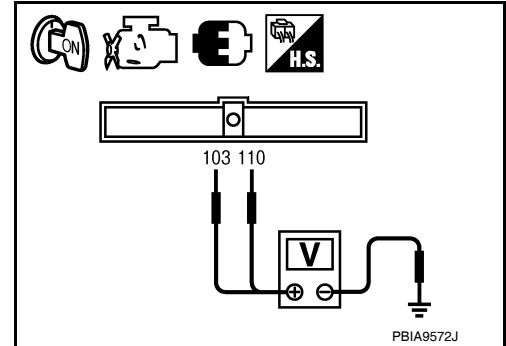
Component Inspection

INFOID:000000006580821

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 110 (APP sensor 1 signal), 103 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
110 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
103 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V



4. If NG, replace accelerator pedal assembly and go to next step. Refer to [ACC-4](#).

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P2127, P2128 APP SENSOR

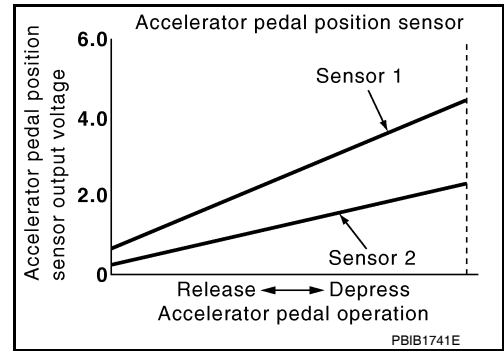
Component Description

INFOID:000000006580823

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580824

Specification data are reference values.

Monitor item	Condition	Specification
ACCEL SEN 1	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	ON
	Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:000000006580825

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127 2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (APP sensor 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • EVAP control system pressure sensor
P2128 2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC Confirmation Procedure

INFOID:000000006580826

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1042. "Diagnosis Procedure"](#).

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

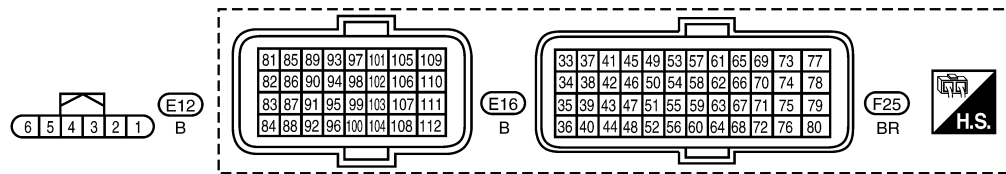
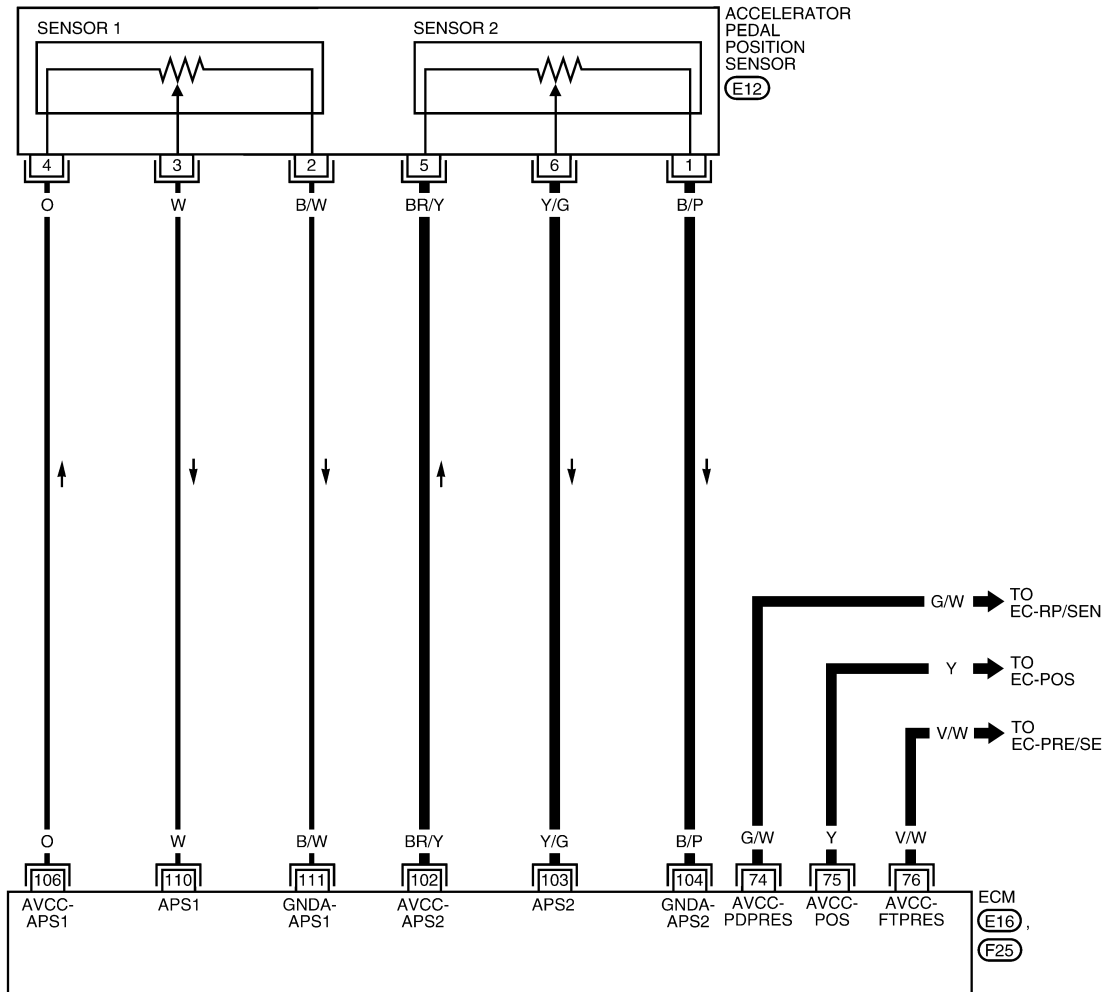
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580827

EC-APPS2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
103	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	B/P	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
106	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
110	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

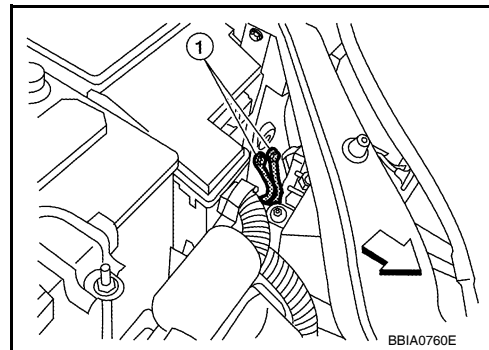
INFOID:000000006580828

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-706. "Ground Inspection"](#).
- ⇐ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



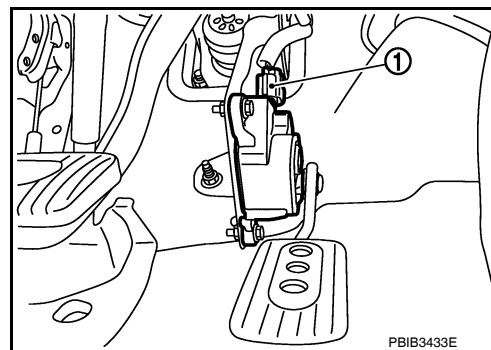
2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

DTC P2127, P2128 APP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

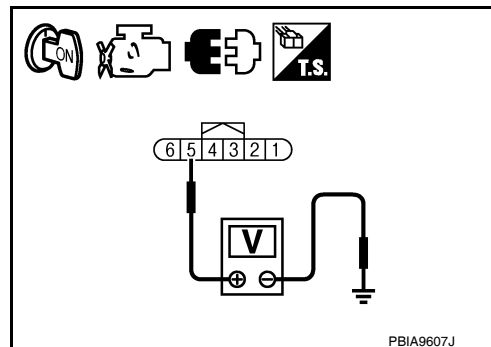


3. Check voltage between APP sensor terminal 5 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 6.
 NG >> GO TO 3.



3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 5 and ECM terminal 102. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
 NG >> Repair open circuit.

4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-1098. "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-863. "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-921. "Wiring Diagram"
102	APP sensor terminal 5	EC-1041. "Wiring Diagram"

OK or NG

- OK >> GO TO 5.
 NG >> Repair short to ground or short to power in harness or connectors.

5.CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-866. "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [MTC-28](#).)
- EVAP control system pressure (Refer to [EC-925. "Component Inspection"](#).)

OK or NG

- OK >> GO TO 10.
 NG >> Replace malfunctioning component.

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

6. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 104 and APP sensor terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 103 and APP sensor terminal 6.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to [EC-1044, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4](#).

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

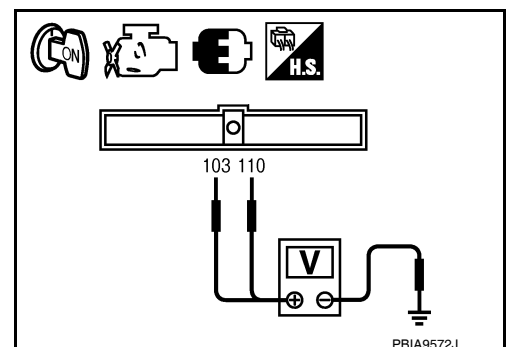
Component Inspection

INFOID:000000006580829

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 110 (APP sensor 1 signal), 103 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
110 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
103 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V



DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

4. If NG, replace accelerator pedal assembly and go to next step. Refer to [ACC-4](#).

A

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DTC P2135 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

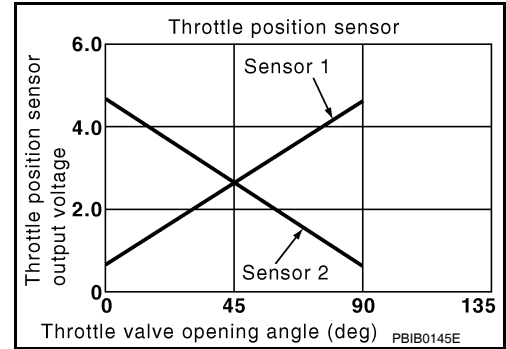
DTC P2135 TP SENSOR

Component Description

INFOID:000000006580831

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580832

Specification data are reference values.

Monitor item	Condition	Specification
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	More than 0.36 V
	• Shift lever: D (CVT), 1st (M/T) Accelerator pedal: Fully depressed	Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:000000006580833

This self-diagnosis has the one trip detection logic.

NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.

Refer to [EC-969](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135 2135	Throttle position sensor circuit range/performance	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	<ul style="list-style-type: none">• Harness or connector (TP sensor 1 and 2 circuit is open or shorted.)• Electric throttle control actuator (TP sensor 1 and 2)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

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. So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006580834

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1048, "Diagnosis Procedure"](#).

DTC P2135 TP SENSOR

< SERVICE INFORMATION >

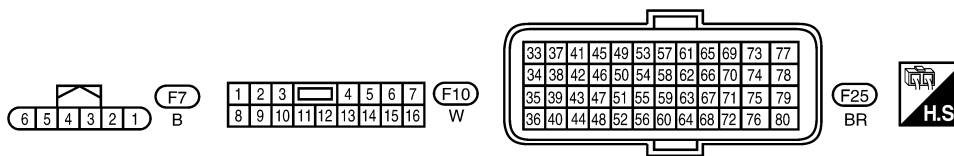
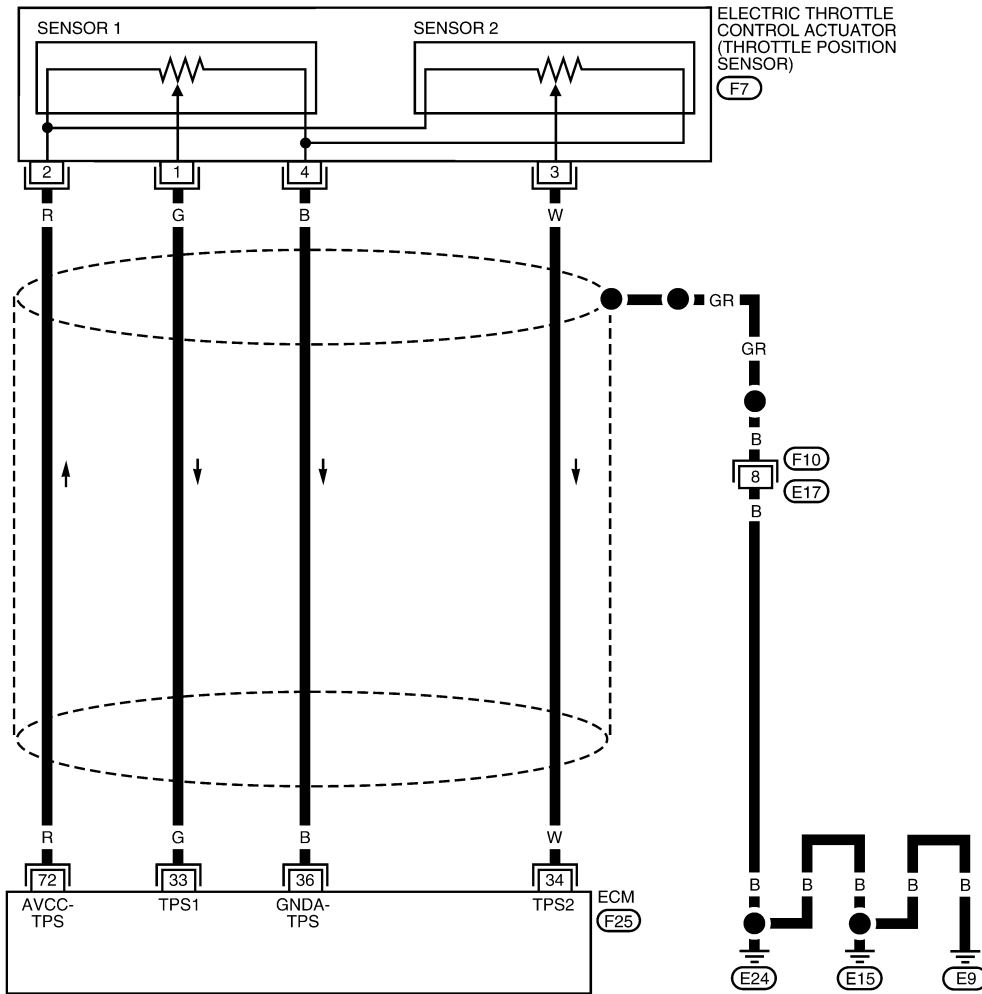
[MR20DE (EXCEPT FOR CALIFORNIA)]

INFOID:000000006580835

Wiring Diagram

EC-TPS3-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P2135 TP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
33	G	Throttle position sensor 1	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
34	W	Throttle position sensor 2	[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Shift lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
36	B	Sensor ground (Throttle position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
72	R	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

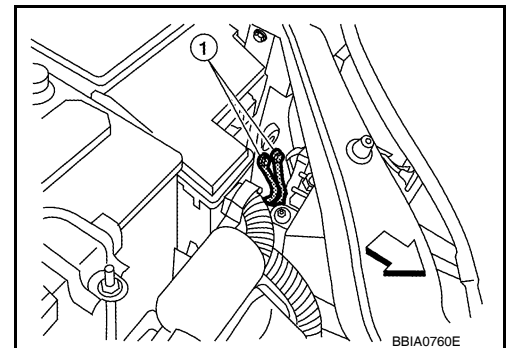
INFOID:000000006580836

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-706. "Ground Inspection"](#).
- ↶ : Vehicle front
 - Body ground (1)

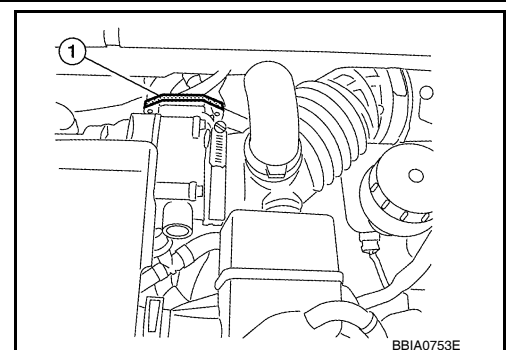
OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator (1) harness connector.
2. Turn ignition switch ON.



DTC P2135 TP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

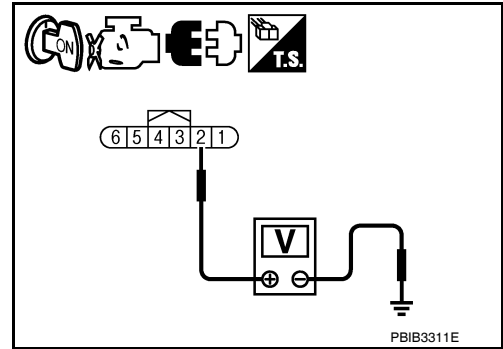
< SERVICE INFORMATION >

3. Check voltage between electric throttle control actuator terminal 2 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 4 and ECM terminal 36. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following;
Electric throttle control actuator terminal 1 and ECM terminal 33,
Electric throttle control actuator terminal 3 and ECM terminal 34.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-1049, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-18](#).

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> INSPECTION END

Component Inspection

INFOID:000000006580837

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.

DTC P2135 TP SENSOR

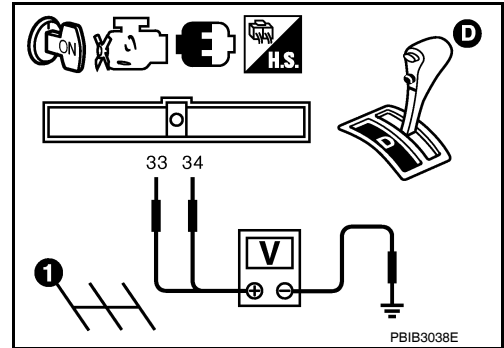
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Perform [EC-648, "Throttle Valve Closed Position Learning"](#).
3. Turn ignition switch ON.
4. Set shift lever to D position (CVT) or 1st position (M/T).
5. Check voltage between ECM terminals 33 (TP sensor 1 signal), 34 (TP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
33 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
34 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V

6. If NG, replace electric throttle control actuator and go to the next step. Refer to [EM-18](#).



DTC P2138 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

DTC P2138 APP SENSOR

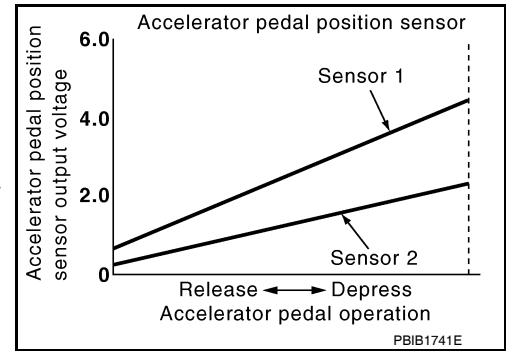
Component Description

INFOID:000000006580839

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580840

Specification data are reference values.

Monitor item	Condition	Specification
ACCEL SEN 1	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	ON
	Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:000000006580841

This self-diagnosis has the one trip detection logic.

NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.

Refer to [EC-969](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138 2138	Accelerator pedal position sensor circuit range/performance	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	<ul style="list-style-type: none"> • Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 1 and 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • EVAP control system pressure sensor

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

DTC P2138 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Engine operating condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006580842

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1054, "Diagnosis Procedure"](#).

DTC P2138 APP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

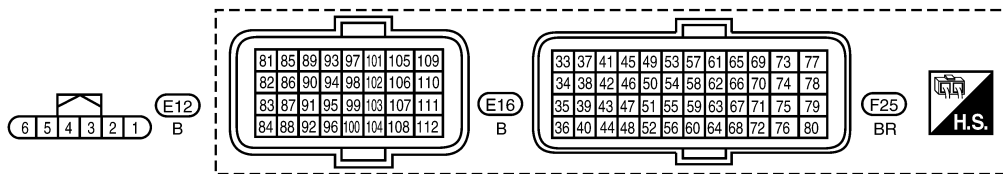
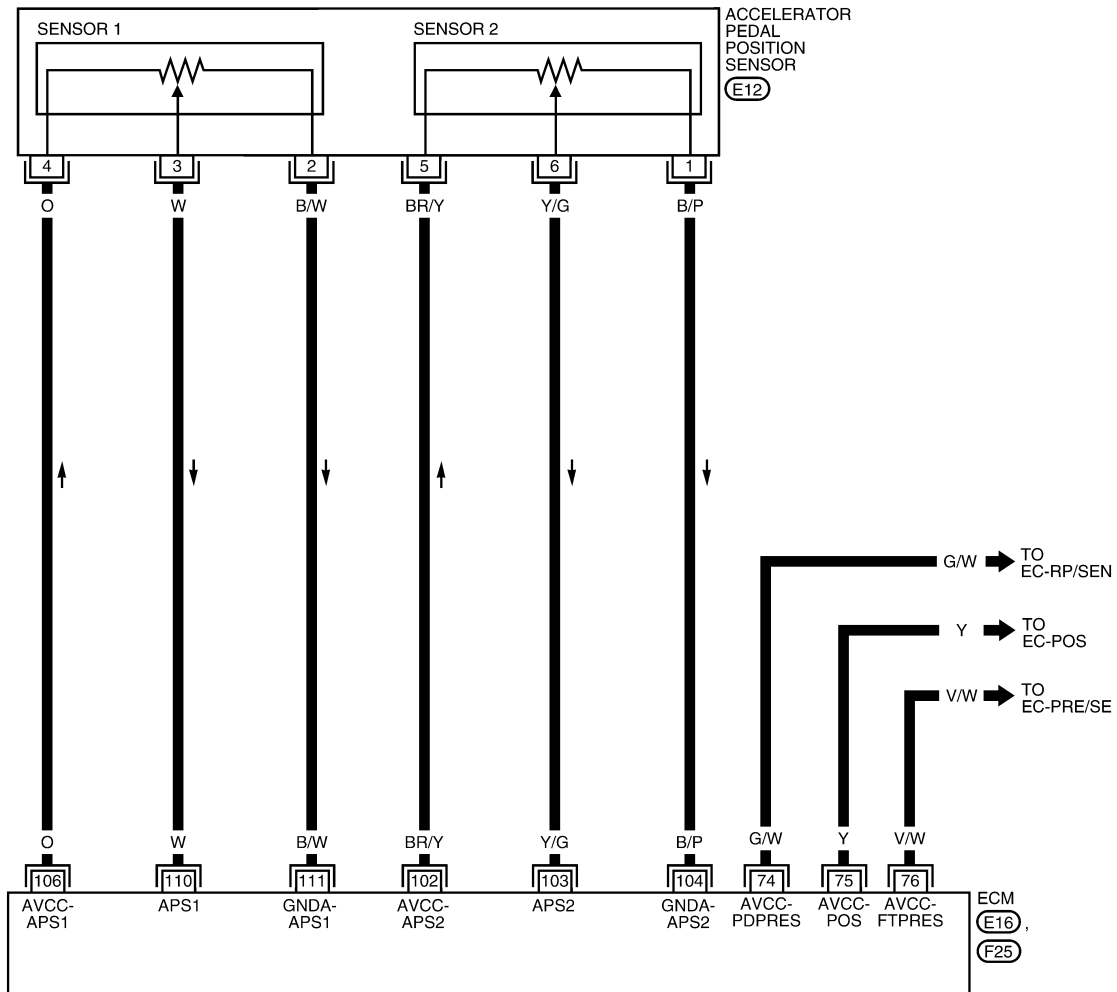
< SERVICE INFORMATION >

INFOID:000000006580843

Wiring Diagram

EC-APPS3-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0169GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P2138 APP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
75	Y	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
76	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
102	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
103	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
104	B/P	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
106	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
110	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
111	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

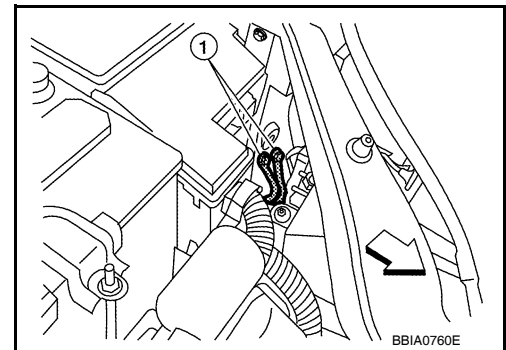
INFOID:000000006580844

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
 2. Loosen and retighten ground screws on the body.
Refer to [EC-706. "Ground Inspection"](#).
- ⇐ : Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



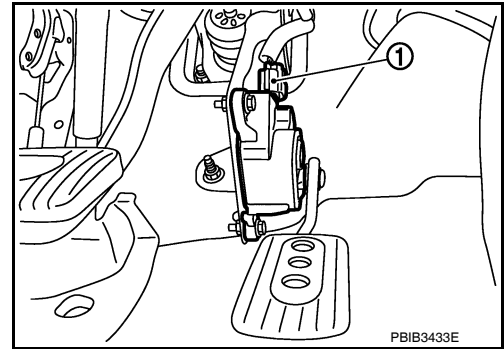
2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

DTC P2138 APP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

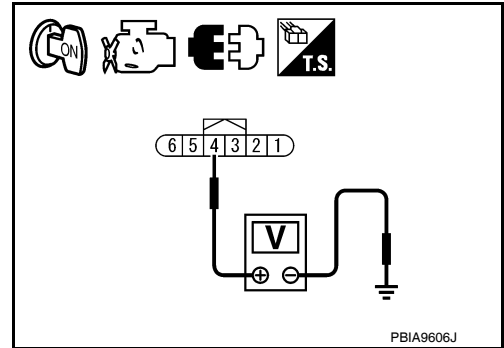


3. Check voltage between APP sensor terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



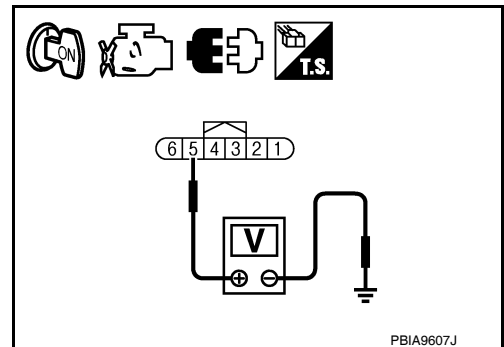
3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between APP sensor terminal 5 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 4.



4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 5 and ECM terminal 102. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit.

5.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
74	Refrigerant pressure sensor terminal 3	EC-1098. "Wiring Diagram"
75	Crankshaft position sensor (POS) terminal 1	EC-863. "Wiring Diagram"
76	EVAP control system pressure sensor terminal 3	EC-921. "Wiring Diagram"
102	APP sensor terminal 5	EC-1041. "Wiring Diagram"

DTC P2138 APP SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 6.

NG >> Repair short to ground or short to power in harness or connectors.

6. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-866, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [MTC-28](#).)
- EVAP control system pressure (Refer to [EC-925, "Component Inspection"](#).)

OK or NG

OK >> GO TO 11.

NG >> Replace malfunctioning component.

7. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following;
ECM terminal 111 and APP sensor terminal 2,
ECM terminal 104 and APP sensor terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following;
ECM terminal 110 and APP sensor terminal 3,
ECM terminal 103 and APP sensor terminal 6.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK APP SENSOR

Refer to [EC-1057, "Component Inspection"](#).

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4](#).

>> **INSPECTION END**

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

DTC P2138 APP SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

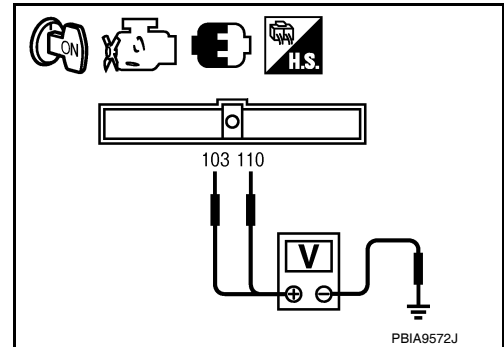
Component Inspection

INFOID:000000006580845

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 110 (APP sensor 1 signal), 103 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
110 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
103 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V



4. If NG, replace accelerator pedal assembly and go to next step. Refer to [ACC-4](#).

A
EC
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DTC P2A00 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

DTC P2A00 A/F SENSOR 1

Component Description

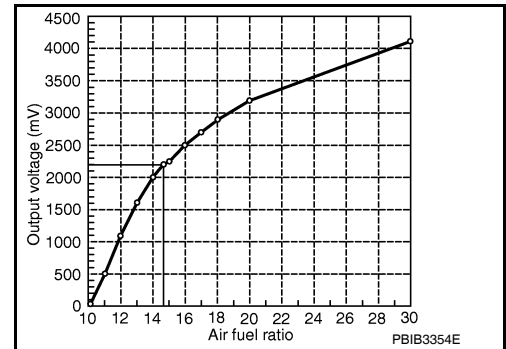
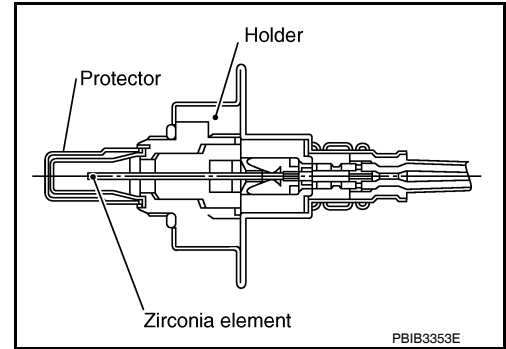
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The air fuel ratio (A/F) sensor 1 is a planar one-cell limit current sensor. The sensor element of the A/F sensor 1 is composed an electrode layer, which transports ions. It has a heater in the element.

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 λ 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 about 800°C (1,472°F).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580848

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1)	<ul style="list-style-type: none"> Engine: After warming up Maintaining engine speed at 2,000 rpm 	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006580849

To judge the malfunction, the A/F signal computed by ECM from the A/F sensor 1 signal is monitored not to be shifted to LEAN side or RICH side.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P2A00 2A00	Air fuel ratio (A/F) sensor 1 circuit range/performance	<ul style="list-style-type: none"> The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period. The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period. 	<ul style="list-style-type: none"> Air fuel ratio (A/F) sensor 1 Air fuel ratio (A/F) sensor 1 heater Fuel pressure Fuel injector Intake air leaks

DTC Confirmation Procedure

INFOID:000000006580850

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.

DTC P2A00 A/F SENSOR 1

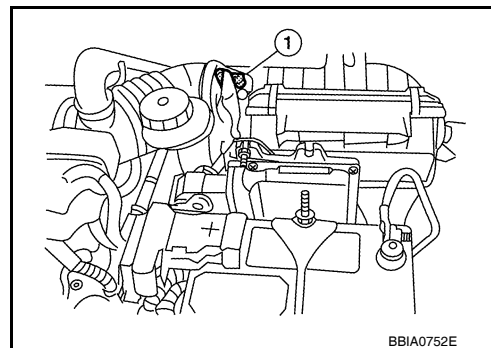
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Turn ignition switch ON and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
4. Clear the self-learning coefficient by touching "CLEAR".
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 1 minute under no load.
7. Let engine idle for 1 minute.
8. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
9. Check 1st trip DTC.
10. If 1st trip DTC is detected, go to [EC-1061. "Diagnosis Procedure"](#).

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. Disconnect mass air flow sensor (1) harness connector.
4. Start engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select Service \$03 with GST and make sure that DTC P0102 is detected.
7. Select Service \$04 with GST and erase the DTC P0102.
8. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
9. Let engine idle for 1 minute.
10. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
11. Select Service \$07 with GST.
If 1st trip DTC is detected, go to [EC-1061. "Diagnosis Procedure"](#).



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DTC P2A00 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

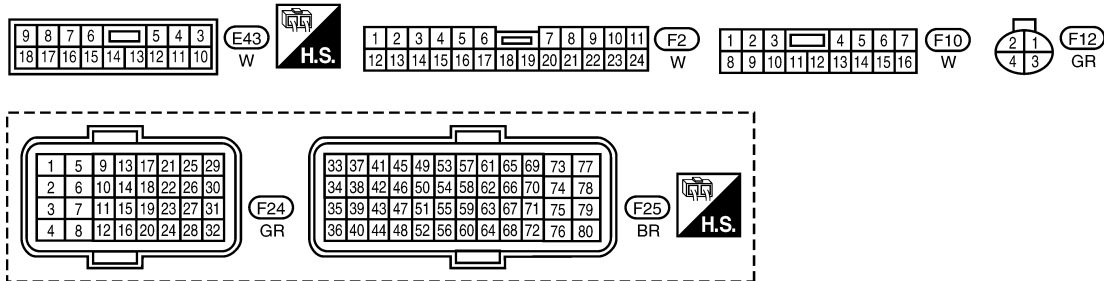
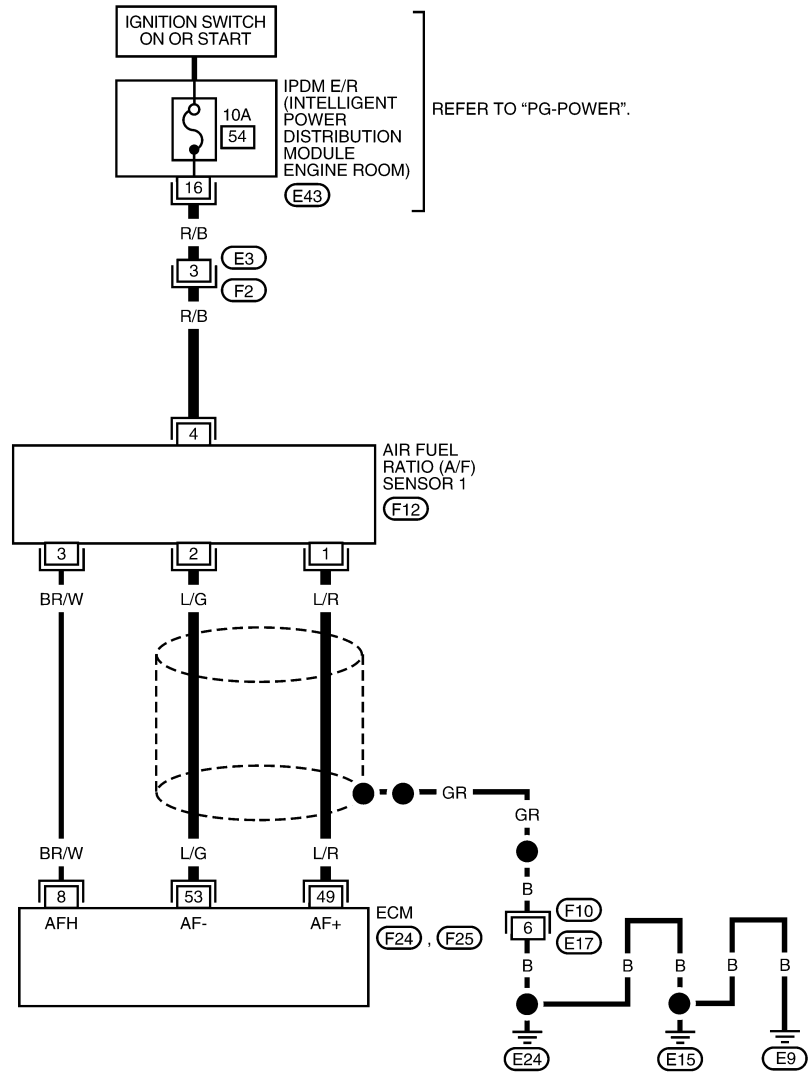
< SERVICE INFORMATION >

INFOID:000000006580851

Wiring Diagram

EC-A/F-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0160GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

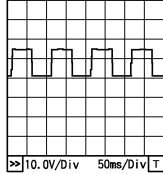
CAUTION:

DTC P2A00 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/W	A/F sensor 1 heater	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ 
49	L/R	A/F sensor 1	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
53	L/G	A/F sensor 1	[Ignition switch: ON]	Approximately 2.2 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

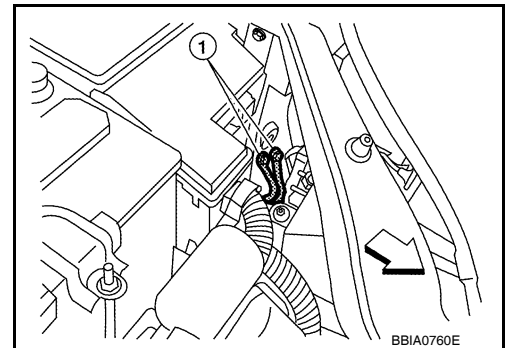
INFOID:000000006580852

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
 - Loosen and retighten ground screws on the body.
Refer to [EC-706 "Ground Inspection"](#).
- ↔: Vehicle front
 - Body ground (1)

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.



2. RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1

Loosen and retighten the air fuel ratio (A/F) sensor 1.
Refer to [EM-23](#).

>> GO TO 3.

3. CHECK FOR INTAKE AIR LEAK

- Start engine and run it at idle.
- Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace.

4. CLEAR THE SELF-LEARNING DATA.

With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
- Clear the self-learning control coefficient by touching "CLEAR".
- Run engine for at least 10 minutes at idle speed.
- Check 1st trip DTC.

Is the 1st trip DTC P0171 and P0172 detected?

DTC P2A00 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

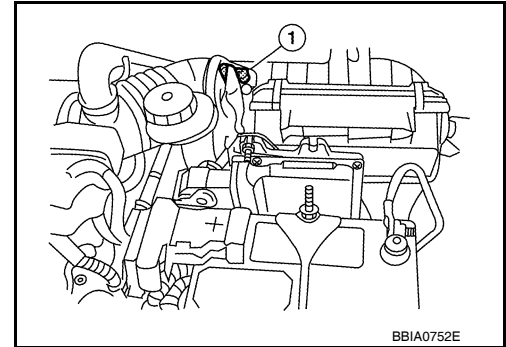
< SERVICE INFORMATION >

Is it difficult to start engine?

⊗ **Without CONSULT-III**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Make sure DTC P0102 is displayed.
7. Erase the DTC memory. Refer to [EC-609. "Emission-related Diagnostic Information"](#).
8. Make sure DTC P0000 is displayed.
9. Run engine for at least 10 minutes at idle speed.

**Is the 1st trip DTC P0171 and P0172 detected?
Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-820](#) or [EC-826](#).
No >> GO TO 5.

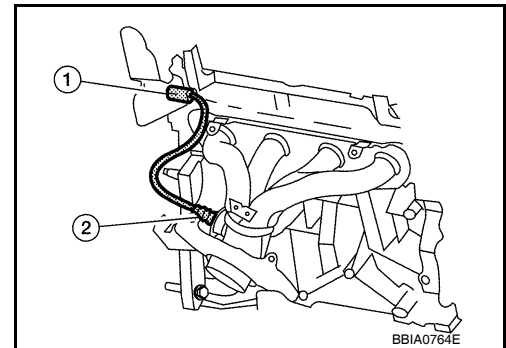
5. CHECK HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector (1).
 - Air fuel ratio (A/F) sensor (2)
3. Check harness connector for water.

Water should no exist.

OK or NG

- OK >> GO TO 6.
NG >> Repair or replace harness connector.



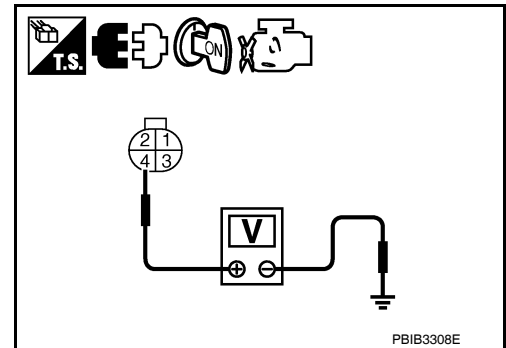
6. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
NG >> GO TO 7.



7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

DTC P2A00 A/F SENSOR 1

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

A/F sensor 1 terminal	ECM terminal
1	49
2	53

Continuity should exist.

4. Check harness continuity between ECM terminals 49, 53 or A/F sensor 1 terminals 1, 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK A/F SENSOR 1 HEATER

Refer to [EC-721, "Component Inspection"](#).

OK or NG

OK >> GO TO 10.

NG >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Perform [EC-701](#).

OK or NG

OK >> GO TO 11.

NG >> Repair or replace.

11. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [EM-23](#).

CAUTION:

- Discard any air fuel ratio (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 air fuel ratio (A/F) sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

>> GO TO 12.

12. CONFIRM A/F ADJUSTMENT DATA

1. Turn ignition switch ON.
2. Select "A/F ADJ-B1" in "DATA MONITOR" mode with CONSULT-III.
3. Make sure that "0.000" is displayed on CONSULT-III screen.

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 13.

13. CLEAR THE SELF-LEARNING DATA

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear the self-learning control coefficient by touching "CLEAR".

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.

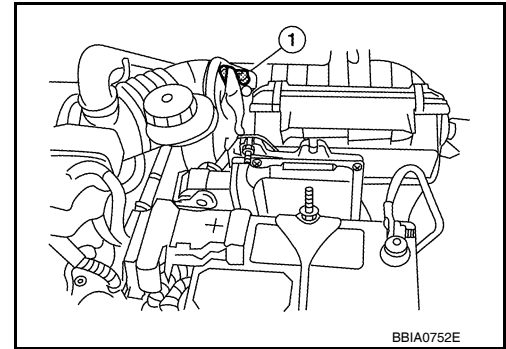
DTC P2A00 A/F SENSOR 1

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. Disconnect mass air flow sensor harness (1) connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Make sure DTC P0102 is displayed.
7. Erase the DTC memory. Refer to [EC-609. "Emission-related Diagnostic Information"](#).
8. Make sure DTC P0000 is displayed.

>> GO TO 14.



14. CONFIRM A/F ADJUSTMENT DATA

1. Turn ignition switch OFF and then ON.
2. Select "A/F ADJ-B1" in "DATA MONITOR" mode with CONSULT-III.
3. Make sure that "0.000" is displayed on CONSULT-III screen.

>> INSPECTION END

ASCD BRAKE SWITCH

[MR20DE (EXCEPT FOR CALIFORNIA)]

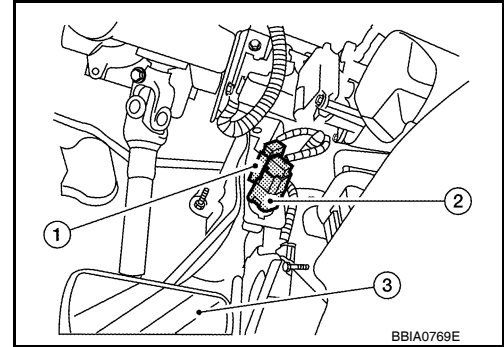
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ASCD BRAKE SWITCH

Component Description

INFOID:000000006580854

When depress on the brake pedal, ASCD brake switch (1) is turned OFF and stop lamp switch (2) is turned ON. ECM detects the state of the brake pedal (3) by this input of two kinds (ON/OFF signal)
Refer to [EC-590](#) for the ASCD function.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580855

Specification data are reference values.

Monitor item	Condition	Specification
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	ON
	• Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	OFF
BRAKE SW2 (Stop lamp switch)	• Ignition switch: ON	OFF
	• Brake pedal: Fully released • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	ON

ASCD BRAKE SWITCH

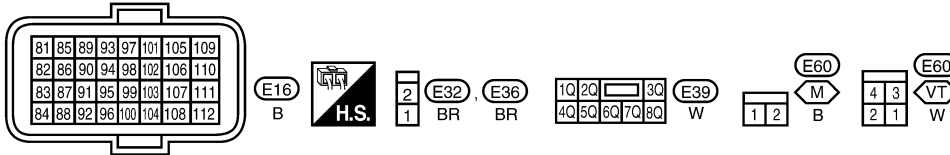
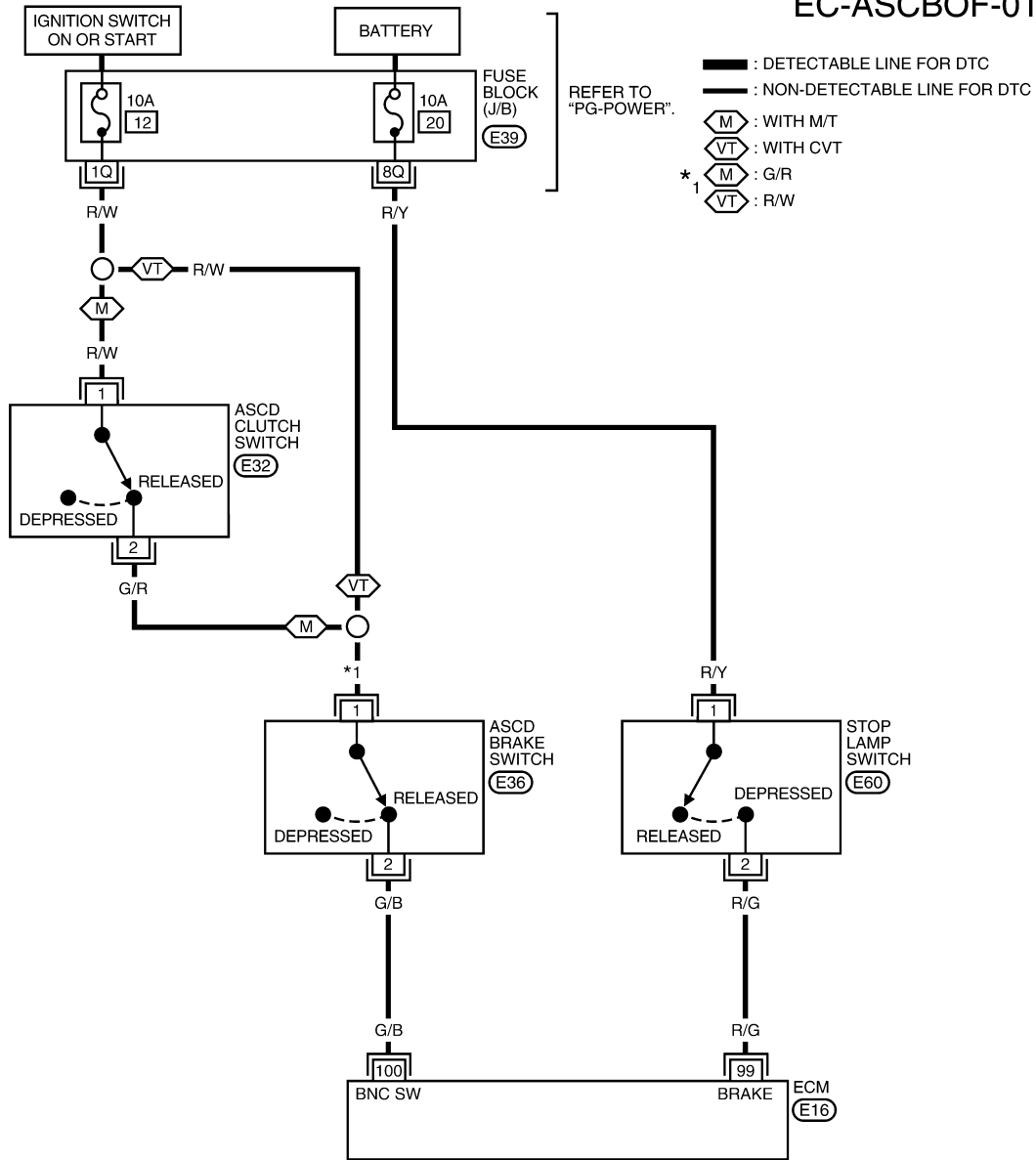
< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

INFOID:000000006580856

Wiring Diagram

EC-ASCBOF-01



ABBWA0650GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
99	R/G	Stop lamp switch	[Ignition switch: ON] • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)
100	G/B	ASCD brake switch	[Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580857

1. CHECK OVERALL FUNCTION-I

With CONSULT-III

- Turn ignition switch ON.
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-III.
- Check "BRAKE SW1" indication under the following conditions.

M/T models

Condition	Indication
Clutch pedal and/or brake pedal: Slightly depressed	OFF
Clutch pedal and brake pedal: Fully released	ON

CVT models

Condition	Indication
Brake pedal: Slightly depressed	OFF
Brake pedal: Fully released	ON

Without CONSULT-III

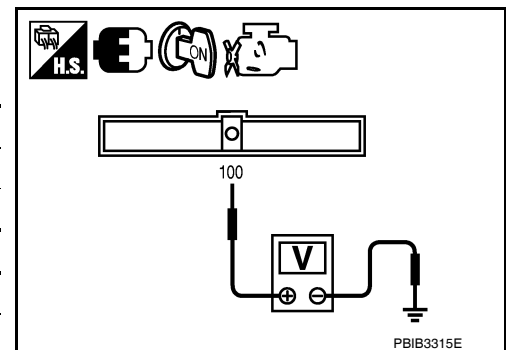
- Turn ignition switch ON.
- Check voltage between ECM terminal 100 and ground under the following conditions.

M/T models

Condition	Voltage
Clutch pedal and/or brake pedal: Slightly depressed	Approximately 0 V
Clutch pedal and brake pedal: Fully released	Battery voltage

CVT models

Condition	Voltage
Brake pedal: Slightly depressed	Approximately 0 V
Brake pedal: Fully released	Battery voltage



OK or NG

- OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK OVERALL FUNCTION-II

With CONSULT-III

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

ASCD BRAKE SWITCH

< SERVICE INFORMATION >

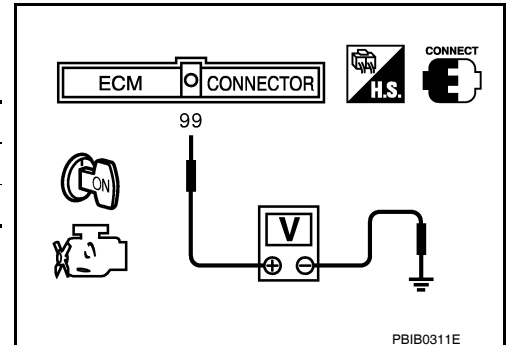
[MR20DE (EXCEPT FOR CALIFORNIA)]

Condition	Indication
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON

⊗ Without CONSULT-III

Check voltage between ECM terminal 99 and ground under the following conditions.

Condition	Voltage
Brake pedal: Fully released	Approximately 0 V
Brake pedal: Slightly depressed	Battery voltage

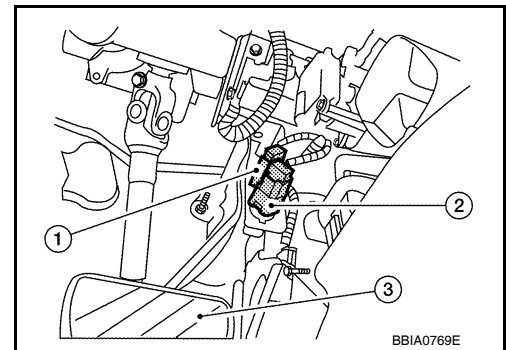


OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 11.

3. CHECK ASCD BRAKE SWITCH POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch (1) harness connector.
 - Stop lamp switch (2)
 - Brake pedal (3)
3. Turn ignition switch ON.

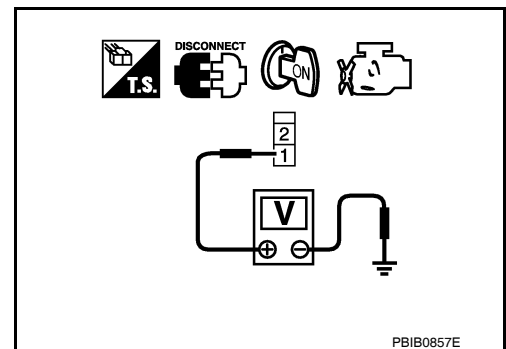


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 8.
- NG (M/T models) >> GO TO 4.
- NG (CVT models) >> GO TO 6.



4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

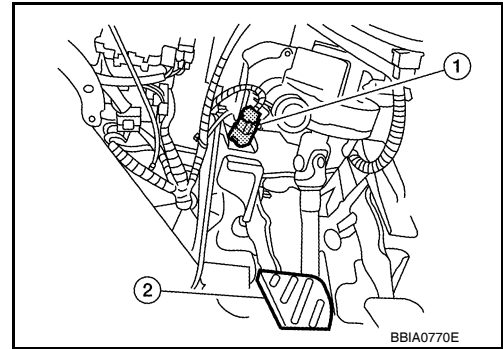
1. Turn ignition switch OFF.

ASCD BRAKE SWITCH

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

2. Disconnect ASCD clutch switch (1) harness connector.
 - Clutch pedal (2)
3. Turn ignition switch ON.

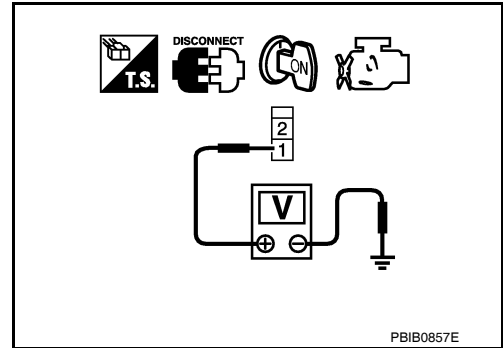


4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between ASCD clutch switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 1 and ASCD clutch switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 10.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 100 and ASCD brake switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

ASCD BRAKE SWITCH

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK ASCD BRAKE SWITCH

Refer to [EC-1008, "Component Inspection"](#).

OK or NG

OK >> GO TO 15.

NG >> Replace ASCD brake switch. Refer to [BR-8](#).

10. CHECK ASCD CLUTCH SWITCH

Refer to [EC-1008, "Component Inspection"](#)

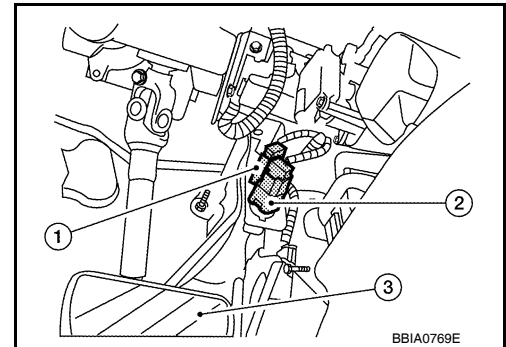
OK or NG

OK >> GO TO 15.

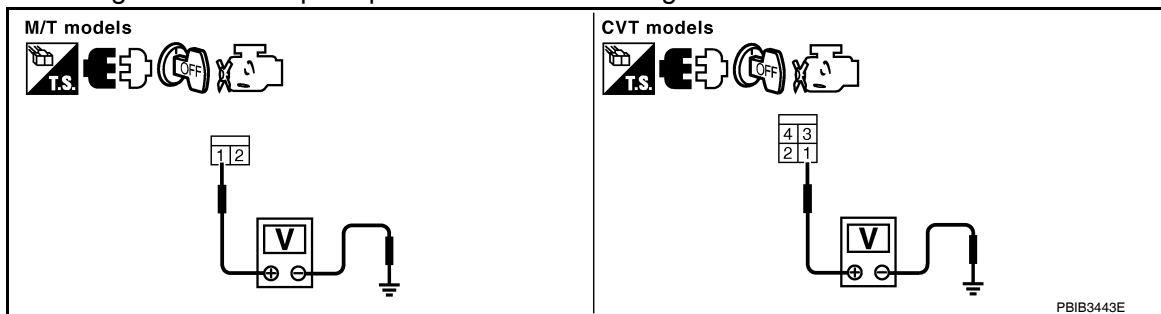
NG >> Replace ASCD clutch switch. Refer to [CL-7](#).

11. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch (2) harness connector.
 - ASCD brake switch (1)
 - Brake pedal (3)



3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -III or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 99 and stop lamp switch terminal 2.
Refer to Wiring Diagram.

ASCD BRAKE SWITCH

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK STOP LAMP SWITCH

Refer to [EC-1008, "Component Inspection"](#)

OK or NG

OK >> GO TO 15.

NG >> Replace stop lamp switch. Refer to [BR-8](#).

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

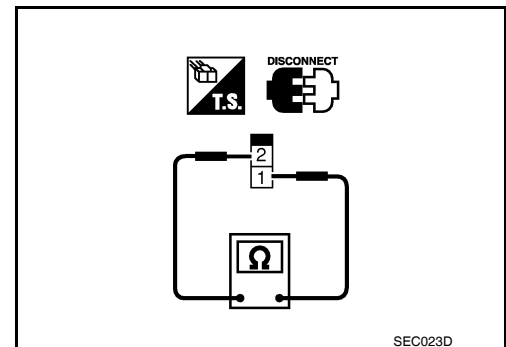
INFOID:000000006580858

ASCD BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Brake pedal: Fully released.	Should exist.
Brake pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-7](#), and perform step 3 again.

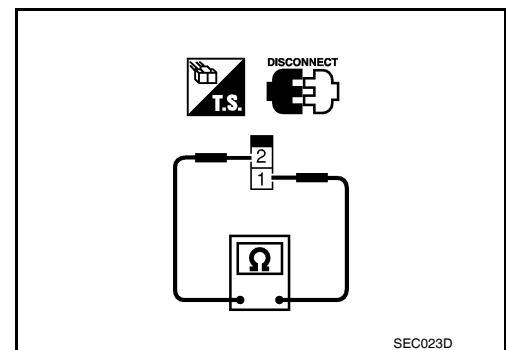


ASCD CLUTCH SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Clutch pedal: Fully released.	Should exist.
Clutch pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-6](#), and perform step 3 again.



STOP LAMP SWITCH

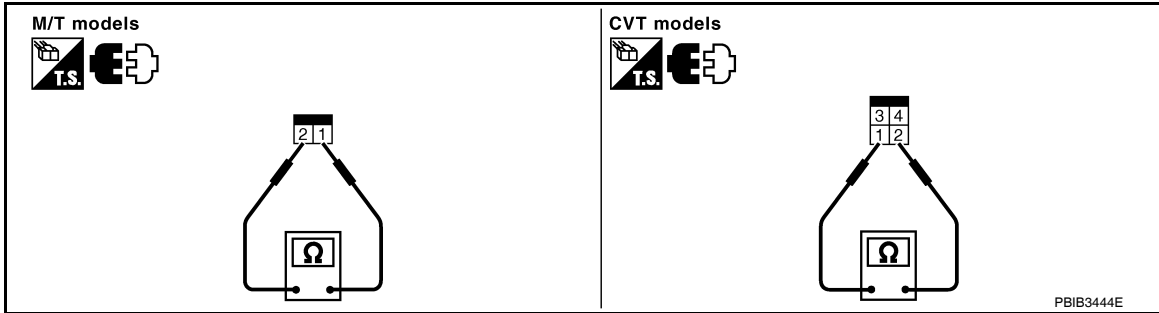
1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.

ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-7](#), and perform step 3 again.

ASCD INDICATOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

ASCD INDICATOR

Component Description

INFOID:000000006580859

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE indicator illuminates when MAIN switch on ASCD steering switch is turned ON to indicate that ASCD system is ready for operation.

SET indicator illuminates when following conditions are met.

- CRUISE indicator is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET indicator remains lit during ASCD control.

Refer to [EC-590](#) for the ASCD function.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580860

Specification data are reference value.

Monitor item	Condition		Specification
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at 1st time → 2nd	ON → OFF
SET LAMP	• MAIN switch: ON • Vehicle: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

ASCD INDICATOR

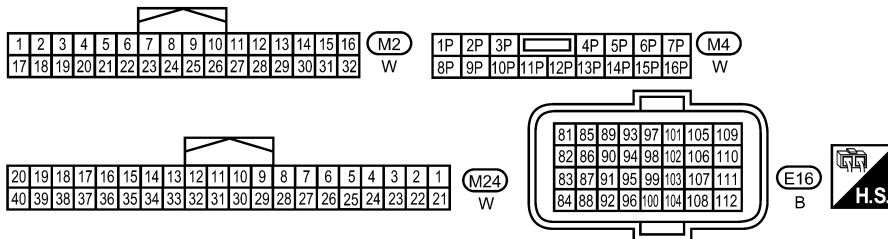
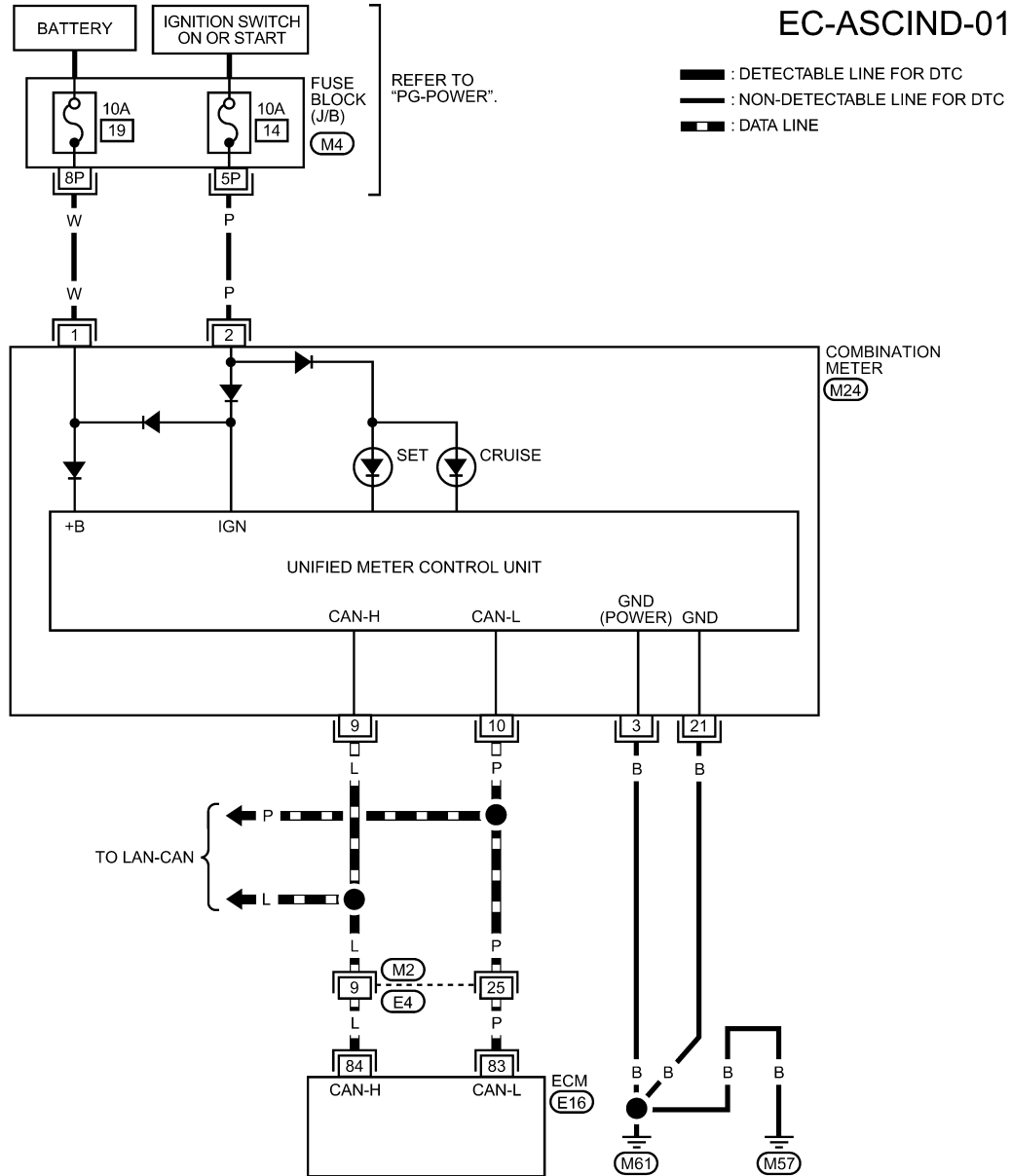
[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

INFOID:000000006580861

Wiring Diagram

EC-ASCIND-01



ABBWA0170GB

Diagnosis Procedure

INFOID:000000006580862

1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at 1st time → 2nd	ON → OFF
SET LAMP	• MAIN switch: ON • Vehicle: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 2.

2.CHECK DTC

Check that DTC UXXXX is not displayed.

Yes or No

Yes >> Perform trouble diagnoses for DTC UXXXX.

No >> GO TO 3.

3.CHECK COMBINATION METER OPERATION

Does combination meter operate normally?

Yes or No

Yes >> GO TO 4.

No >> Check combination meter circuit. Refer to [DI-6](#).

4.CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

ELECTRICAL LOAD SIGNAL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

ELECTRICAL LOAD SIGNAL

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580863

Specification data are reference values.

Monitor item	Condition	Specification	
LOAD SIGNAL	• Ignition switch: ON	Rear window defogger switch is ON and/or lighting switch is in 2nd position.	ON
		Rear window defogger switch is OFF and lighting switch is OFF.	OFF
HEATER FAN SW	• Ignition switch: ON	Heater fan: Operating.	ON
		Heater fan: Not operating.	OFF

Diagnosis Procedure

INFOID:000000006580864

1. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

1. Turn ignition switch ON.
2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-III under the following conditions.

Condition	LOAD SIGNAL
Lighting switch: ON at 2nd position	ON
Lighting switch: OFF	OFF

OK or NG

- OK >> GO TO 2.
NG >> GO TO 4.

2. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-III under the following conditions.

Condition	LOAD SIGNAL
Rear window defogger switch: ON	ON
Rear window defogger switch: OFF	OFF

OK or NG

- OK >> GO TO 3.
NG >> GO TO 5.

3. CHECK HEATER FAN SIGNAL CIRCUIT OVERALL FUNCTION

Check "HEATER FAN SW" in "DATA MONITOR" mode with CONSULT-III under the following conditions.

Condition	HEATER FAN SW
Heater fan control switch: ON	ON
Heater fan control switch: OFF	OFF

OK or NG

- OK >> **INSPECTION END.**
NG >> GO TO 6.

4. CHECK HEADLAMP SYSTEM

Refer to [LT-5](#) or [LT-26](#).

>> **INSPECTION END**

5. CHECK REAR WINDOW DEFOGGER SYSTEM

ELECTRICAL LOAD SIGNAL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Refer to [GW-56](#).

>> INSPECTION END

6. CHECK HEATER FAN CONTROL SYSTEM

Refer to [MTC-28](#).

>> INSPECTION END

A

EC

C

D

E

F

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H

I

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P

FUEL INJECTOR

< SERVICE INFORMATION >

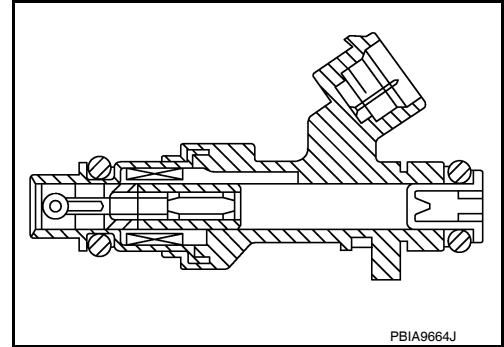
[MR20DE (EXCEPT FOR CALIFORNIA)]

FUEL INJECTOR

Component Description

INFOID:000000006580865

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580866

Specification data are reference values.

Monitor item	Condition	Specification
B/FUEL SCHDL	See EC-693 .	
INJ PULSE-B1	• Engine: After warming up • Air conditioner switch: OFF • Shift lever: P or N (CVT), Neutral (M/T) • No load	Idle
		2,000 rpm
		2.0 - 3.0 msec
		1.9 - 2.9 msec

FUEL INJECTOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

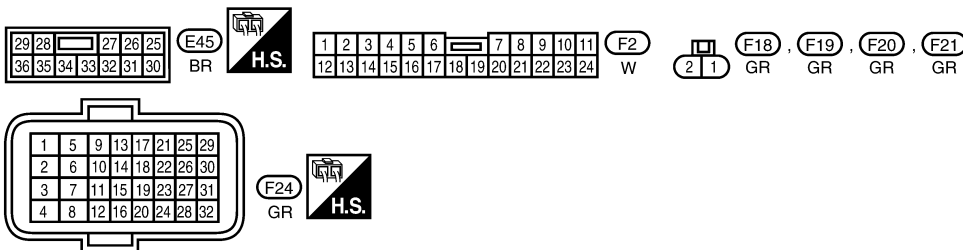
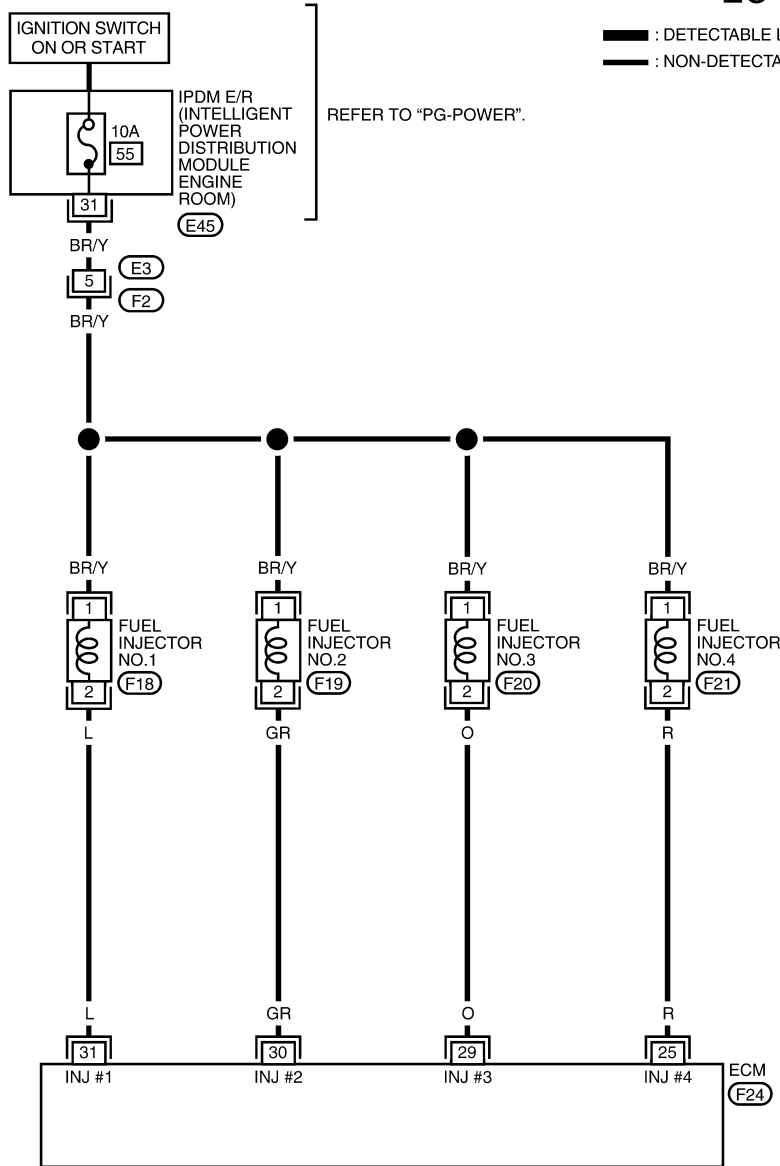
< SERVICE INFORMATION >

Wiring Diagram

INFOID:00000006580867

EC-INJECT-01

— : DETECTABLE LINE FOR DTC
 - - : NON-DETECTABLE LINE FOR DTC



BBWA2907E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

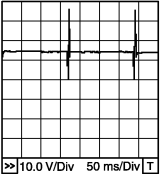
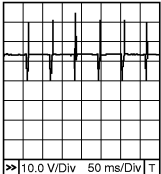
CAUTION:

FUEL INJECTOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25 29 30 31	R O GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle</p>	<p>BATTERY VOLTAGE (11 - 14 V)★</p>  <p>PBIB0529E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	<p>BATTERY VOLTAGE (11 - 14 V)★</p>  <p>PBIA4943J</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006580868

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

Yes or No

Yes >> GO TO 2.

No >> GO TO 3.

2. CHECK OVERALL FUNCTION

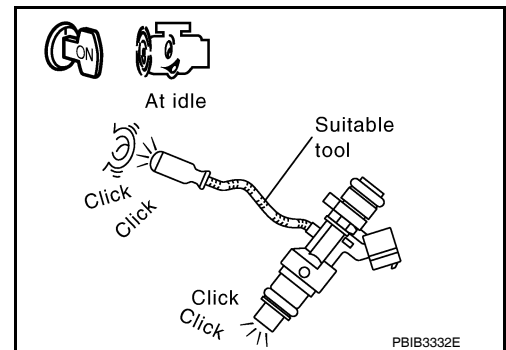
With CONSULT-III

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-III

1. Start engine.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



OK or NG

OK >> **INSPECTION END**

NG >> GO TO 3.

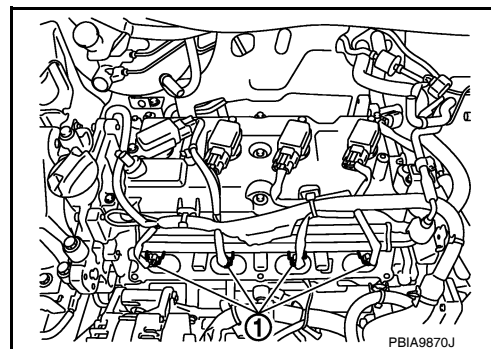
FUEL INJECTOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

3. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel injector (1) harness connector.
3. Turn ignition switch ON.

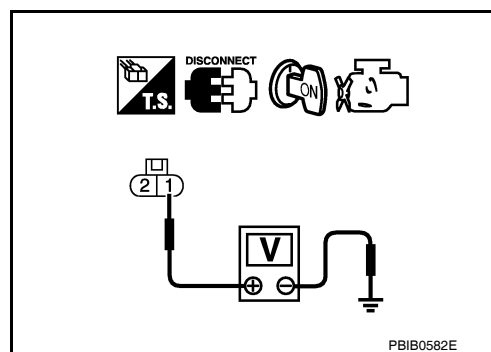


4. Check voltage between fuel injector terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- IPDM E/R harness connector E45
- 10 A fuse
- Harness for open or short between fuel injector and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between fuel injector terminal 2 and ECM terminals 25, 29, 30, 31. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK FUEL INJECTOR

Refer to [EC-1082. "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> Replace fuel injector. Refer to [EM-36](#).

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

FUEL INJECTOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

>> INSPECTION END

Component Inspection

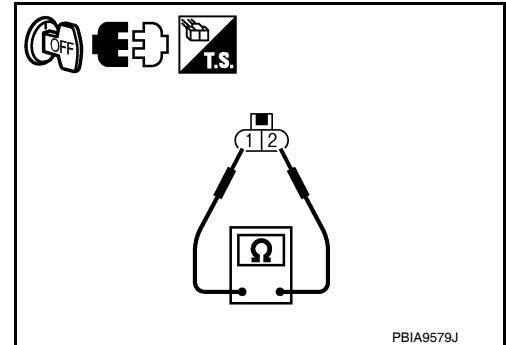
INFOID:000000006580869

FUEL INJECTOR

1. Disconnect fuel injector harness connector.
2. Check resistance between terminals as shown in the figure.

Resistance: 11.1 - 14.5 Ω [at 10 - 60°C (50 - 140°F)]

3. If NG, replace fuel injector. Refer to [EM-36](#).



FUEL PUMP

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

FUEL PUMP

Description

INFOID:000000006580871

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay
Battery	Battery voltage*		

*: ECM determines the start signal status by the signals of engine speed and battery voltage.

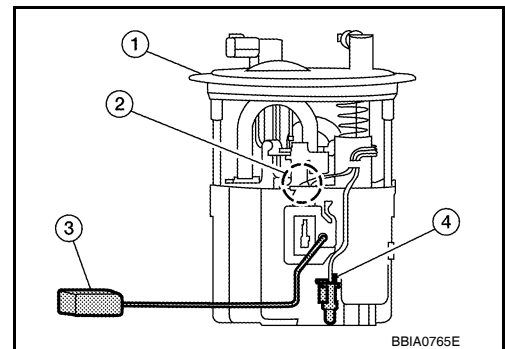
The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine start ability. If the ECM receives a engine speed signal from the crankshaft position sensor (POS) and camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump 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
Engine: Stopped	Stops in 1.5 seconds
Except as shown above	Stops

COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the fuel tank.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)
- Fuel tank temperature sensor (4)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006580872

Specification data are reference values.

Monitor item	Condition	Specification
FUEL PUMP RLY	<ul style="list-style-type: none"> • For 1 second after turning ignition switch ON • Engine running or cranking 	ON
	<ul style="list-style-type: none"> • Except above conditions 	OFF

FUEL PUMP

< SERVICE INFORMATION >

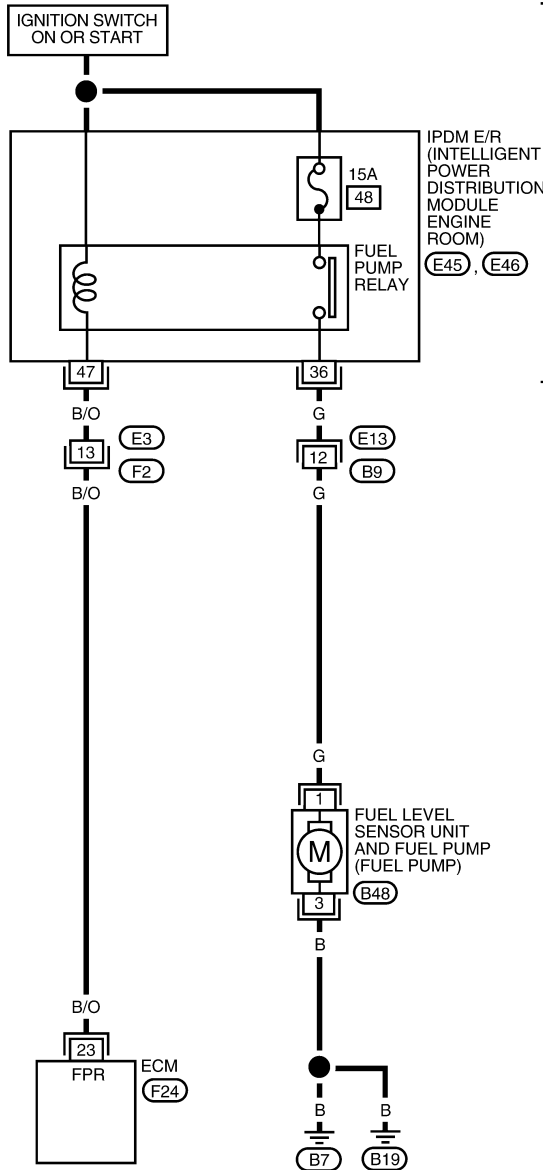
[MR20DE (EXCEPT FOR CALIFORNIA)]

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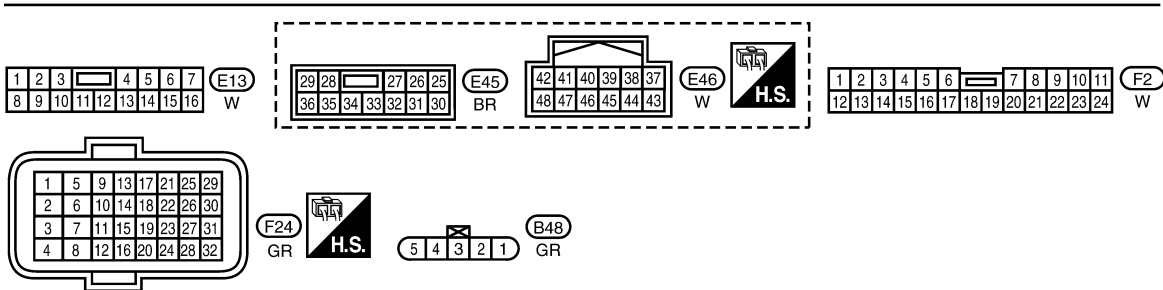
Wiring Diagram

EC-F/PUMP-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



REFER TO "PG-POWER".



BBWA2908E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

FUEL PUMP

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
23	B/O	Fuel pump relay	[Ignition switch: ON] • For 1 second after turning ignition switch ON [Engine is running]	0 - 1.0 V
			[Ignition switch: ON] • More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006580874

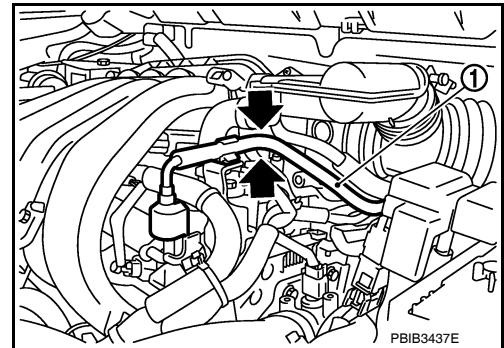
1. CHECK OVERALL FUNCTION

- Turn ignition switch ON.
- Pinch fuel feed hose (1) with two fingers.
- This illumination is shows the view with intake air duct removed.

Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 2.



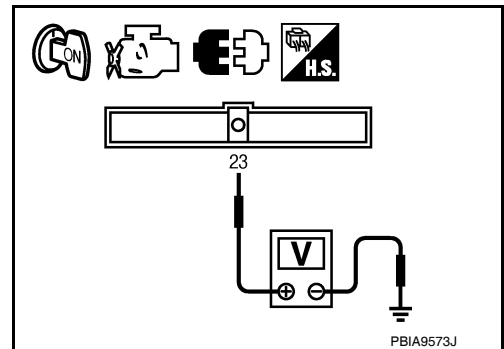
2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Turn ignition switch ON.
- Check voltage between ECM terminal 23 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 3.



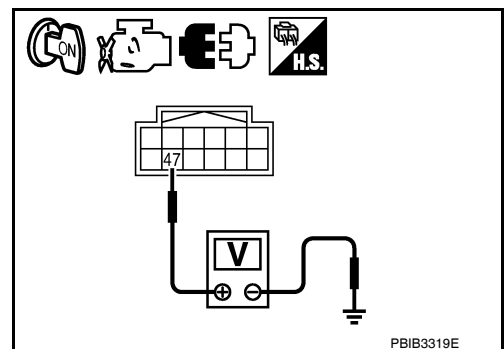
3. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

- Turn ignition switch OFF.
- Disconnect IPDM E/R harness connector E46.
- Turn ignition switch ON.
- Check voltage between IPDM E/R terminal 47 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
 NG >> GO TO 11.



FUEL PUMP

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

4. DETECT MALFUNCTIONING PART

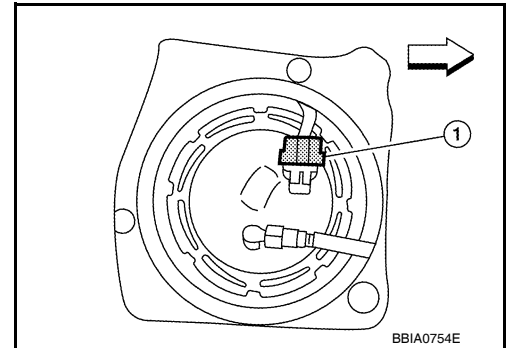
Check the following.

- Harness connectors E3, F2
- Harness for open or short between IPDM E/R and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect "fuel level sensor unit and fuel pump" harness connector (1).
 - This illumination is shows the view with inspection hole cover removed.
4. Turn ignition switch ON.

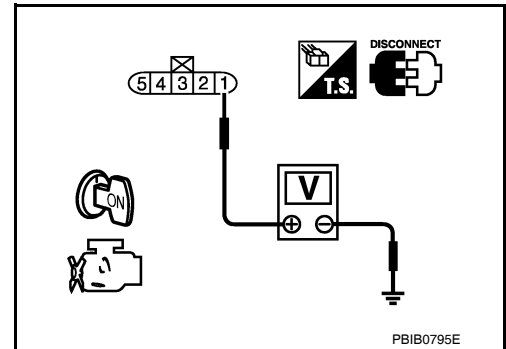


5. Check voltage between "fuel level sensor unit and fuel pump" terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage should exist for 1 second after ignition switch is turned ON.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 6.



6. CHECK 15 A FUSE

1. Turn ignition switch OFF.
2. Disconnect 15 A fuse.
3. Check 15 A fuse.

OK or NG

- OK >> GO TO 7.
- NG >> Replace fuse.

7. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-IV

1. Disconnect IPDM E/R harness connector E45.
2. Check harness continuity between IPDM E/R terminal 36 and "fuel level sensor unit and fuel pump" terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 11.
- NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E13, B9
- Harness for open or short between IPDM E/R and "fuel level sensor unit and fuel pump"

FUEL PUMP

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK FUEL PUMP GROUND CIRCUIT

1. Check harness continuity between "fuel level sensor unit and fuel pump" terminal 3 and ground. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to power.

OK or NG

OK >> GO TO 10.

NG >> Repair or replace harness or connectors.

10. CHECK FUEL PUMP

Refer to [EC-1087, "Component Inspection"](#).

OK or NG

OK >> GO TO 11.

NG >> Replace fuel pump. Refer to [FL-6](#).

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

OK or NG

OK >> Replace IPDM E/R. Refer to [PG-28](#).

NG >> Repair or replace harness or connectors.

Component Inspection

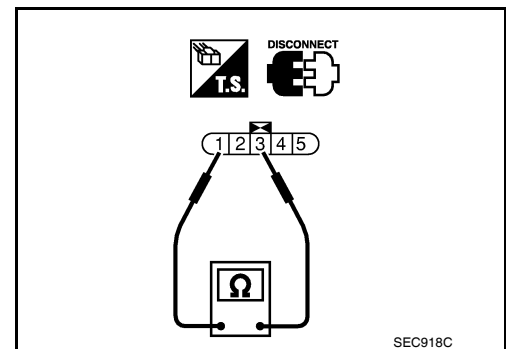
INFOID:000000006580875

FUEL PUMP

1. Disconnect "fuel level sensor unit and fuel pump" harness connector.
2. Check resistance between "fuel level sensor unit and fuel pump" terminals 1 and 3.

Resistance: Approximately 0.2 - 5.0 Ω [at 25°C (77°F)]

3. If NG, replace "fuel level sensor unit and fuel pump". Refer to [FL-6](#).



IGNITION SIGNAL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

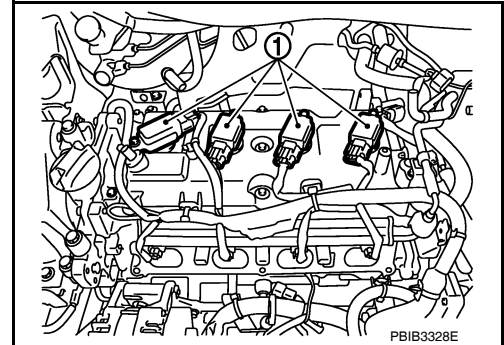
IGNITION SIGNAL

Component Description

INFOID:000000006580877

IGNITION COIL & 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 (1) primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.



IGNITION SIGNAL

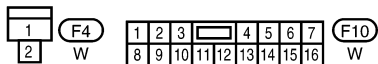
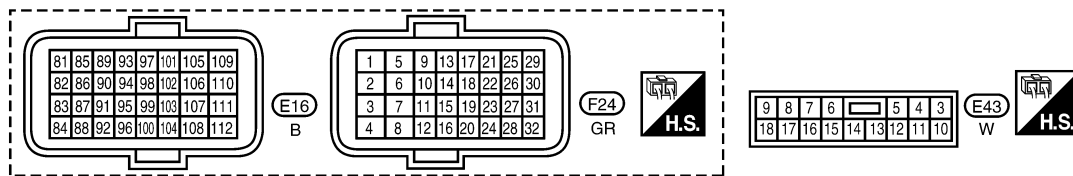
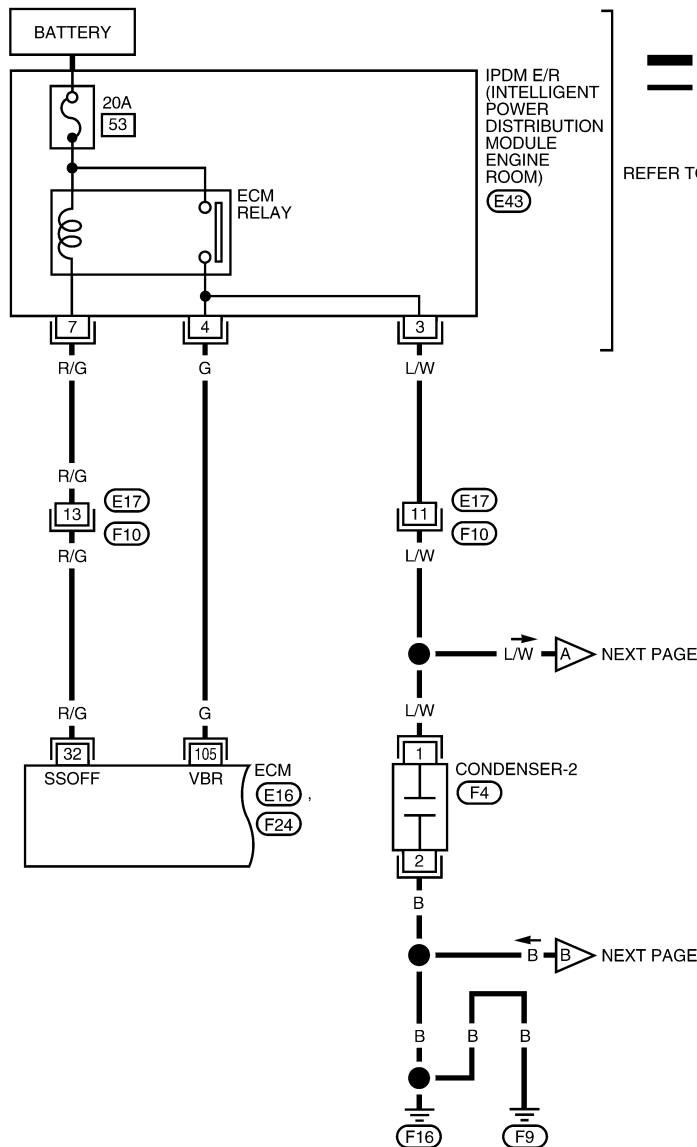
< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

INFOID:000000006580878

Wiring Diagram

EC-IGNSYS-01



AABWA0250GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

IGNITION SIGNAL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

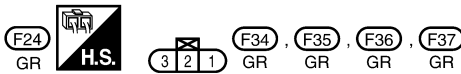
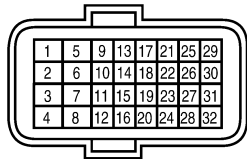
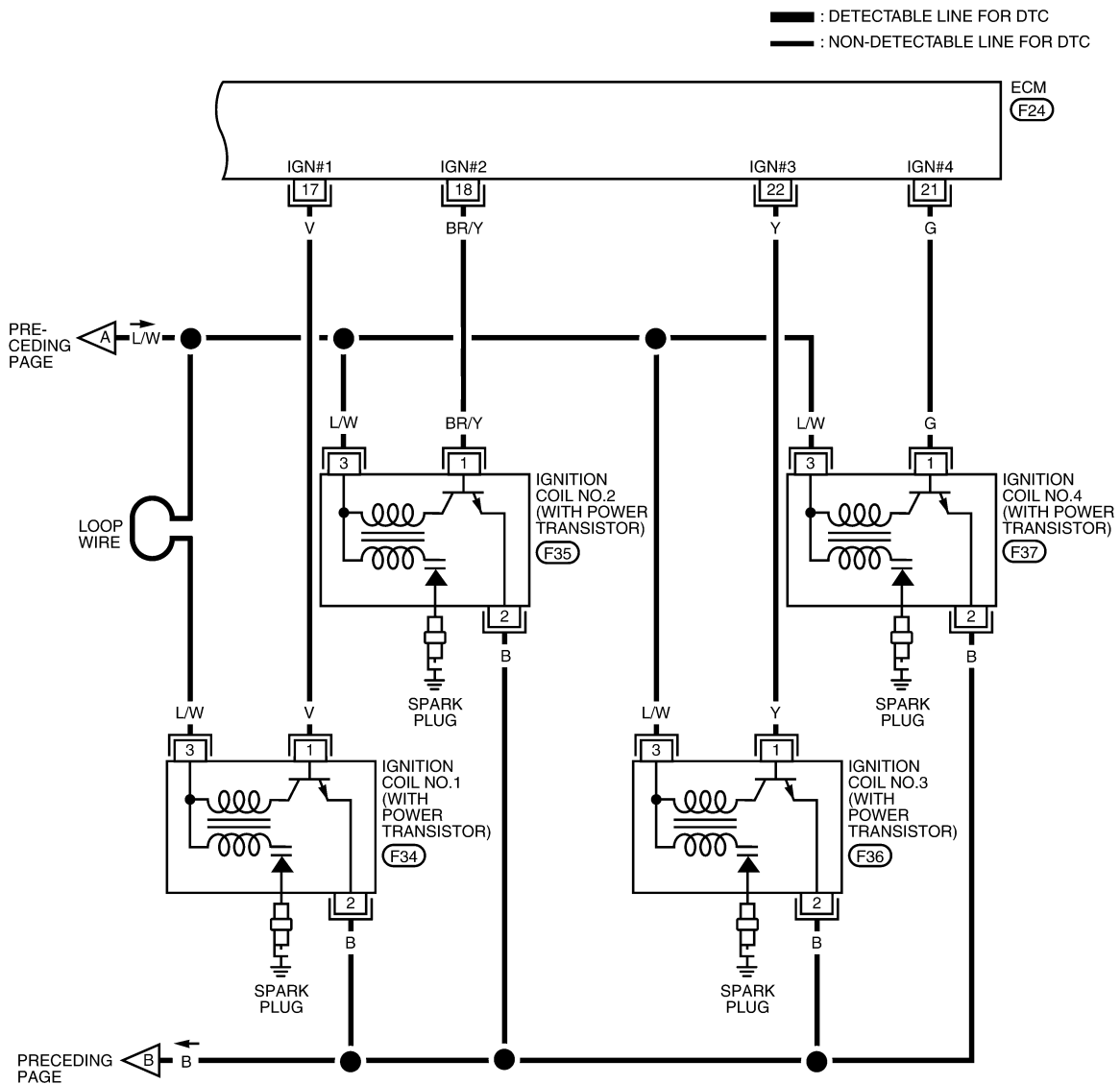
TER- MI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none">• For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] <ul style="list-style-type: none">• More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

IGNITION SIGNAL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

EC-IGNSYS-02



BBWA2910E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

IGNITION SIGNAL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
17 18 21 22	V BR/Y G Y	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 4 Ignition signal No. 3	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle</p>	<p>0 - 0.3 V★</p> <p>PBIA9265J</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,500 rpm 	<p>0.2 - 0.5 V★</p> <p>PBIA9266J</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006580879

1. CHECK ENGINE START

Turn ignition switch OFF, and restart engine.

Is engine running?

Yes or No

- Yes (With CONSULT-III)>>GO TO 2.
- Yes (Without CONSULT-III)>>GO TO 3.
- No >> GO TO 4.

2. CHECK OVERALL FUNCTION

With CONSULT-III

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
2. Make sure that each circuit produces a momentary engine speed drop.

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 10.

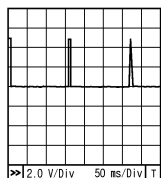
3. CHECK OVERALL FUNCTION

Without CONSULT-III

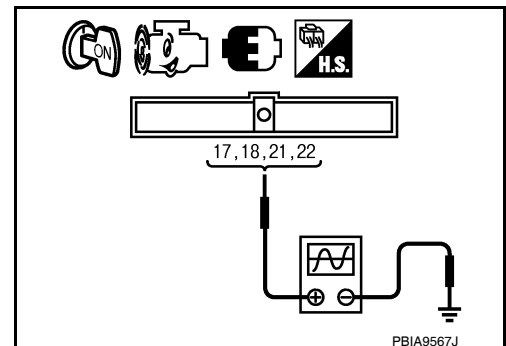
1. Let engine idle.
2. Read the voltage signal between ECM terminals 17, 18, 21, 22 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.

NOTE:

The pulse cycle changes depending on rpm at idle.



PBIA9265J



PBIA9567J

OK or NG

IGNITION SIGNAL

[MR20DE (EXCEPT FOR CALIFORNIA)]

< SERVICE INFORMATION >

- OK >> **INSPECTION END**
- NG >> GO TO 10.

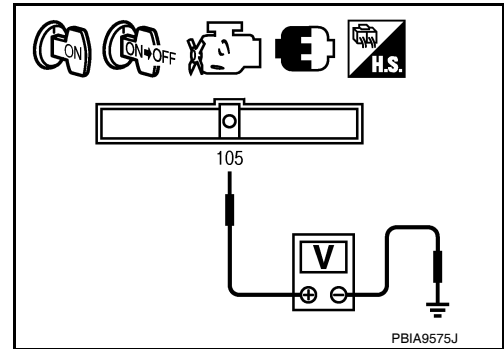
4.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check voltage between ECM terminal 105 and ground with CONSULT-III or tester.

Voltage: Battery voltage

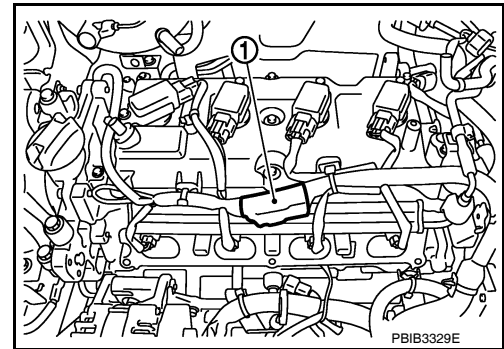
OK or NG

- OK >> GO TO 5.
- NG >> Go to [EC-702](#).



5.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser-2 (1) harness connector.
3. Turn ignition switch ON.

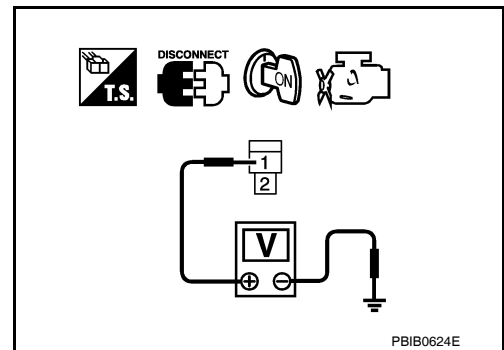


4. Check voltage between condenser-2 terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 6.



6.CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between IPDM E/R terminal 3 and condenser-2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> Go to [EC-702](#).
- NG >> GO TO 7.

7.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10

IGNITION SIGNAL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

- Harness for open or short between IPDM E/R and condenser-2

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK CONDENSER-2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between condenser-2 terminal 2 and ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to power in harness or connectors.

9. CHECK CONDENSER-2

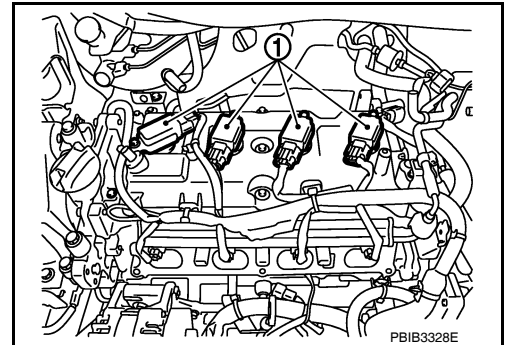
Refer to [EC-1095. "Component Inspection"](#)

OK or NG

- OK >> GO TO 10.
- NG >> Replace condenser-2.

10. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil (1) harness connector.
4. Turn ignition switch ON.

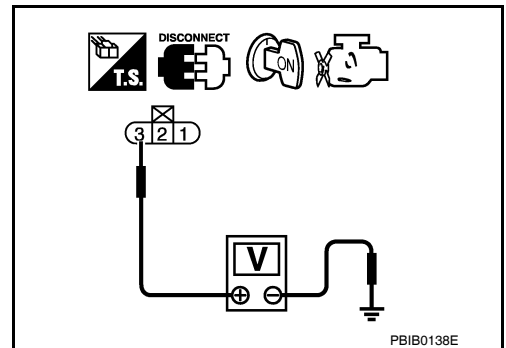


5. Check voltage between ignition coil terminal 3 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 12.
- NG >> GO TO 11.



11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector F10
- Harness for open or short between ignition coil and harness connector F10

>> Repair or replace harness or connectors.

12. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

IGNITION SIGNAL

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

2. Check harness continuity between ignition coil terminal 2 and ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 13.

NG >> Repair open circuit or short to power in harness or connectors.

13. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 17, 18, 21, 22 and ignition coil terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-1095. "Component Inspection"](#).

OK or NG

OK >> GO TO 15.

NG >> Replace ignition coil with power transistor. Refer to [EM-33](#).

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006580880

IGNITION COIL WITH POWER TRANSISTOR

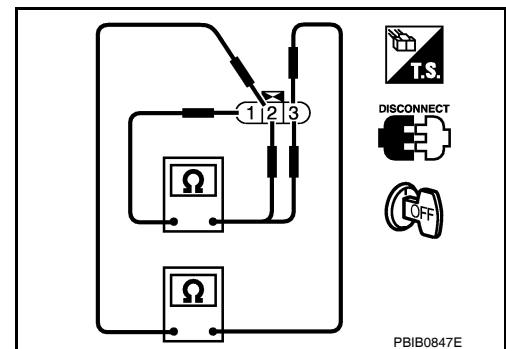
CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminal No. (Polarity)	Resistance [at 25°C (77°F)]
1 and 2	Except 0 or ∞ Ω
1 and 3	Except 0 Ω
2 and 3	

4. If NG, replace ignition coil with power transistor. Refer to [EM-33](#).
If OK, go to next step.
5. Turn ignition switch OFF.
6. Reconnect all harness connectors disconnected.



IGNITION SIGNAL

< SERVICE INFORMATION >

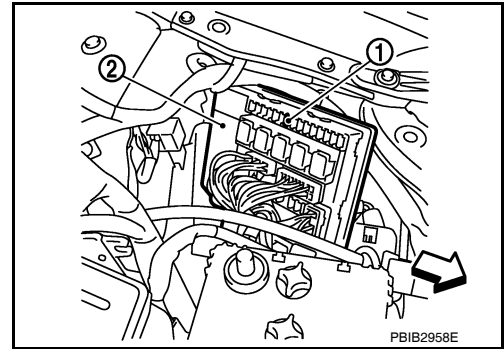
[MR20DE (EXCEPT FOR CALIFORNIA)]

7. Remove fuel pump fuse (1) in IPDM E/R (2) to release fuel pressure.

NOTE:

Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.

- ⇐ : Vehicle front
8. Start engine.
 9. After engine stalls, crank it two or three times to release all fuel pressure.
 10. Turn ignition switch OFF.
 11. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
 12. Remove ignition coil and spark plug of the cylinder to be checked.
 13. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
 14. Connect spark plug and harness connector to ignition coil.
 15. 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.
 16. Crank engine for about 3 seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

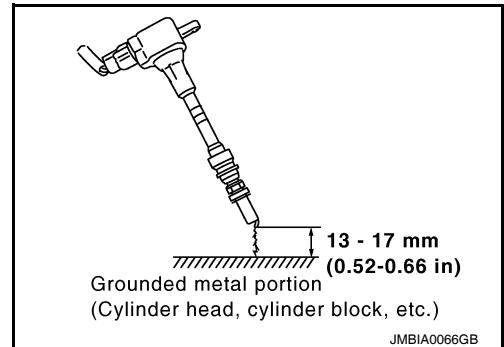
CAUTION:

- Do not approach to the spark plug and the ignition coil within 50 cm. 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.

17. If NG, replace ignition coil with power transistor. Refer to [EM-33](#).

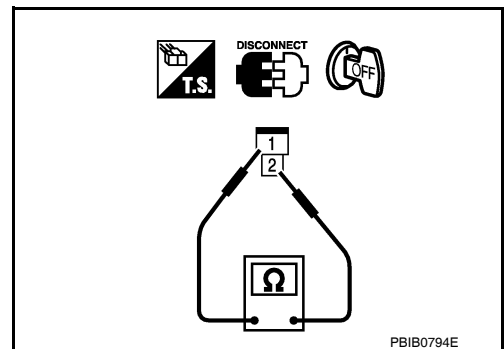


CONDENSER-2

1. Turn ignition switch OFF.
2. Disconnect condenser-2 harness connector.
3. Check resistance between condenser-2 terminals 1 and 2.

Resistance: Above 1 MΩ [at 25°C (77°F)]

4. If NG, replace condenser-2.



REFRIGERANT PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

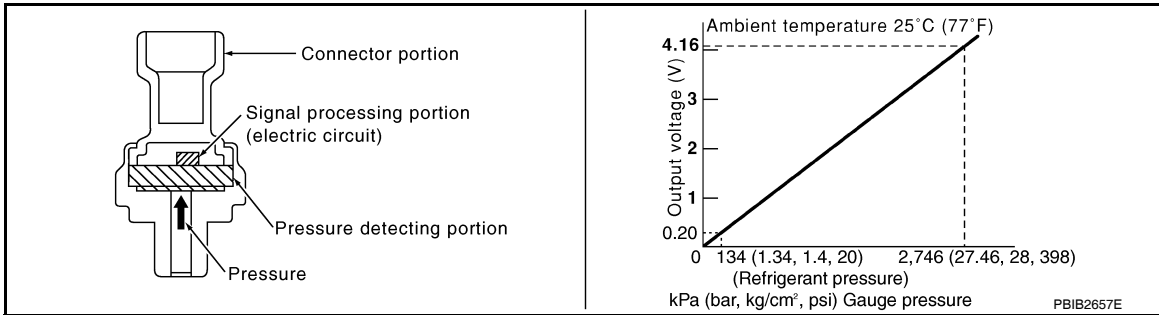
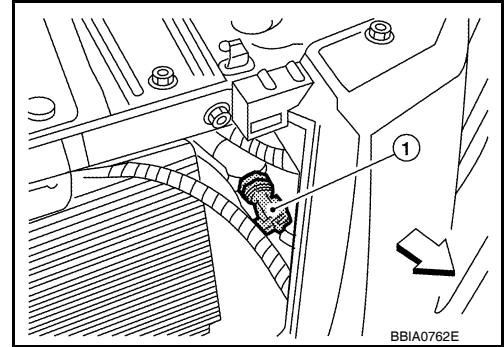
REFRIGERANT PRESSURE SENSOR

Component Description

INFOID:000000006580882

The refrigerant pressure sensor (1) 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.

- ←: Vehicle front



REFRIGERANT PRESSURE SENSOR

< SERVICE INFORMATION >

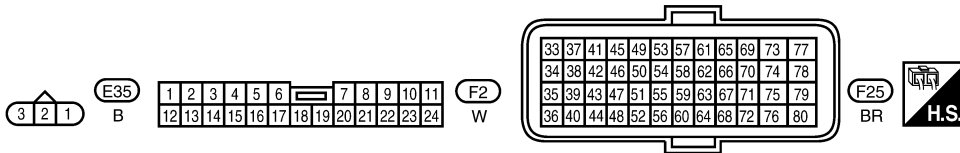
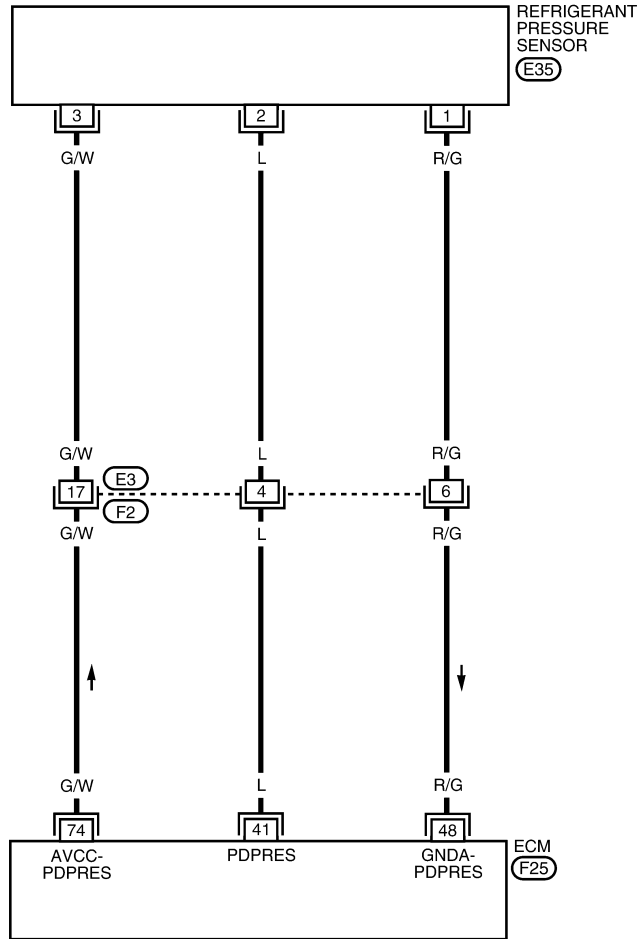
[MR20DE (EXCEPT FOR CALIFORNIA)]

Wiring Diagram

INFOID:000000006580883

EC-RP/SEN-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA2911E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

REFRIGERANT PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
41	L	Refrigerant pressure sensor	[Engine is running] • Warm-up condition • Both A/C switch and blower fan switch: ON (Compressor operates)	1.0 - 4.0 V
48	R/G	Sensor ground (Refrigerant pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
74	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

INFOID:000000006580884

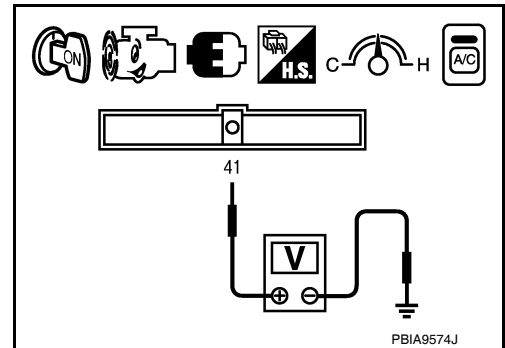
1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower fan switch ON.
3. Check voltage between ECM terminal 41 and ground with CONSULT-III or tester.

Voltage: 1.0 - 4.0 V

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 2.

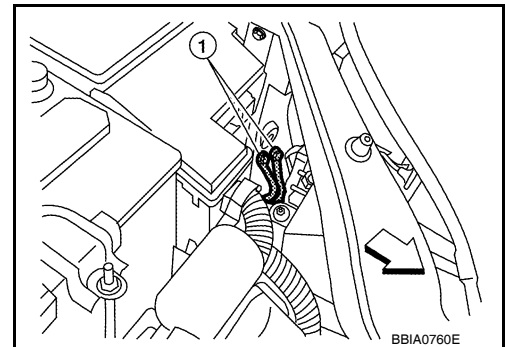


2. CHECK GROUND CONNECTIONS

1. Turn A/C switch and blower fan switch OFF.
 2. Stop engine and turn ignition switch OFF.
 3. Loosen and retighten ground screws on the body.
Refer to [EC-706. "Ground Inspection"](#).
- ⇐: Vehicle front
 - Body ground (1)

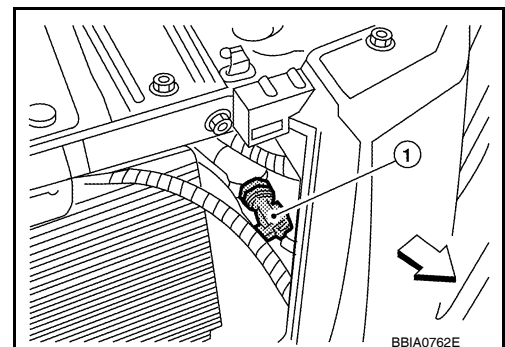
OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace ground connections.



3. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor (1) harness connector.
- ⇐: Vehicle front
2. Turn ignition switch ON.



REFRIGERANT PRESSURE SENSOR

[MR20DE (EXCEPT FOR CALIFORNIA)]

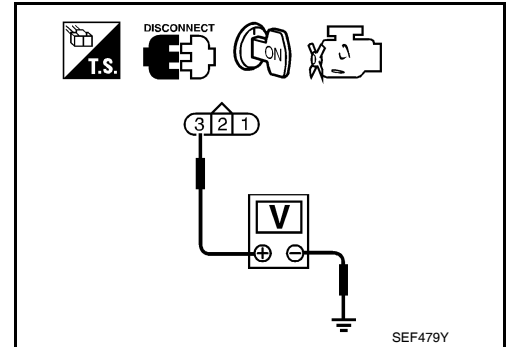
< SERVICE INFORMATION >

3. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between refrigerant pressure sensor terminal 1 and ECM terminal 48. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between refrigerant pressure sensor terminal 2 and ECM terminal 41. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-701](#).

REFRIGERANT PRESSURE SENSOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

OK or NG

- OK >> Replace refrigerant pressure sensor. Refer to [MTC-92](#).
- NG >> Repair or replace.

A

EC

C

D

E

F

G

H

I

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O

P

MIL AND DATA LINK CONNECTOR

< SERVICE INFORMATION >

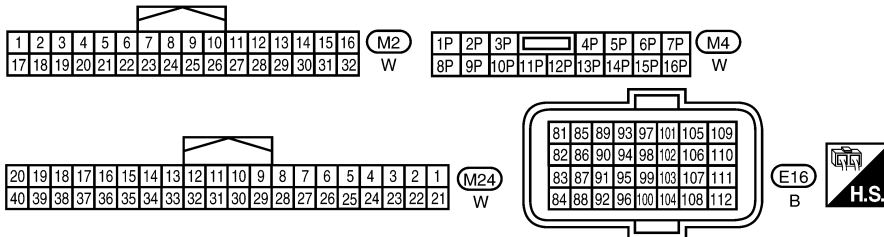
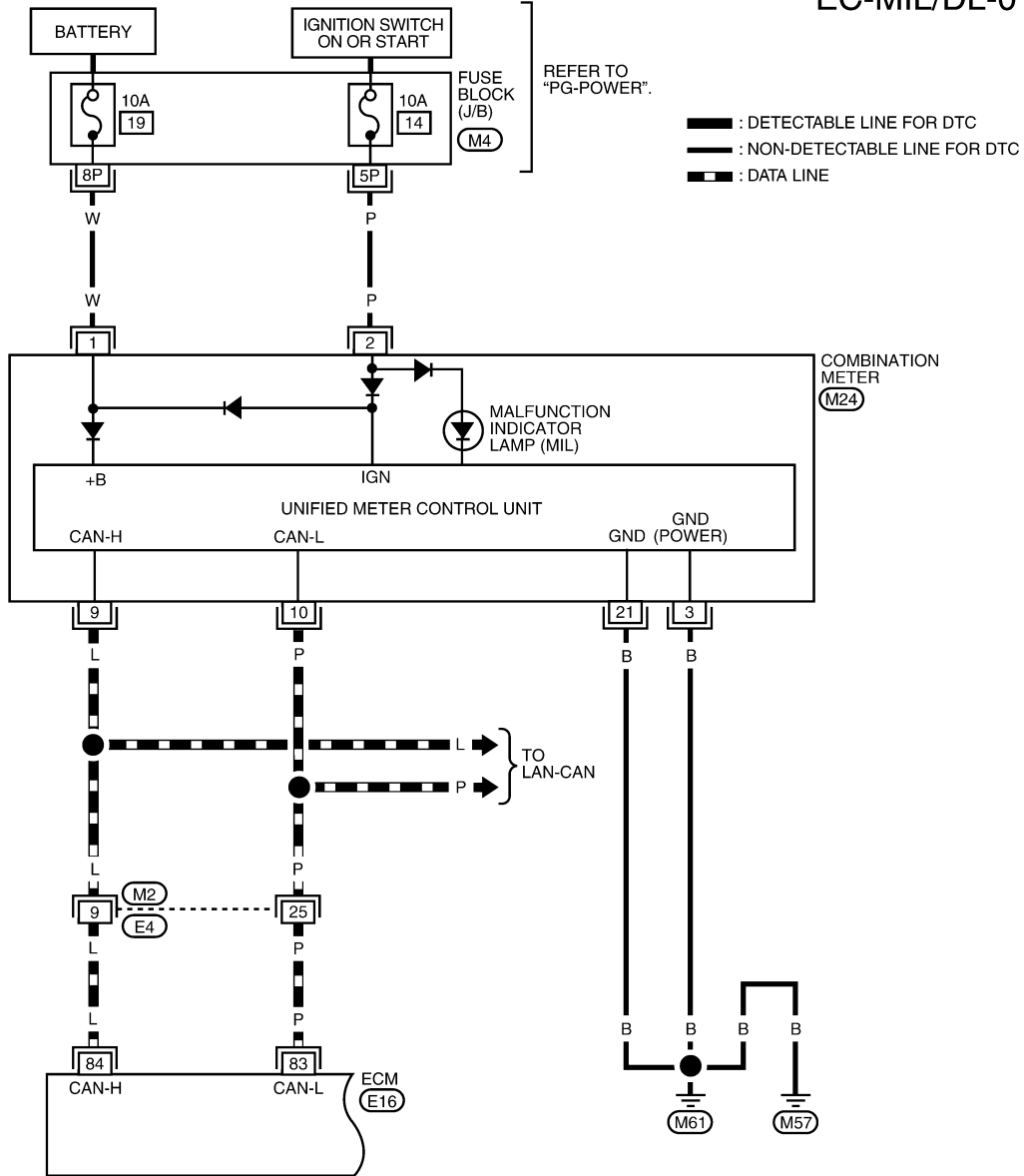
[MR20DE (EXCEPT FOR CALIFORNIA)]

MIL AND DATA LINK CONNECTOR

Wiring Diagram

INFOID:000000006580886

EC-MIL/DL-01



ABBWA0171GB

MIL AND DATA LINK CONNECTOR

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

EC-MIL/DL-02

A

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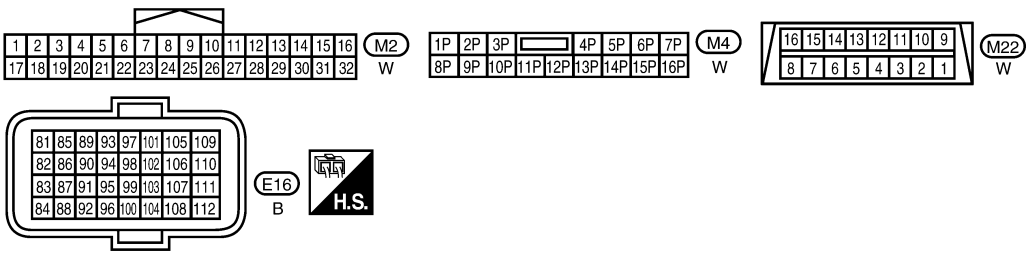
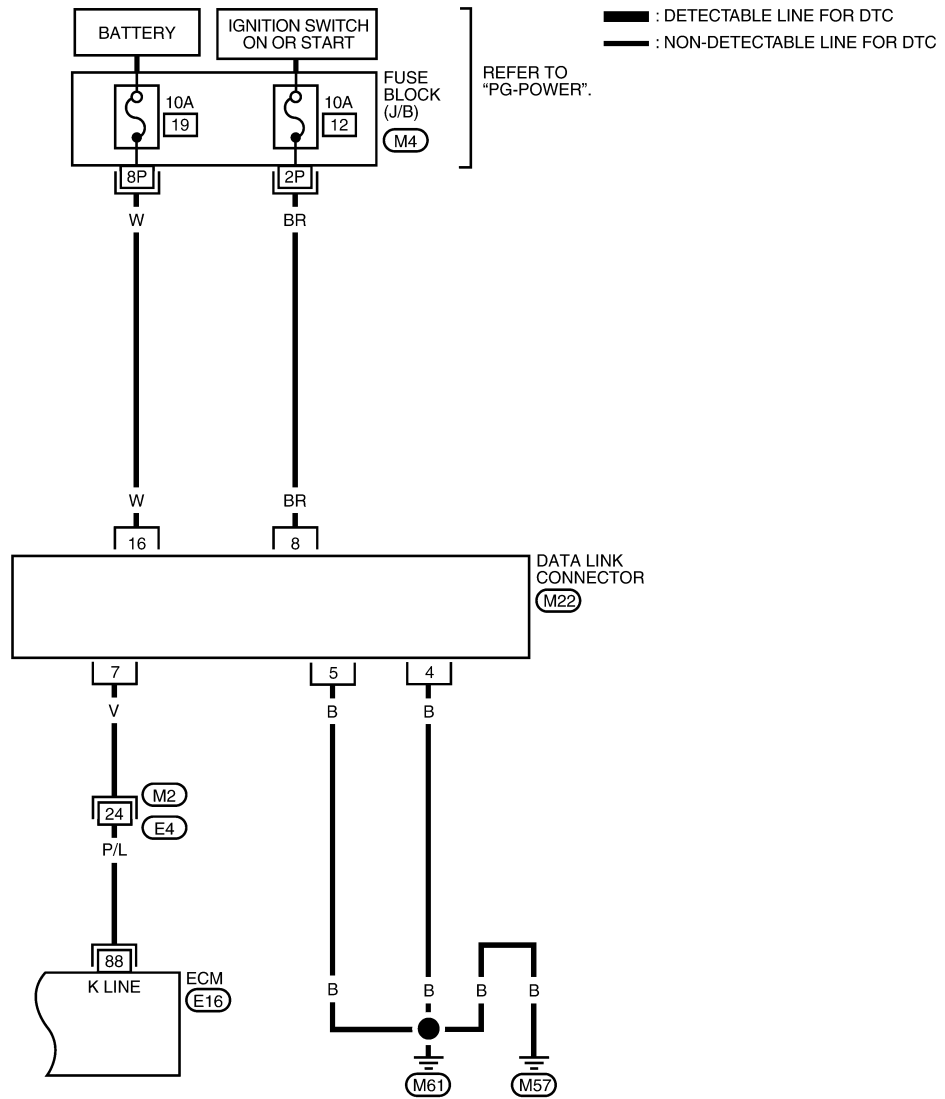
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BBWA2913E

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Pressure

INFOID:000000006580887

Fuel pressure at idle	Approximately 350 kPa (3.57 kg/cm ² , 51 psi)
-----------------------	--

Idle Speed and Ignition Timing

INFOID:000000006580888

Target idle speed	CVT	No load* ¹ (In P or N position)	700 ± 50 rpm
	M/T	No load* ¹ (in Neutral position)	675 ± 50 rpm
Air conditioner: ON	CVT	In P or N position	800 rpm or more
	M/T	In Neutral position	
Ignition timing	CVT	In P or N position	6 ± 5° BTDC
	M/T	In Neutral position	

*1: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Calculated Load Value

INFOID:000000006580889

	Calculated load value (Using CONSULT-III or GST)
At idle	10 - 35 %
At 2,500 rpm	10 - 35 %

Mass Air Flow Sensor

INFOID:000000006580890

Supply voltage	Battery voltage (11 - 14 V)
Output voltage at idle	0.9 - 1.2* V
Mass air flow (Using CONSULT-III or GST)	1.0 - 4.0 g/sec at idle* 2.0 - 10.0 g/sec at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no load.

Intake Air Temperature Sensor

INFOID:000000006580891

Temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200

Engine Coolant Temperature Sensor

INFOID:000000006580892

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

Air Fuel Ratio (A/F) Sensor 1 Heater

INFOID:000000006580893

Resistance [at 25°C (77°F)]	1.8 - 2.44 Ω
-----------------------------	--------------

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[MR20DE (EXCEPT FOR CALIFORNIA)]

Heated Oxygen sensor 2 Heater

INFOID:000000006580894

A

Resistance [at 25°C (77°F)]	3.4 - 4.4 Ω
-----------------------------	-------------

Crankshaft Position Sensor (POS)

INFOID:000000006580895

EC

Refer to [EC-866, "Component Inspection"](#).

Camshaft Position Sensor (PHASE)

INFOID:000000006580896

C

Refer to [EC-872, "Component Inspection"](#).

Throttle Control Motor

INFOID:000000006580897

D

Resistance [at 25°C (77°F)]	Approximately 1 - 15 Ω
-----------------------------	------------------------

E

Fuel Injector

INFOID:000000006580898

F

Resistance [at 10 - 60°C (50 - 140°F)]	11.1 - 14.5 Ω
--	---------------

Fuel Pump

INFOID:000000006580899

G

Resistance [at 25°C (77°F)]	Approximately 0.2 - 5.0 Ω
-----------------------------	---------------------------

H

I

J

K

L

M

N

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P

INDEX FOR DTC

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[QR25DE]

SERVICE INFORMATION

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U0101-U1001

INFOID:000000006150341

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
U0101	0101*4	LOST COMM (TCM)	EC-1243
U0140	0140*4	LOST COMM (BCM)	EC-1245
U1001	1001*4	CAN COMM CIRCUIT	EC-1247

*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: The troubleshooting for this DTC needs CONSULT-III.

P0011-P0075

INFOID:000000006150342

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0011	0011	INT/V TIM CONT-B1	EC-1249
P0031	0031	A/F SEN1 HTR (B1)	EC-1253
P0032	0032	A/F SEN1 HTR (B1)	EC-1253
P0037	0037	HO2S2 HTR (B1)	EC-1260
P0038	0038	HO2S2 HTR (B1)	EC-1260
P0051	0051	A/F SEN1 HTR (B2)	EC-1253
P0052	0052	A/F SEN1 HTR (B2)	EC-1253
P0057	0057	HO2S2 HTR (B2)	EC-1260
P0058	0058	HO2S2 HTR (B2)	EC-1260
P0075	0075	INT/V TIM V/CIR-B1	EC-1268

*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.

P0101-P0128

INFOID:000000006150343

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0101	0101	MAF SEN/CIRCUIT-B1	EC-1273
P0102	0102	MAF SEN/CIRCUIT-B1	EC-1280
P0103	0103	MAF SEN/CIRCUIT-B1	EC-1280
P0112	0112	IAT SEN/CIRCUIT-B1	EC-1287
P0113	0113	IAT SEN/CIRCUIT-B1	EC-1287
P0116	0116	ECT SEN/CIRC	EC-1291
P0117	0117	ECT SEN/CIRC	EC-1294

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DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0118	0118	ECT SEN/CIRC	EC-1294
P0122	0122	TP SEN 2/CIRC-B1	EC-1299
P0123	0123	TP SEN 2/CIRC-B1	EC-1299
P0125	0125	ECT SENSOR	EC-1304
P0127	0127	IAT SENSOR-B1	EC-1307
P0128	0128	THERMSTAT FNCTN	EC-1310

*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.

P0130-P0159

INFOID:000000006150344

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0130	0130	A/F SENSOR1 (B1)	EC-1312
P0131	0131	A/F SENSOR1 (B1)	EC-1320
P0132	0132	A/F SENSOR1 (B1)	EC-1328
P0133	0133	A/F SENSOR1 (B1)	EC-1336
P0137	0137	HO2S2 (B1)	EC-1345
P0138	0138	HO2S2 (B1)	EC-1354
P0139	0139	HO2S2 (B1)	EC-1365
P0150	0150	A/F SENSOR1 (B2)	EC-1312
P0151	0151	A/F SENSOR1 (B2)	EC-1320
P0152	0152	A/F SENSOR1 (B2)	EC-1328
P0153	0153	A/F SENSOR1 (B2)	EC-1336
P0157	0157	HO2S2 (B2)	EC-1345
P0158	0158	HO2S2 (B2)	EC-1354
P0159	0159	HO2S2 (B2)	EC-1365

*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.

P0171-P0223

INFOID:000000006150345

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0171	0171	FUEL SYS-LEAN-B1	EC-1375
P0172	0172	FUEL SYS-RICH-B1	EC-1384
P0174	0174	FUEL SYS-LEAN-B2	EC-1375
P0175	0175	FUEL SYS-RICH-B2	EC-1384
P0181	0181	FTT SENSOR	EC-1392
P0182	0182	FTT SEN/CIRCUIT	EC-1396

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DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0183	0183	FTT SEN/CIRCUIT	EC-1396
P0222	0222	TP SEN 1/CIRC-B1	EC-1400
P0223	0223	TP SEN 1/CIRC-B1	EC-1400

*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.

P0300-P0430

INFOID:000000006150346

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0300	0300	MULTI CYL MISFIRE	EC-1405
P0301	0301	CYL 1 MISFIRE	EC-1405
P0302	0302	CYL 2 MISFIRE	EC-1405
P0303	0303	CYL 3 MISFIRE	EC-1405
P0304	0304	CYL 4 MISFIRE	EC-1405
P0327	0327	KNOCK SEN/CIRC-B1	EC-1411
P0328	0328	KNOCK SEN/CIRC-B1	EC-1411
P0335	0335	CKP SEN/CIRCUIT	EC-1415
P0340	0340	CMP SEN/CIRC-B1	EC-1421
P0420	0420	TW CATALYST SYS-B1	EC-1427
P0430	0430	TW CATALYST SYS-B2	EC-1427

*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.

P0441-P0463

INFOID:000000006150347

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0441	0441	EVAP PURG FLOW/MON	EC-1432
P0442	0442	EVAP SMALL LEAK	EC-1437
P0443	0443	PURG VOLUME CONT/V	EC-1444
P0444	0444	PURG VOLUME CONT/V	EC-1452
P0445	0445	PURG VOLUME CONT/V	EC-1452
P0447	0447	VENT CONTROL VALVE	EC-1458
P0448	0448	VENT CONTROL VALVE	EC-1463
P0451	0451	EVAP SYS PRES SEN	EC-1469
P0452	0452	EVAP SYS PRES SEN	EC-1472
P0453	0453	EVAP SYS PRES SEN	EC-1479
P0455	0455	EVAP GROSS LEAK	EC-1487
P0456	0456	EVAP VERY SML LEAK	EC-1494

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DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0460	0460	FUEL LEV SEN SLOSH	EC-1502
P0461	0461	FUEL LEVEL SENSOR	EC-1504
P0462	0462	FUEL LEV SEN/CIRC	EC-1506
P0463	0463	FUEL LEV SEN/CIRC	EC-1506

*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.

P0500-P0643

INFOID:000000006150348

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0500	0500	VEH SPEED SEN/CIRC	EC-1508
P0506	0506	ISC SYSTEM	EC-1510
P0507	0507	ISC SYSTEM	EC-1512
P0603	0603	ECM BACK UP/CIRCUIT	EC-1514
P0605	0605	ECM	EC-1517
P0607	0607	ECM	EC-1519
P0643	0643	SENSOR POWER/CIRC	EC-1520

*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.

P0705-P0850

INFOID:000000006150349

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P0705	0705	T/M RANGE SENSOR A	CVT-61
P0710	0710	FLUID TEMP SENSOR A	CVT-66
P0715	0715	INPUT SPEED SENSOR A	CVT-71
P0720	0720	OUTPUT SPEED SENSOR	CVT-76
P0740	0740	TORQUE CONVERTER	CVT-84
P0744	0744	TORQUE CONVERTER	CVT-89
P0745	0745	PC SOLENOID A	CVT-91
P0746	0746	PC SOLENOID A	CVT-96
P0776	0776	PC SOLENOID B	CVT-98
P0778	0778	PC SOLENOID B	CVT-100
P0840	0840	FLUID PRESS SEN/SW A	CVT-110
P0850	0850	P-N POS SW/CIRCUIT	EC-1525

*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.

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P1148-P1574

INFOID:000000006150350

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P1148	1148	CLOSED LOOP-B1	EC-1531
P1168	1168	CLOSED LOOP-B2	EC-1531
P1212	1212	TCS/CIRC	EC-1532
P1217	1217	ENG OVER TEMP	EC-1533
P1225	1225	CTP LEARNING-B1	EC-1545
P1226	1226	CTP LEARNING-B1	EC-1546
P1421	1421	COLD START CONTROL	EC-1547
P1564	1564	ASCD SW	EC-1549
P1572	1572	ASCD BRAKE SW	EC-1555
P1574	1574	ASCD VHL SPD SEN	EC-1564

*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.

P1610-P1615

INFOID:000000006150351

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P1610	1610	LOCK MODE	BL-170
P1611	1611	ID DISCORD, IMM-ECM	
P1612	1612	CHAIN OF ECM-IMMU	
P1614	1614	CHAIN OF IMMU-KEY	
P1615	1615	DIFFERENCE OF KEY	

*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.

P1715-P1805

INFOID:000000006150352

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P1715	1715	IN PULY SPEED	EC-1566
P1740	1740	SLCT SOLENOID	CVT-129
P1777	1777	STEP MOTOR	CVT-135
P1778	1778	STEP MOTOR	CVT-139
P1805	1805	BRAKE SW/CIRCUIT	EC-1568

*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.

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[QR25DE]

P2100-P2A03

INFOID:000000006150353

DTC*1		Items (CONSULT-III screen terms)	Reference page
CONSULT-III GST*2	ECM*3		
P2100	2100	ETC MOT PWR-B1	EC-1572
P2101	2101	ETC FUNCTION/CIRC-B1	EC-1576
P2103	2103	ETC MOT PWR	EC-1572
P2118	2118	ETC MOT-B1	EC-1582
P2119	2119	ETC ACTR-B1	EC-1586
P2122	2122	APP SEN 1/CIRC	EC-1588
P2123	2123	APP SEN 1/CIRC	EC-1588
P2127	2127	APP SEN 2/CIRC	EC-1593
P2128	2128	APP SEN 2/CIRC	EC-1593
P2135	2135	TP SENSOR-B1	EC-1600
P2138	2138	APP SENSOR	EC-1605
P2A00	2A00	A/F SENSOR1 (B1)	EC-1612
P2A03	2A03	A/F SENSOR1 (B2)	EC-1612

*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.

PRECAUTIONS

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[QR25DE]

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000006150354

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 and SB section of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized 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 the SRS section.
- Do not 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

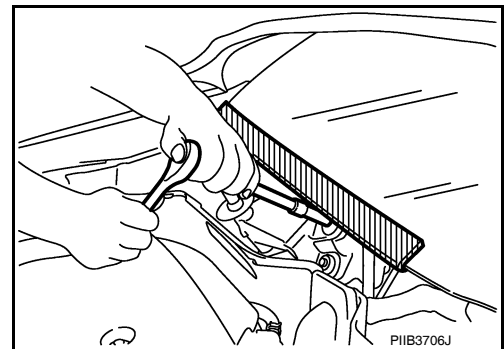
WARNING:

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT 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.

Precaution for Procedure without Cowl Top Cover

INFOID:000000006150355

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



On Board Diagnosis (OBD) System of Engine and CVT

INFOID:000000006150356

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 turn the ignition switch OFF and disconnect the battery ground 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 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-60](#).
- 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.

PRECAUTIONS

[QR25DE]

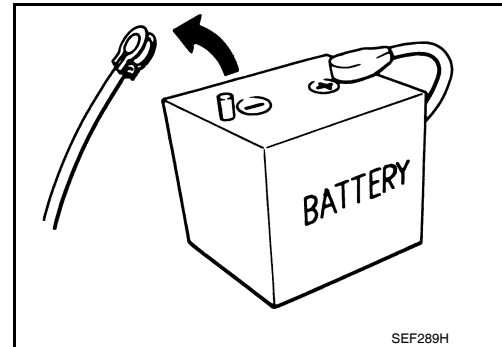
< SERVICE INFORMATION >

- Always 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 erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

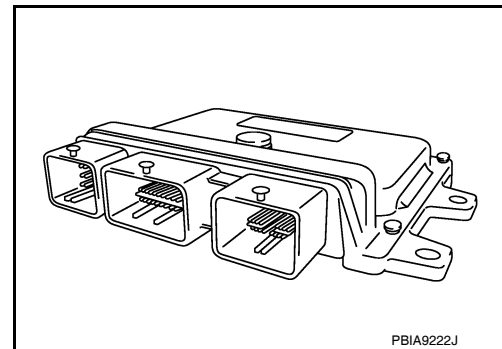
Precaution

INFOID:000000006150357

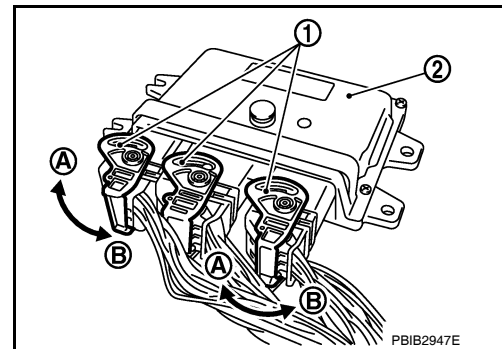
- Always use a 12 volt battery as power source.
- Never attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.
- Before removing parts, turn ignition switch OFF and then disconnect negative battery cable.



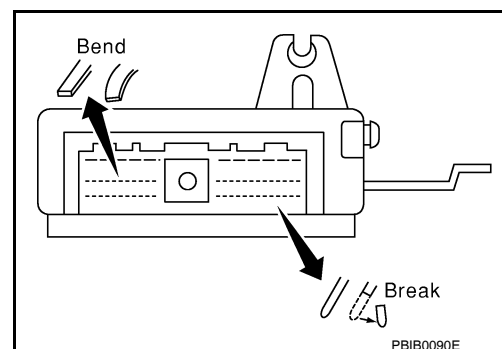
- Never disassemble ECM.
- If battery cable is disconnected, the memory will return to the initial ECM values. The ECM will now start to self-control at its initial values. Engine operation can vary slightly when the cable is disconnected. However, this is not an indication of a malfunction. Never replace 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.

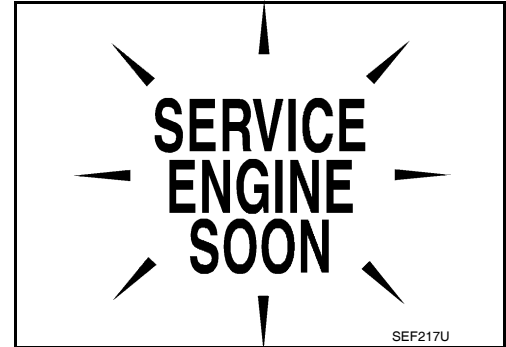
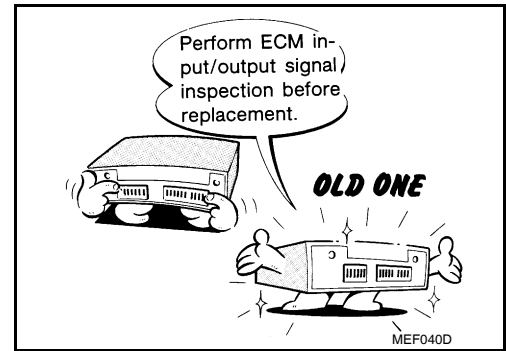


PRECAUTIONS

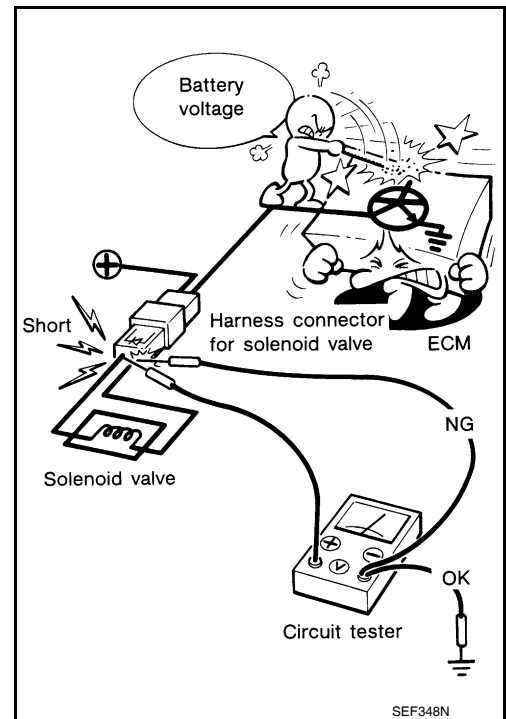
[QR25DE]

< SERVICE INFORMATION >

- Before replacing ECM, perform “ECM Terminals and Reference Value” inspection and check that ECM functions properly. Refer to [EC-1207, "ECM Terminal and Reference Value"](#).
- Handle mass air flow sensor carefully to avoid damage.
- Never disassemble mass air flow sensor.
- Never clean mass air flow sensor with any type of detergent.
- Never disassemble electric throttle control actuator.
- Even a slight leak 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 Overall Function Check. The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Overall Function Check should be a good result if the repair is completed.



- 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.

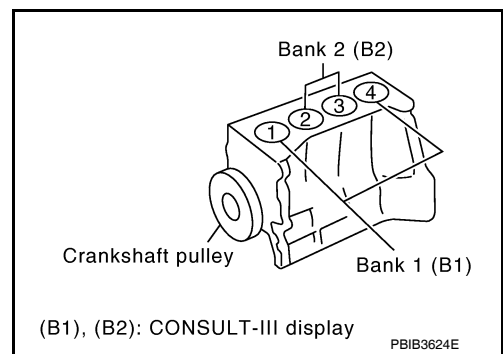


PRECAUTIONS

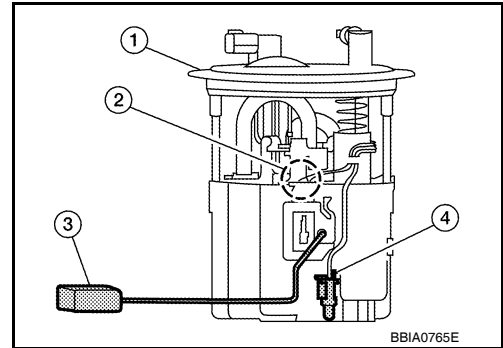
[QR25DE]

< SERVICE INFORMATION >

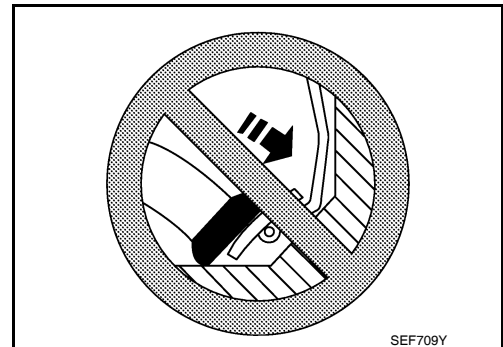
- B1 indicates bank 1 (cylinders number 1 and 4), B2 indicates bank 2 (cylinders number 2 and 3).



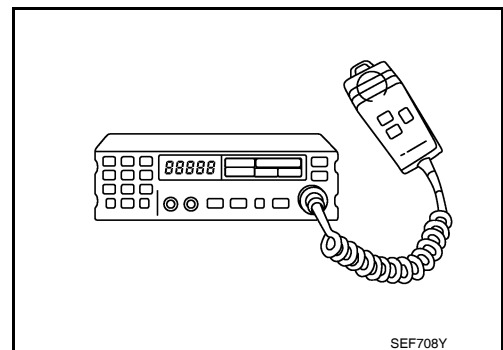
- Never operate fuel pump when there is no fuel in lines.
- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)
- Fuel tank temperature sensor (4)
- Tighten fuel hose clamps to the specified torque.



- Never depress accelerator pedal when starting.
- Immediately after starting, never rev up engine unnecessarily.
- Never rev up engine just prior to shutdown.



- When installing C.B. ham radio or a mobile phone, always observe the following as it may adversely affect electronic control systems depending on installation location.
- 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.
- Always ground the radio to vehicle body.



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P

PREPARATION

< SERVICE INFORMATION >

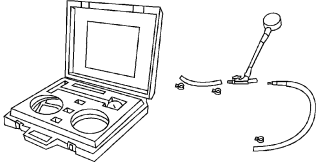
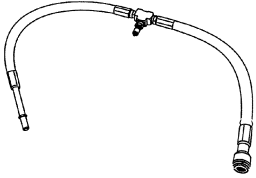

[QR25DE]

PREPARATION

Special Service Tool

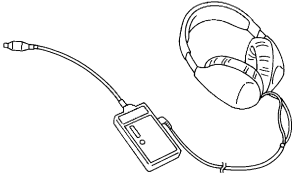
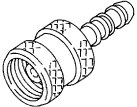
INFOID:000000006150358

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
(J-44321) Fuel pressure gauge Kit <div style="text-align: center;">  <p style="text-align: center;"><small>LEC642</small></p> </div>	Checks fuel pressure
(J-44321-6) Fuel pressure adapter <div style="text-align: center;">  <p style="text-align: center;"><small>LBIA0376E</small></p> </div>	Connects fuel pressure gauge to quick connector type fuel lines.
(J-45488) Quick connector re- lease <div style="text-align: center;">  <p style="text-align: center;"><small>PBIC0198E</small></p> </div>	Removes fuel tube quick connectors in engine room.

Commercial Service Tool

INFOID:000000006150359

Tool number (Kent-Moore No.) Tool name	Description
Leak detector i.e.: (J-41416) <div style="text-align: center;">  <p style="text-align: center;"><small>S-NT703</small></p> </div>	Locats the EVAP leak
EVAP service port adapter i.e.: (J-41413-OBD) <div style="text-align: center;">  <p style="text-align: center;"><small>S-NT704</small></p> </div>	Applies positive pressure through EVAP service port

PREPARATION

< SERVICE INFORMATION >

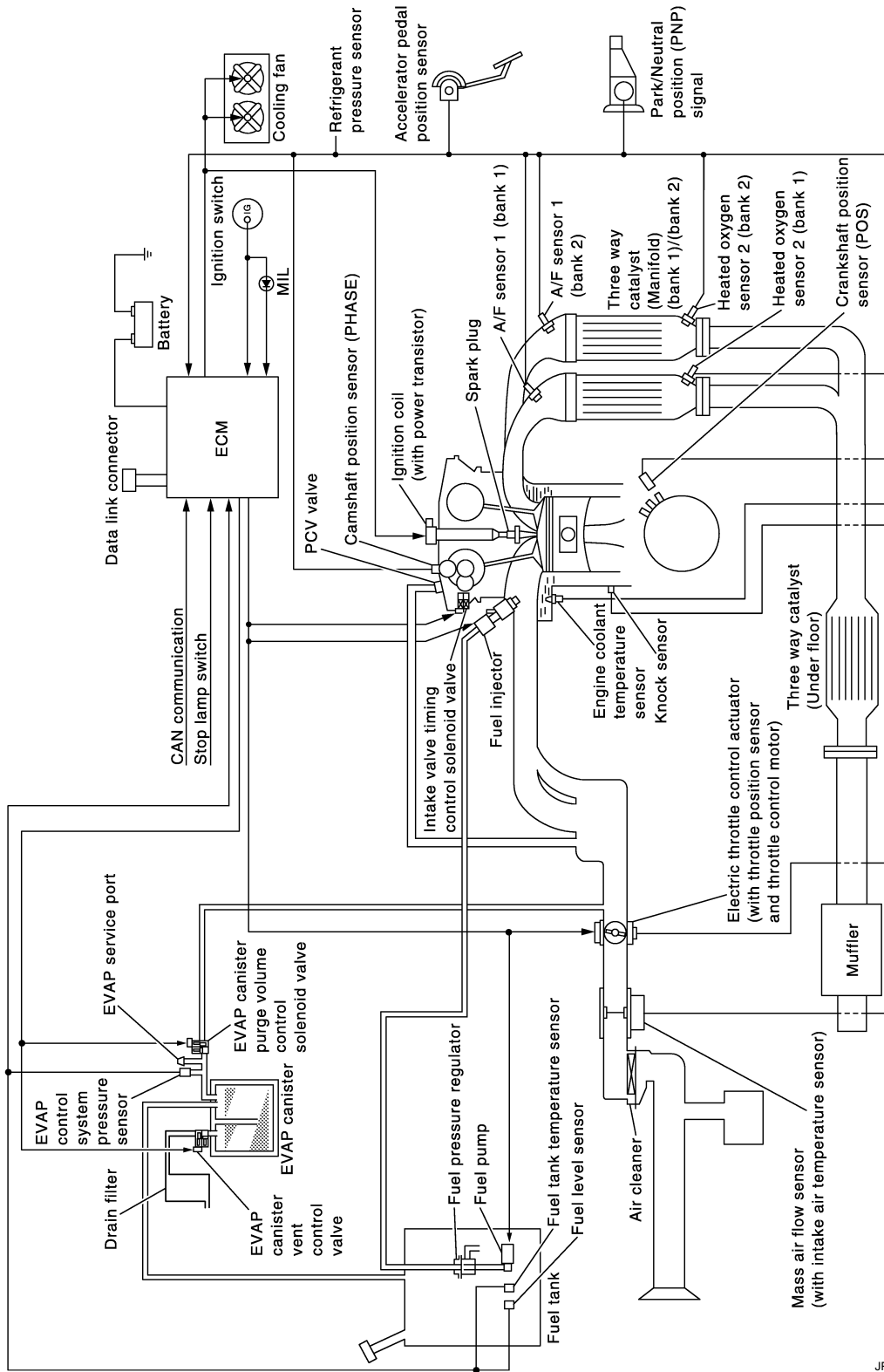
[QR25DE]

Tool number (Kent-Moore No.) Tool name	Description	
Fuel filler cap adapter i.e.: (MLR-8382) <div style="text-align: center;"> </div> <div style="text-align: center;"> S-NT815 </div>	Checks fuel tank vacuum relief valve opening pressure	EC
Socket wrench <div style="text-align: center;"> </div> <div style="text-align: center;"> S-NT705 </div>	Removes and installs engine coolant temperature sensor	
Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12) <div style="text-align: center;"> </div> <div style="text-align: center;"> AEM488 </div>	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 Zirconia Oxygen Sensor b: 12 mm diameter with pitch 1.25 mm for Titanium Oxygen Sensor	
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907) <div style="text-align: center;"> </div> <div style="text-align: center;"> S-NT779 </div>	Lubricates oxygen sensor thread cleaning tool when reconditioning exhaust system threads.	

ENGINE CONTROL SYSTEM

Schematic

INFOID:000000006150360



JPBIA3070GB

Multiport Fuel Injection (MFI) System

INFOID:000000006150361

INPUT/OUTPUT SIGNAL CHART

ENGINE CONTROL SYSTEM

< SERVICE INFORMATION >

[QR25DE]

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*3 Piston position	Fuel injection & mixture ratio control	Fuel injector
Camshaft position sensor (PHASE)			
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		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) signal	Gear position		
Battery	Battery voltage*3		
Knock sensor	Engine knocking condition		
EPS control unit	Power steering operation*2		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
Air conditioner switch	Air conditioner operation*2		
Combination meter	Vehicle speed*2		

*1: This sensor is not used to control the engine system under normal conditions.

*2: This signal is sent to the ECM through 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.

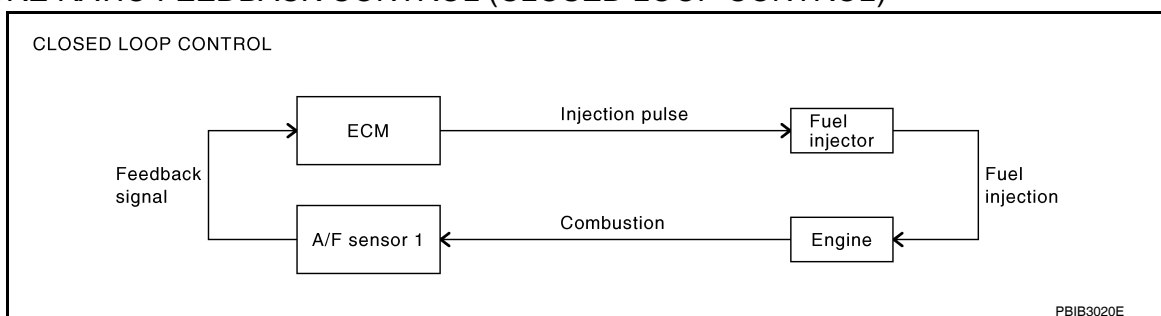
<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from N to D (CVT models)
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



The mixture ratio feedback system provides the best air/fuel mixture ratio for drivability and emission control. The three way catalyst (manifold) can better reduce CO, HC and NOx emissions. This system uses air fuel

< SERVICE INFORMATION >

ratio (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 air fuel ratio (A/F) sensor 1, refer to [EC-1320](#). 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 air fuel ratio (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 control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of air fuel ratio (A/F) sensor 1 or its circuit
- Insufficient activation of air fuel ratio (A/F) sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from N to D (CVT models)
- When starting the engine

MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from air fuel ratio (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.

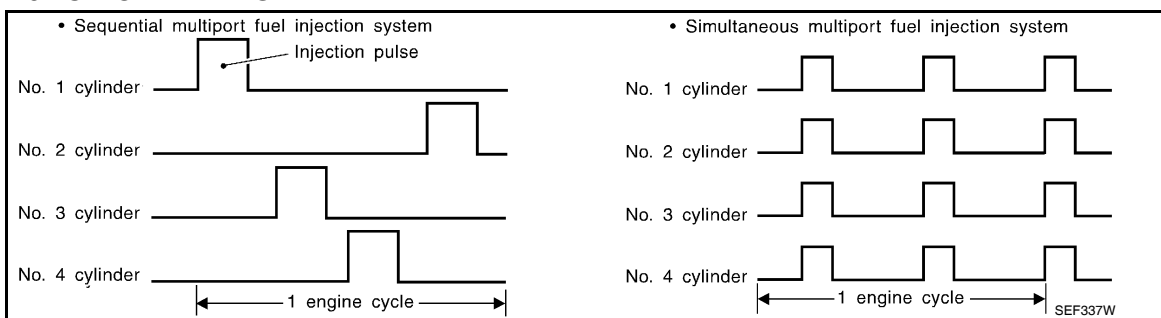
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.

“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 air fuel ratio (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 long-term to compensate for continual deviation of the short-term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

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 firing order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

The four fuel injectors will then receive the signals two times for each engine cycle.

This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

ENGINE CONTROL SYSTEM

< SERVICE INFORMATION >

[QR25DE]

FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds (CVT), operation of the engine at excessively high speeds or operation of the vehicle at excessively high speeds (M/T).

Electronic Ignition (EI) System

INFOID:000000006150362

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2 Piston position	Ignition timing control	Power transistor
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Battery	Battery voltage*2		
Knock sensor	Engine knocking		
Park/neutral position (PNP) signal	Gear position		
Combination meter	Vehicle speed*1		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

Ignition order: 1 - 3 - 4 - 2

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

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.

Fuel Cut Control (at No Load and High Engine Speed)

INFOID:000000006150363

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Park/neutral position (PNP) signal	Neutral position	Fuel cut control	Fuel injector
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Combination meter	Vehicle speed*		

*: This signal is sent to the ECM through CAN communication line.

SYSTEM DESCRIPTION

ENGINE CONTROL SYSTEM

< SERVICE INFORMATION >

[QR25DE]

If the engine speed is above 1,800 rpm under no load [for example, the selector lever position is P or N (CVT), Neutral (M/T) and engine speed is over 1,800 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 1,500 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under [EC-1118. "Multiport Fuel Injection \(MFI\) System"](#).

AIR CONDITIONING CUT CONTROL

< SERVICE INFORMATION >

[QR25DE]

AIR CONDITIONING CUT CONTROL

Input/Output Signal Chart

INFOID:000000006150364

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner ON signal*1	Air conditioner cut control	Air conditioner relay
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*2		
Refrigerant pressure sensor	Refrigerant pressure		
EPS control unit	Power steering operation*1		
Combination meter	Vehicle speed*1		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

System Description

INFOID:000000006150365

This system improves engine operation when the air conditioner is used. Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< SERVICE INFORMATION >

[QR25DE]

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

System Description

INFOID:000000006150366

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch			
ASCD clutch switch (M/T models)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/neutral position (PNP) signal	Gear position		
Combination meter	Vehicle speed*		
TCM (CVT models)	Powertrain revolution*		

*: This signal is sent to the ECM through 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 indicator and SET indicator in combination meter. If any malfunction occurs in the ASCD system, it automatically deactivates control.

NOTE:

Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.

SET OPERATION

Press MAIN switch. (The CRUISE indicator in 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. (Then SET indicator in combination meter illuminates.)

ACCELERATE OPERATION

If the RESUME/ACCELERATE switch is depressed 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
- More than two switches an ASCD steering switch are pressed at the same time (Set speed will be cleared)
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to the neutral position (M/T models)
- Selector lever position is changed to N, P or R (CVT models)
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.

- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.

When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ACCELERATE switch.

- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

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 depressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will maintain the new set speed.

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

< SERVICE INFORMATION >

[QR25DE]

RESUME OPERATION

When the RESUME/ACCELERATE switch is depressed after canceling operation other than depressing the MAIN switch, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

- Brake pedal is released.
- Clutch pedal is released (M/T models)
- Selector lever position is in other than P and N (CVT models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

Component Description

INFOID:000000006150367

ASCD STEERING SWITCH

Refer to [EC-1549](#).

ASCD BRAKE SWITCH

Refer to [EC-1555](#) and [EC-1621](#).

ASCD CLUTCH SWITCH

Refer to [EC-1555](#) and [EC-1621](#).

STOP LAMP SWITCH

Refer to [EC-1555](#), [EC-1568](#) and [EC-1621](#).

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EC-1572](#), [EC-1576](#), [EC-1582](#) and [EC-1586](#).

ASCD INDICATOR

Refer to [EC-1629](#).

A
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CAN COMMUNICATION

System Description

INFOID:000000006150368

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.

EVAPORATIVE EMISSION SYSTEM

< SERVICE INFORMATION >

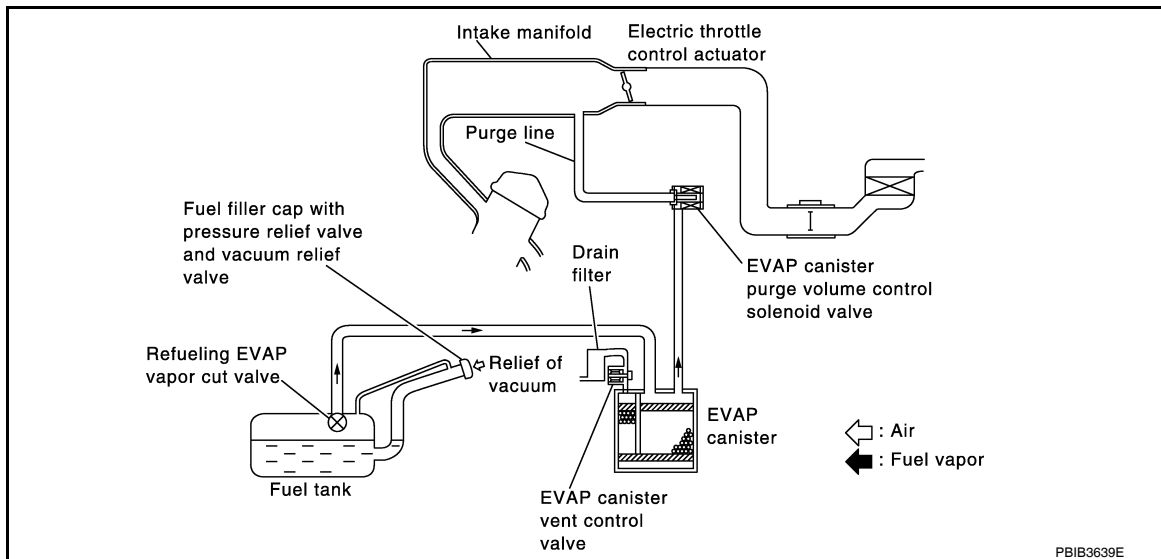
[QR25DE]

EVAPORATIVE EMISSION SYSTEM

Description

INFOID:000000006150369

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.

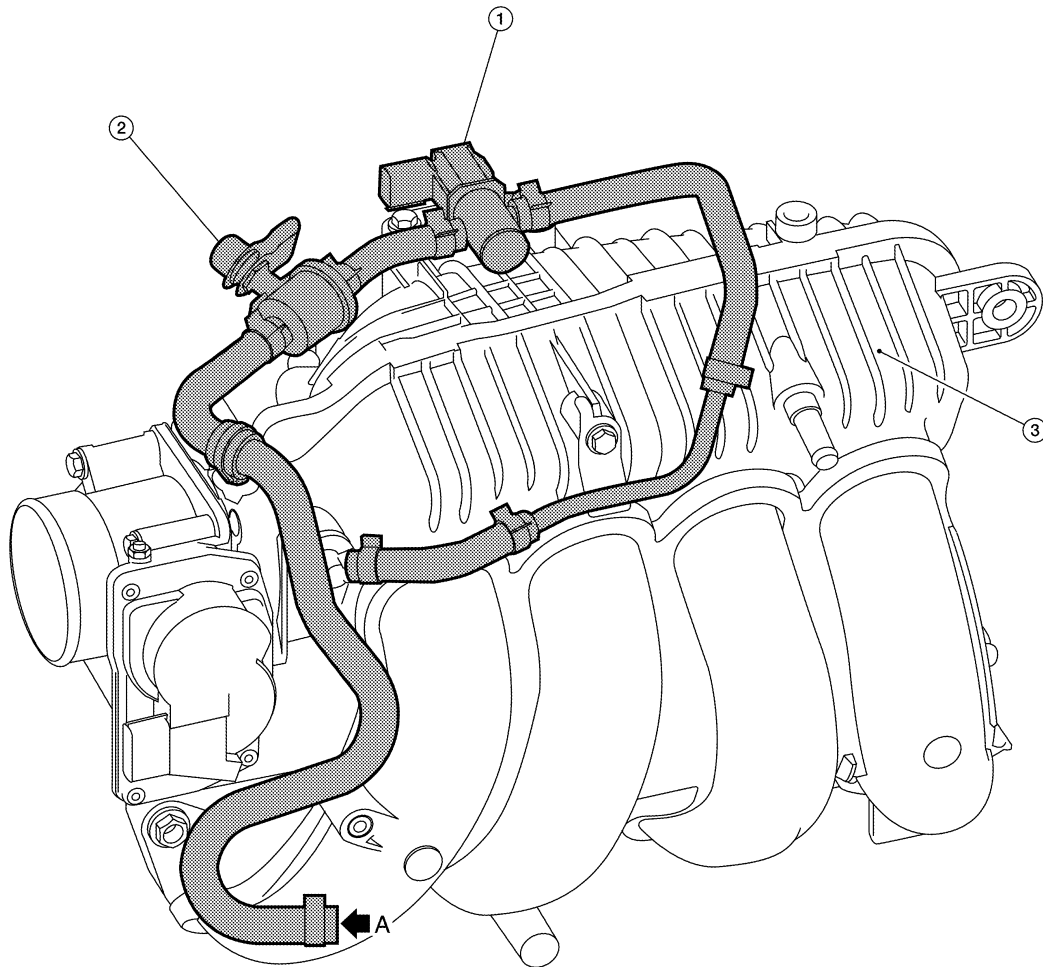
EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating and idling.

EVAPORATIVE EMISSION LINE DRAWING

EVAPORATIVE EMISSION SYSTEM

< SERVICE INFORMATION >

[QR25DE]



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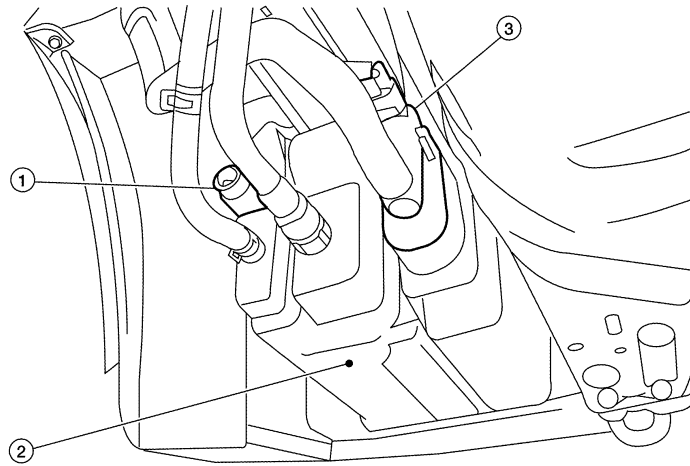
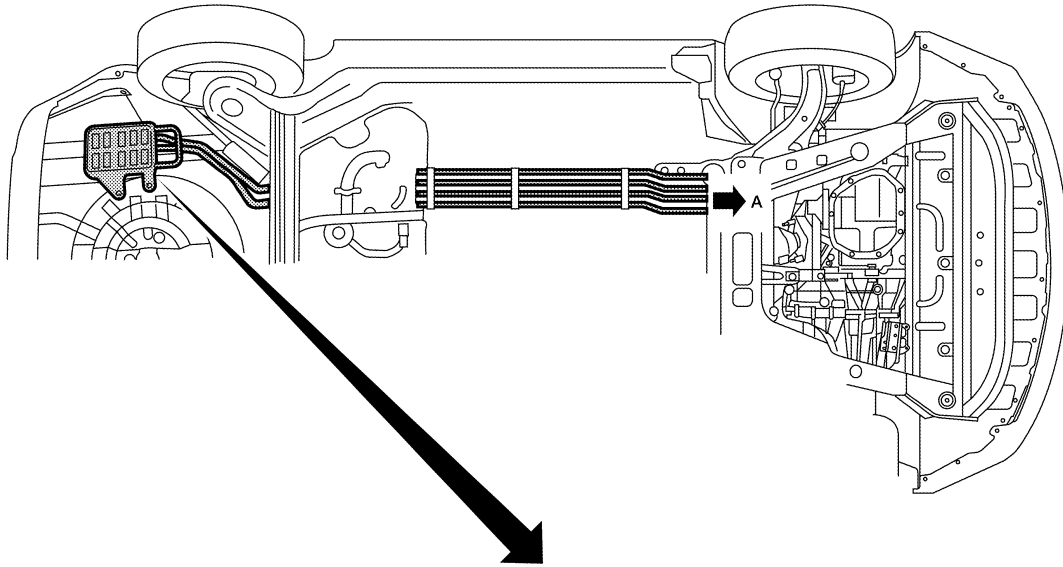
- 1. EVAP canister purge volume control solenoid valve
- 2. EVAP service port
- 3. Intake manifold collector

NOTE: Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

EVAPORATIVE EMISSION SYSTEM

< SERVICE INFORMATION >

[QR25DE]



BBIA0746E

← To previous page

1. EVAP control system pressure sensor 2. EVAP canister 3. EVAP canister vent control valve

NOTE: Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

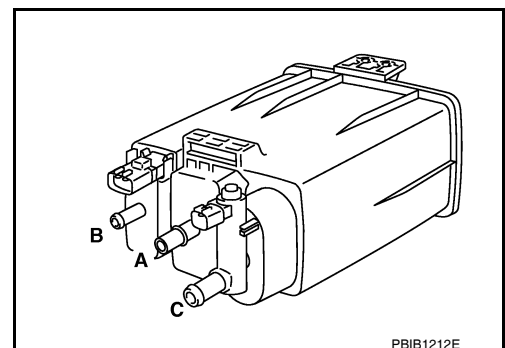
Component Inspection

INFOID:000000006150370

EVAP CANISTER

Check EVAP canister as follows:

1. Block port **(B)**.
2. Blow air into port **(A)** and confirm that it flows freely out of port **(C)**.
3. Release blocked port **(B)**.
4. Apply vacuum pressure to port **(B)** and confirm that vacuum pressure exists at the ports **(A)** and **(C)**.
5. Block port **(A)** and **(B)**.
6. Apply pressure to port **(C)** and check that there is no leakage.



PBIB1212E

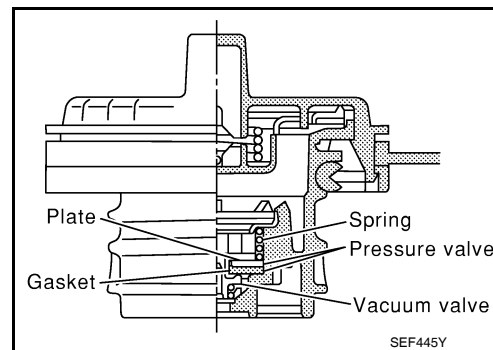
FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FILLER CAP)

EVAPORATIVE EMISSION SYSTEM

[QR25DE]

< SERVICE INFORMATION >

1. Wipe clean valve housing.



2. Check valve opening pressure and vacuum.

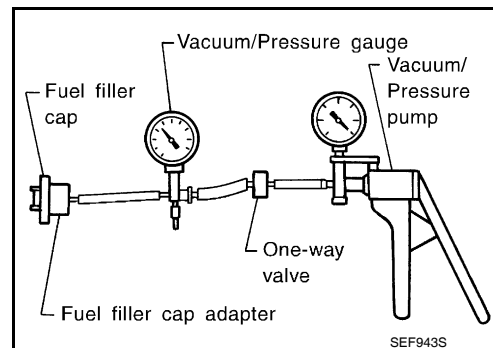
Pressure: 15.3 - 20.0 kPa
(0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum: -6.0 to -3.4 kPa
(-0.061 to -0.035 kg/cm², -0.87 to -0.48 psi)

3. If out of specification, replace fuel filler cap as an assembly.
Refer to [FL-10, "Component"](#).

CAUTION:

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.



EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1457, "Component Inspection"](#).

FUEL TANK TEMPERATURE SENSOR

Refer to [EC-1399, "Component Inspection"](#).

EVAP CANISTER VENT CONTROL VALVE

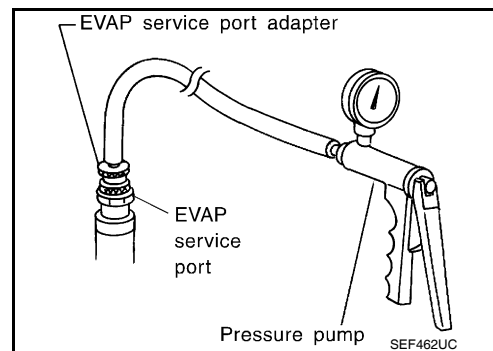
Refer to [EC-1462, "Component Inspection"](#).

EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1478, "Component Inspection"](#).

EVAP SERVICE PORT

Positive pressure is delivered to the EVAP system through the EVAP service port. If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.



How to Detect Fuel Vapor Leakage

INFOID:000000006150372

CAUTION:

- Never use compressed air or a high pressure pump.
- Never exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in EVAP system.

NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

Ⓜ WITH CONSULT-III

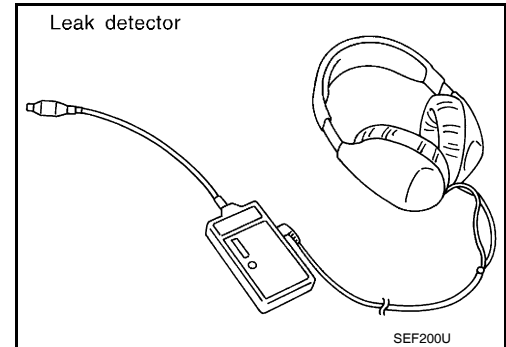
1. Attach the EVAP service port adapter securely to the EVAP service port.

EVAPORATIVE EMISSION SYSTEM

[QR25DE]

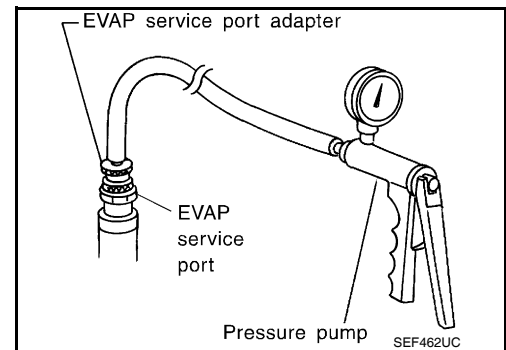
< SERVICE INFORMATION >

2. Also attach the pressure pump and hose to the EVAP service port adapter.
3. Turn ignition switch ON.
4. Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-III.
5. Touch "START". A bar graph (Pressure indicating display) will appear on the screen.
6. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
7. Remove EVAP service port adapter and hose with pressure pump.
8. Locate the leak using a leak detector. Refer to [EC-1127](#), "[Description](#)".

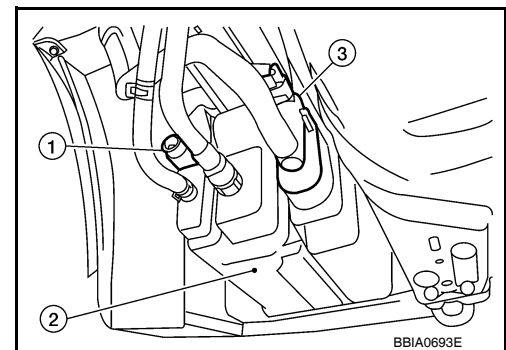


⊗ WITHOUT CONSULT-III

1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump with pressure gauge to the EVAP service port adapter.



3. Apply battery voltage to the terminal of EVAP canister vent control valve (3) to make a closed EVAP system.
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
4. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm², 0.2 to 0.4 psi).
5. Remove EVAP service port adapter and hose with pressure pump.
6. Locate the leak using a leak detector. Refer to [EC-1127](#), "[Description](#)".



ON BOARD REFUELING VAPOR RECOVERY (ORVR)

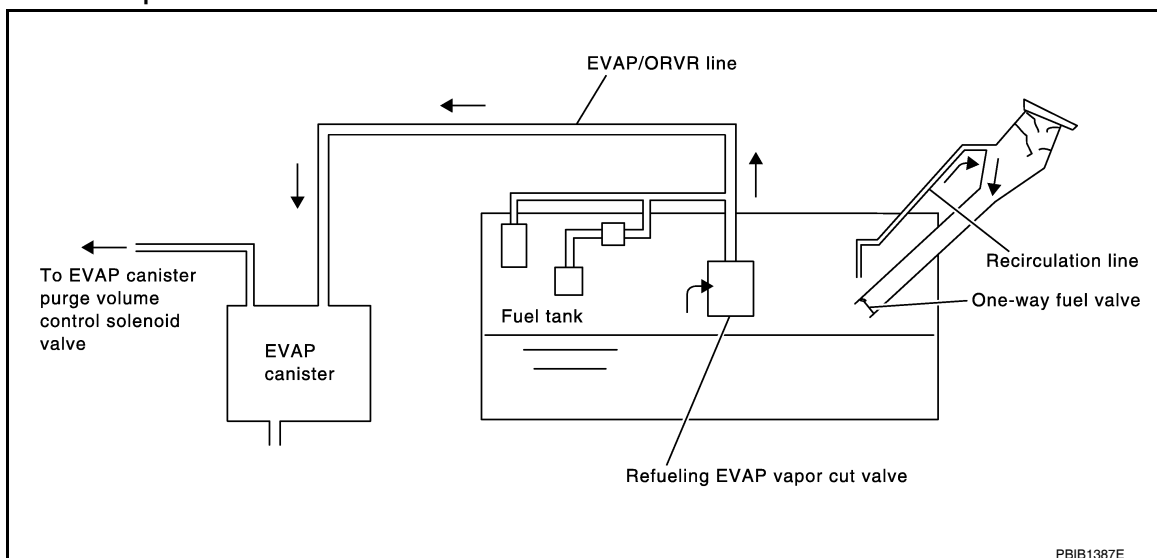
< SERVICE INFORMATION >

[QR25DE]

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

System Description

INFOID:000000006150373



PBIB1387E

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.

WARNING:

When conducting inspections below, be sure to observe the following:

- Put a “CAUTION: FLAMMABLE” sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO₂ 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-1185, "Fuel Pressure Check"](#).
 - Disconnect negative battery 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 leaks 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.

Diagnosis Procedure

INFOID:000000006150374

SYMPTOM: FUEL ODOR FROM EVAP CANISTER IS STRONG.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to [FL-14, "Removal and Installation"](#).
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 2.
- NG >> GO TO 3.

2. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

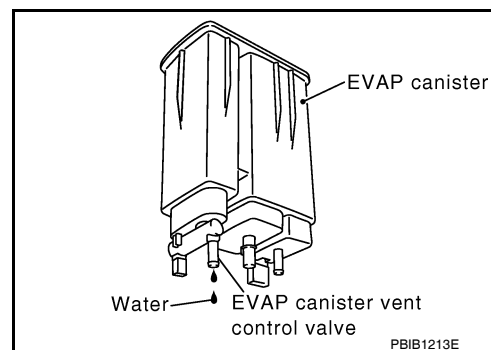
[QR25DE]

< SERVICE INFORMATION >

Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 3.
- No >> GO TO 6.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to [FL-14, "Removal and Installation"](#).

>> GO TO 4.

4. CHECK DRAIN FILTER

Refer to [EC-1135, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace drain filter.

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 [FL-10, "Removal and Installation"](#).

6. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1135, "Component Inspection"](#).

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-10, "Removal and Installation"](#).

SYMPTOM: CANNOT REFUEL/FUEL ODOR FROM THE FUEL FILLER OPENING IS STRONG WHILE REFUELING.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to [FL-14, "Removal and Installation"](#).
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 2.
- NG >> GO TO 3.

2. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

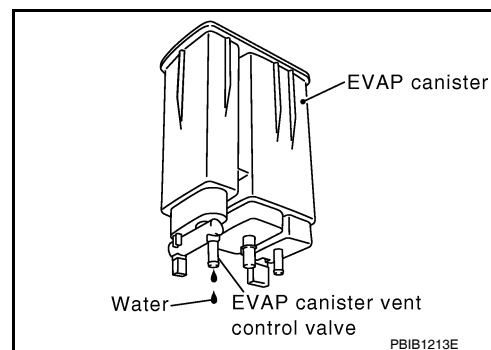
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< SERVICE INFORMATION >

Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 3.
- No >> GO TO 6.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one. Refer to [FL-14, "Removal and Installation"](#).

>> GO TO 4.

4. CHECK DRAIN FILTER

Refer to [EC-1135, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace drain filter.

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 [FL-10, "Removal and Installation"](#).

6. CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling EVAP vapor cut valve for clogging, kinks, looseness and improper connection.

OK or NG

- OK >> GO TO 7.
- NG >> Repair or replace hoses and tubes.

7. CHECK FILLER NECK TUBE

Check recirculation line for clogging, dents and cracks.

OK or NG

- OK >> GO TO 8.
- NG >> Replace filler neck tube. Refer to [FL-10, "Removal and Installation"](#).

8. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1135, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-10, "Removal and Installation"](#).

9. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

OK or NG

- OK >> GO TO 10.
- NG >> Replace fuel filler tube. Refer to [FL-10, "Removal and Installation"](#).

10. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

OK or NG

- OK >> GO TO 11.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QR25DE]

< SERVICE INFORMATION >

NG >> Repair or replace one-way fuel valve with fuel tank. Refer to [FL-10, "Removal and Installation"](#).

11. CHECK ONE-WAY FUEL VALVE-II

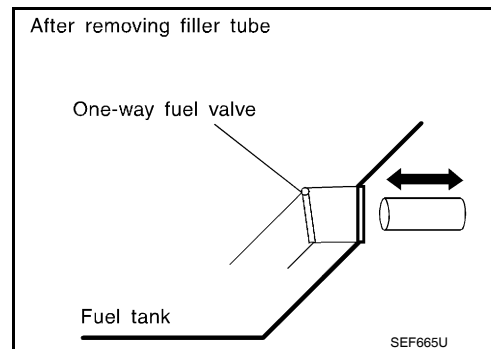
1. Check that fuel is drained from the tank.
2. Remove fuel filler tube and hose. Refer to [FL-10, "Removal and Installation"](#).
3. Check one-way fuel valve for operation as follows.
When a stick is inserted, the valve should open, when removing stick it should close.

Do not drop any material into the tank.

OK or NG

OK >> **INSPECTION END**

NG >> Replace fuel filler tube or replace one-way fuel valve with fuel tank. Refer to [FL-10, "Removal and Installation"](#).



INFOID:000000006150375

Component Inspection

REFUELING EVAP VAPOR CUT VALVE

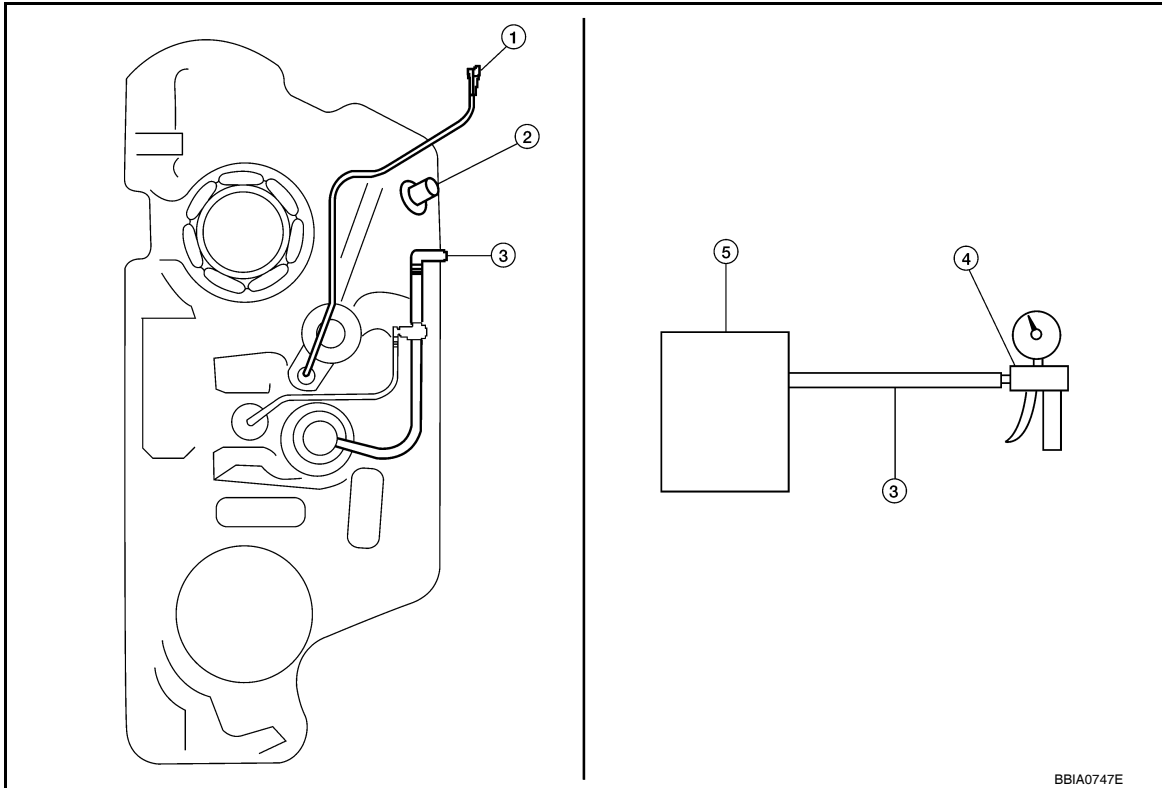
Ⓟ With CONSULT-III

1. Remove fuel tank. Refer to [FL-10](#).
2. Drain fuel from the tank as follows:
 - a. Remove fuel feed hose located on the fuel gauge retainer.
 - b. Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
 - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-III.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose end.
 - b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
 - c. Turn fuel tank upside down.
 - d. Apply vacuum pressure to hose end -13.3 kPa (-0.136 kg/cm^2 , -1.93 psi) with fuel gauge retainer remaining open and check that the pressure is applicable.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

< SERVICE INFORMATION >

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- | | | |
|-------------------------------|----------------|-------------------|
| 1. Recirculation line | 2. Filler tube | 3. EVAP/ORVR line |
| 4. Vacuum/pressure handy pump | 5. Fuel tank | |

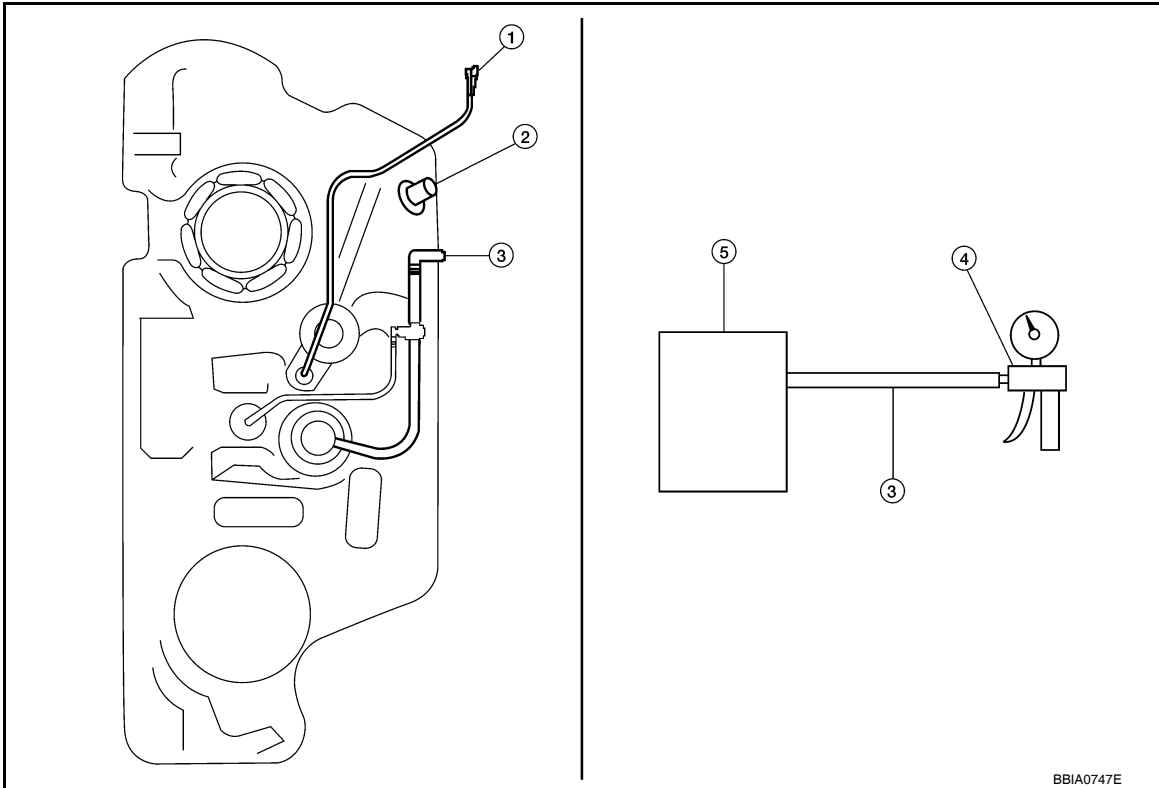
⊗ Without CONSULT-III

1. Remove fuel tank. Refer to [FL-10](#).
2. Drain fuel from the tank as follows:
 - a. Remove fuel gauge retainer.
 - b. Drain fuel from the tank using a handy pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose end.
 - b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
 - c. Turn fuel tank upside down.
 - d. Apply vacuum pressure to hose end -13.3 kPa (-0.136 kg/cm^2 , -1.93 psi) with fuel gauge retainer remaining open and check that the pressure is applicable.

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

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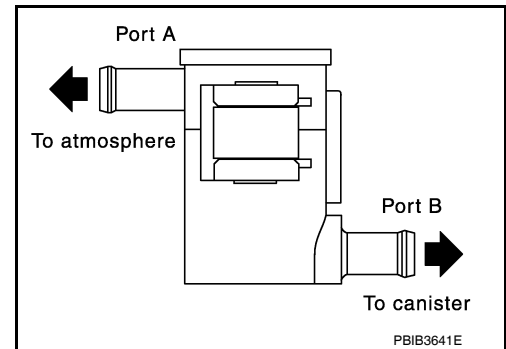
[QR25DE]



- 1. Recirculation line
- 2. Filler tube
- 3. EVAP/ORVR line
- 4. Vacuum/pressure handy pump
- 5. Fuel tank

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter.



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POSITIVE CRANKCASE VENTILATION

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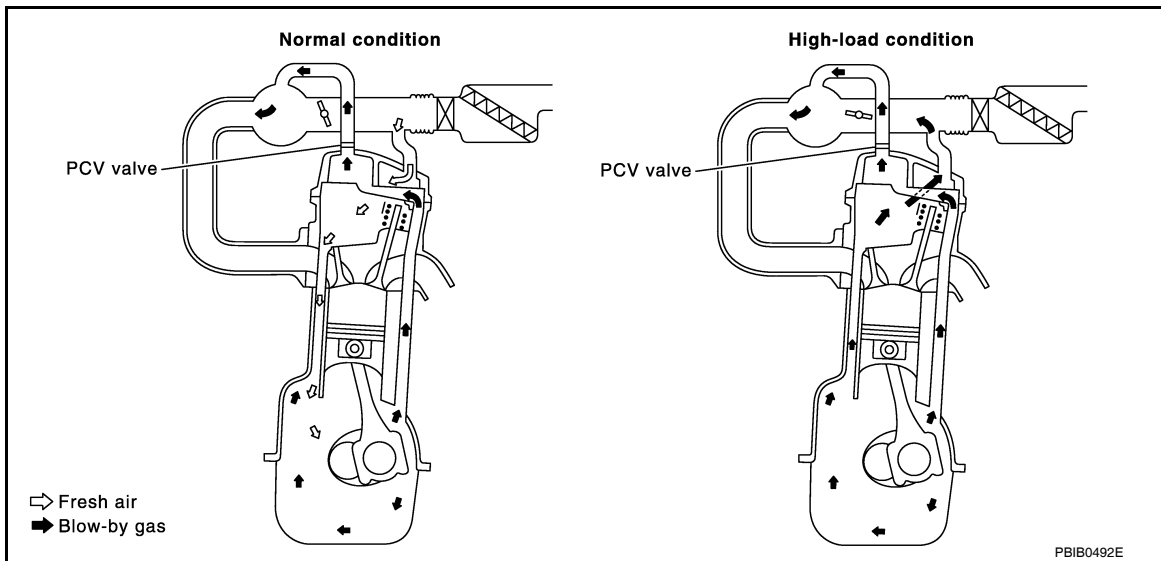
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POSITIVE CRANKCASE VENTILATION

Description

INFOID:000000006150376

SYSTEM DESCRIPTION

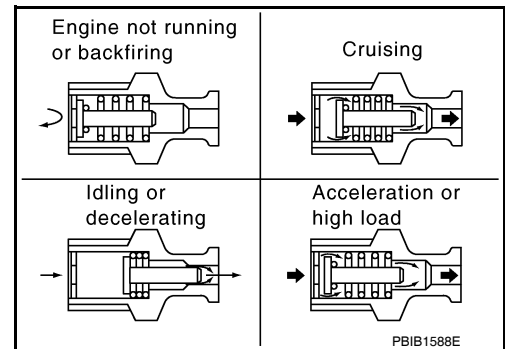


This system returns blow-by gas to the intake manifold.

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 then 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.

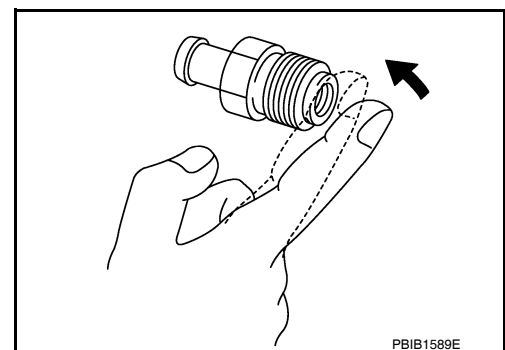


Component Inspection

INFOID:000000006150377

PCV (POSITIVE CRANKCASE VENTILATION) VALVE

With engine running at idle, remove PCV valve from rocker cover. Refer to [EM-151, "Removal and Installation"](#). 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.



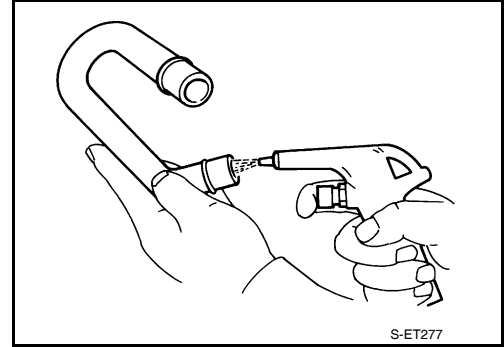
POSITIVE CRANKCASE VENTILATION

< SERVICE INFORMATION >

[QR25DE]

PCV VALVE VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace. Refer to [EM-135](#), "[Removal and Installation](#)".



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NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)

< SERVICE INFORMATION >

[QR25DE]

NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)

Description

INFOID:000000006150378

- If the security indicator illuminates with the ignition switch ON or DTC P1610 - P1615 is displayed in “SELF DIAGNOSTIC RESULT” mode, perform the trouble diagnosis for corresponding to the detected DTC. Refer to [EC-1110, "P1610-P1615"](#).
- Check that no DTC is displayed in “SELF DIAGNOSIS RESULT” mode of “BCM” before erasing the detected DTC in “ENGINE” mode with CONSULT-III.
- When replacing ECM, refer to [EC-1182, "Procedure After Replacing ECM"](#).

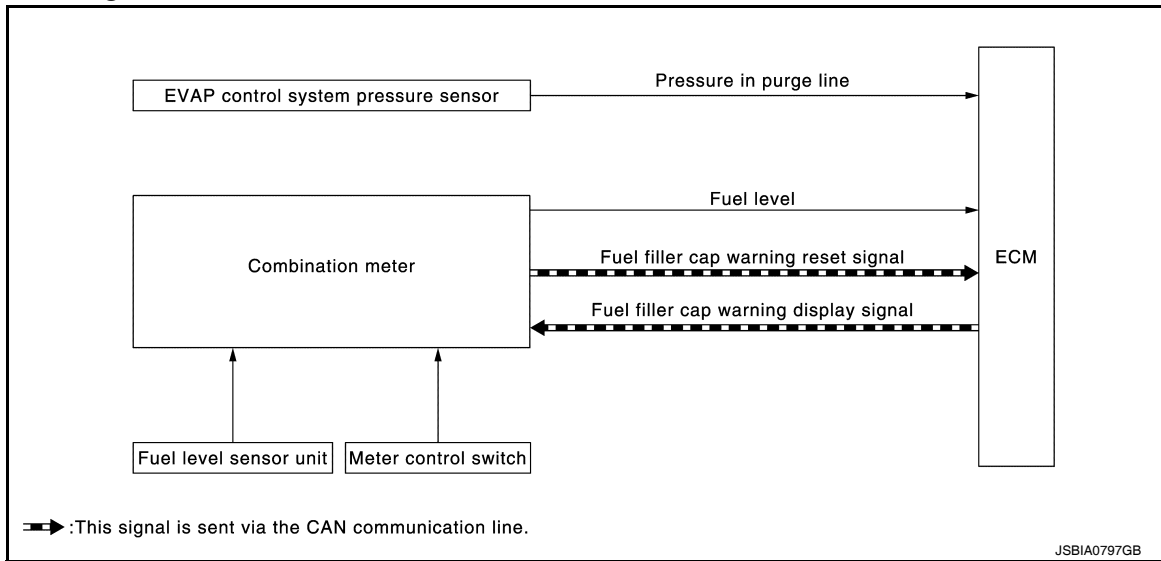
FUEL FILLER CAP WARNING SYSTEM

< SERVICE INFORMATION >

[QR25DE]

FUEL FILLER CAP WARNING SYSTEM

System Diagram



System Description

INFOID:000000006597214

INPUT/OUTPUT SIGNAL CHART

Input

Unit/Sensor	Input signal to ECM	ECM function
EVAP control system pressure sensor	Pressure in purge line	Fuel filler cap warning control
Combination meter	Fuel level	
	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*	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.

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 turns OFF, according to any condition listed below:

- Reset operation is performed by operating the odometer/trip meter 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.
- Fuel refilled.

FUEL FILLER CAP WARNING SYSTEM

< SERVICE INFORMATION >

[QR25DE]

- DTC erased by using CONSULT-III.

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.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SERVICE INFORMATION >

[QR25DE]

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Introduction

INFOID:000000006150379

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	Diagnostic service
Diagnostic Trouble Code (DTC)	Service \$03 of SAE J1979/ISO 15031-5
Freeze Frame data	Service \$02 of SAE J1979/ISO 15031-5
System Readiness Test (SRT) code	Service \$01 of SAE J1979/ISO 15031-5
1st trip Diagnostic Trouble Code (1st Trip DTC)	Service \$07 of SAE J1979/ISO 15031-5
1st trip Freeze Frame data	—
Test values and Test limits	Service \$06 of SAE J1979/ISO 15031-5
Calibration ID	Service \$09 of SAE J1979/ISO 15031-5
Permanent Diagnostic Trouble Code (Permanent DTC)	Service \$0A* of SAE J1979/ISO 15031-5

*: Service \$0A is not applied for regions where it is not mandated.

The above information can be checked using procedures listed in the table below.

x: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	SRT status	Test value	Permanent DTC status
CONSULT-III	x	x	x	x	x	x	—	x
GST	x	x	x	—	x	x	x	x
ECM	x	x*	—	—	—	x	—	—

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator lamp (MIL) on the instrument panel illuminates when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to [EC-1192, "Fail-safe Chart"](#).)

Two Trip Detection Logic

INFOID:000000006150380

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.

x: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Illuminating	Blinking	Illuminating				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	x	—	—	—	—	—	x	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	x	—	—	x	—	—
One trip detection diagnoses (Refer to EC-1144, "Emission-related Diagnostic Information" .)	—	x	—	—	x	—	—	—
Except above	—	—	—	x	—	x	x	—

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by MIL illuminating when there is malfunction on engine control system.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

< SERVICE INFORMATION >

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 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.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut
--	--

Emission-related Diagnostic Information

INFOID:000000006150381

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

×: Applicable —: Not applicable

Items (CONSULT-III screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT-III GST*2	ECM*3					
LOST COMM (TCM)	U0101	0101*5	—	1 (CVT) — (M/T)	× (CVT) — (M/T)	B	EC-1243
LOST COMM (BCM)	U0140	0140*5	—	1	×	B	EC-1245
CAN COMM CIRCUIT	U1001	1001*5	—	2	—	—	EC-1247
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	0000	—	—	Flashing*6	—	EC-1168
INT/V TIM CONT-B1	P0011	0011	×	2	×	B	EC-1249
A/F SEN1 HTR (B1)	P0031	0031	—	2	×	B	EC-1253
A/F SEN1 HTR (B1)	P0032	0032	—	2	×	B	EC-1253
HO2S2 HTR (B1)	P0037	0037	—	2	×	B	EC-1260
HO2S2 HTR (B1)	P0038	0038	—	2	×	B	EC-1260
A/F SEN1 HTR (B2)	P0051	0051	—	2	×	B	EC-1253
A/F SEN1 HTR (B2)	P0052	0052	—	2	×	B	EC-1253
HO2S2 HTR (B2)	P0057	0057	—	2	×	B	EC-1260
HO2S2 HTR (B2)	P0058	0058	—	2	×	B	EC-1260
INT/V TIM V/CIR-B1	P0075	0075	—	2	×	B	EC-1268
MAF SEN/CIRCUIT-B1	P0101	0101	—	2	×	B	EC-1273
MAF SEN/CIRCUIT-B1	P0102	0102	—	1	×	B	EC-1280
MAF SEN/CIRCUIT-B1	P0103	0103	—	1	×	B	EC-1280
IAT SEN/CIRCUIT-B1	P0112	0112	—	2	×	B	EC-1287
IAT SEN/CIRCUIT-B1	P0113	0113	—	2	×	B	EC-1287
ECT SEN/CIRC	P0116	0116	—	2	×	B	EC-1291
ECT SEN/CIRC	P0117	0117	—	1	×	B	EC-1294
ECT SEN/CIRC	P0118	0118	—	1	×	B	EC-1294
TP SEN 2/CIRC-B1	P0122	0122	—	1	×	B	EC-1299
TP SEN 2/CIRC-B1	P0123	0123	—	1	×	B	EC-1299
ECT SENSOR	P0125	0125	—	2	×	B	EC-1304
IAT SENSOR-B1	P0127	0127	—	2	×	B	EC-1307
THERMSTAT FNCTN	P0128	0128	—	2	×	B	EC-1310
A/F SENSOR1 (B1)	P0130	0130	—	2	×	A	EC-1312
A/F SENSOR1 (B1)	P0131	0131	—	2	×	B	EC-1320
A/F SENSOR1 (B1)	P0132	0132	—	2	×	B	EC-1328
A/F SENSOR1 (B1)	P0133	0133	×	2	×	A	EC-1336

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SERVICE INFORMATION >

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Items (CONSULT-III screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT-III GST*2	ECM*3					
HO2S2 (B1)	P0137	0137	×	2	×	A	EC-1345
HO2S2 (B1)	P0138	0138	×	2	×	A	EC-1354
HO2S2 (B1)	P0139	0139	×	2	×	A	EC-1365
A/F SENSOR1 (B2)	P0150	0150	—	2	×	A	EC-1312
A/F SENSOR1 (B2)	P0151	0151	—	2	×	B	EC-1320
A/F SENSOR1 (B2)	P0152	0152	—	2	×	B	EC-1328
A/F SENSOR1 (B2)	P0153	0153	×	2	×	A	EC-1336
HO2S2 (B2)	P0157	0157	×	2	×	A	EC-1345
HO2S2 (B2)	P0158	0158	×	2	×	A	EC-1354
HO2S2 (B2)	P0159	0159	×	2	×	A	EC-1365
FUEL SYS-LEAN-B1	P0171	0171	—	2	×	B	EC-1375
FUEL SYS-RICH-B1	P0172	0172	—	2	×	B	EC-1384
FUEL SYS-LEAN-B2	P0174	0174	—	2	×	B	EC-1375
FUEL SYS-RICH-B2	P0175	0175	—	2	×	B	EC-1384
FTT SENSOR	P0181	0181	—	2	×	B	EC-1392
FTT SEN/CIRCUIT	P0182	0182	—	2	×	B	EC-1396
FTT SEN/CIRCUIT	P0183	0183	—	2	×	B	EC-1396
TP SEN 1/CIRC-B1	P0222	0222	—	1	×	B	EC-1400
TP SEN 1/CIRC-B1	P0223	0223	—	1	×	B	EC-1400
MULTI CYL MISFIRE	P0300	0300	—	1 or 2	×	B	EC-1405
CYL 1 MISFIRE	P0301	0301	—	1 or 2	×	B	EC-1405
CYL 2 MISFIRE	P0302	0302	—	1 or 2	×	B	EC-1405
CYL 3 MISFIRE	P0303	0303	—	1 or 2	×	B	EC-1405
CYL 4 MISFIRE	P0304	0304	—	1 or 2	×	B	EC-1405
KNOCK SEN/CIRC-B1	P0327	0327	—	2	—	—	EC-1411
KNOCK SEN/CIRC-B1	P0328	0328	—	2	—	—	EC-1411
CKP SEN/CIRCUIT	P0335	0335	—	2	×	B	EC-1415
CMP SEN/CIRC-B1	P0340	0340	—	2	×	B	EC-1421
TW CATALYST SYS-B1	P0420	0420	×	2	×	A	EC-1427
TW CATALYST SYS-B2	P0430	0430	×	2	×	A	EC-1427
EVAP PURG FLOW/MON	P0441	0441	×	2	×	A	EC-1432
EVAP SMALL LEAK	P0442	0442	×	2	×	A	EC-1437
PURG VOLUME CONT/V	P0443	0443	—	2	×	A	EC-1444
PURG VOLUME CONT/V	P0444	0444	—	2	×	B	EC-1452
PURG VOLUME CONT/V	P0445	0445	—	2	×	B	EC-1452
VENT CONTROL VALVE	P0447	0447	—	2	×	B	EC-1458
VENT CONTROL VALVE	P0448	0448	—	2	×	B	EC-1463
EVAP SYS PRES SEN	P0451	0451	—	2	×	A	EC-1469
EVAP SYS PRES SEN	P0452	0452	—	2	×	B	EC-1472
EVAP SYS PRES SEN	P0453	0453	—	2	×	B	EC-1479
EVAP GROSS LEAK	P0455	0455	—	2	×	A	EC-1487
EVAP VERY SML LEAK	P0456	0456	x*7	2	×	A	EC-1494

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Items (CONSULT-III screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT-III GST*2	ECM*3					
FUEL LEV SEN SLOSH	P0460	0460	—	2	×	A	EC-1502
FUEL LEVEL SENSOR	P0461	0461	—	2	×	B	EC-1504
FUEL LEVL SEN/CIRC	P0462	0462	—	2	×	B	EC-1506
FUEL LEVL SEN/CIRC	P0463	0463	—	2	×	B	EC-1506
VEH SPEED SEN/CIRC*8	P0500	0500	—	2	×	B	EC-1508
ISC SYSTEM	P0506	0506	—	2	×	B	EC-1510
ISC SYSTEM	P0507	0507	—	2	×	B	EC-1512
ECM BACK UP/CIRCUIT	P0603	0603	—	2	×	B	EC-1514
ECM	P0605	0605	—	1 or 2	— or ×	B	EC-1517
ECM	P0607	0607	—	1 (CVT) 2 (M/T)	× (CVT) — (M/T)	B	EC-1519
SENSOR POWER/CIRC	P0643	0643	—	1	×	B	EC-1520
T/M RANGE SENSOR A	P0705	0705	—	2	×	B	CVT-61
FLUID TEMP SENSOR A*9	P0710	0710	—	1	×	B	CVT-66
INPUT SPEED SENSOR A	P0715	0715	—	2	×	B	CVT-71
OUTPUT SPEED SENSOR*8	P0720	0720	—	2	×	B	CVT-76
TORQUE CONVERTER	P0740	0740	—	2	×	B	CVT-84
TORQUE CONVERTER	P0744	0744	—	2	×	B	CVT-89
PC SOLENOID A	P0745	0745	—	2	×	B	CVT-91
PC SOLENOID A	P0746	0746	—	1	×	B	CVT-96
PC SOLENOID B	P0776	0776	—	2	×	B	CVT-98
PC SOLENOID B	P0778	0778	—	2	×	B	CVT-100
FLUID PRESS SEN/SW A	P0840	0840	—	2	×	B	CVT-110
P-N POS SW/CIRCUIT	P0850	0850	—	2	×	B	EC-1525
CLOSED LOOP-B1	P1148	1148	—	1	×	A	EC-1531
CLOSED LOOP-B2	P1168	1168	—	1	×	A	EC-1531
TCS/CIRC	P1212	1212	—	2	—	—	EC-1532
ENG OVER TEMP	P1217	1217	—	1	×	B	EC-1533
CTP LEARNING-B1	P1225	1225	—	2	—	—	EC-1545
CTP LEARNING-B1	P1226	1226	—	2	—	—	EC-1546
COLD START CONTROL	P1421	1421	—	2	×	A	EC-1547
ASCD SW	P1564	1564	—	1	—	—	EC-1549
ASCD BRAKE SW	P1572	1572	—	1	—	—	EC-1555
ASCD VHL SPD SEN	P1574	1574	—	1	—	—	EC-1564
LOCK MODE	P1610	1610	—	2	—	—	BL-170
ID DISCORD, IMM-ECM	P1611	1611	—	2	—	—	BL-170
CHAIN OF ECM-IMMU	P1612	1612	—	2	—	—	BL-170
CHAIN OF IMMU-KEY	P1614	1614	—	2	—	—	BL-170
DIFFERENCE OF KEY	P1615	1615	—	2	—	—	BL-170
IN PULY SPEED	P1715	1715	—	2	—	—	EC-1566
SLCT SOLENOID	P1740	1740	—	2	×	B	CVT-129
STEP MOTOR	P1777	1777	—	1	×	B	CVT-135

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Items (CONSULT-III screen terms)	DTC*1		SRT code	Trip	MIL	Permanent DTC group*4	Reference
	CONSULT-III GST*2	ECM*3					
STEP MOTOR	P1778	1778	—	2	×	B	CVT-139
BRAKE SW/CIRCUIT	P1805	1805	—	2	—	—	EC-1568
ETC MOT PWR-B1	P2100	2100	—	1	×	B	EC-1572
ETC FUNCTION/CIRC-B1	P2101	2101	—	1	×	B	EC-1576
ETC MOT PWR	P2103	2103	—	1	×	B	EC-1572
ETC MOT-B1	P2118	2118	—	1	×	B	EC-1582
ETC ACTR-B1	P2119	2119	—	1	×	B	EC-1586
APP SEN 1/CIRC	P2122	2122	—	1	×	B	EC-1588
APP SEN 1/CIRC	P2123	2123	—	1	×	B	EC-1588
APP SEN 2/CIRC	P2127	2127	—	1	×	B	EC-1593
APP SEN 2/CIRC	P2128	2128	—	1	×	B	EC-1593
TP SENSOR-B1	P2135	2135	—	1	×	B	EC-1600
APP SENSOR	P2138	2138	—	1	×	B	EC-1605
A/F SENSOR1 (B1)	P2A00	2A00	—	2	×	A	EC-1612
A/F SENSOR1 (B2)	P2A03	2A03	—	2	×	A	EC-1612

*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-1144, "Emission-related Diagnostic Information"](#), "PERMANENT DIAGNOSTIC TROUBLE CODE (PERMANENT DTC)".

*5: The troubleshooting for this DTC needs CONSULT-III.

*6: When the ECM in the mode that displays SRT status, MIL may flash. For the details, refer to "How to Display SRT Status".

*7: SRT code will not be set if the self-diagnostic result is NG.

*8: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

*9: When erasing this DTC, always use CONSULT-III or GST.

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 reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not illuminate (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL illuminates. In other words, the DTC is stored in the ECM memory and the MIL illuminates 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 illuminate the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION".

For malfunctions in which 1st trip DTCs are displayed, refer to "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS". 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-III.

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. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to [EC-1187, "Trouble Diagnosis Introduction"](#). Then perform DTC Confirmation Procedure or Overall Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

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DTC and 1st trip DTC can be read by the following methods.

WITH CONSULT-III

WITH GST

CONSULT-III or GST Examples: P0340, P0850, P1148, etc.

These DTCs are prescribed by SAE J2012/ISO 15031-6.

(CONSULT-III also displays the malfunctioning component or system.)

NO TOOLS

The number of blinks of the MIL in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC.

Example: 0340, 0850, 1148, etc.

These DTCs are controlled by NISSAN.

• **1st trip DTC No. is the same as DTC No.**

• **Output of a DTC indicates a malfunction. However, GST and the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-III can identify malfunction status as shown below. Therefore, using CONSULT-III (if available) is recommended.**

DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-III.

Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be [0].

If a 1st trip DTC is stored in the ECM, the time data will be [1t].

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-III or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen, not on the GST. For details, see [EC-1214, "CONSULT-III Function \(ENGINE\)"](#).

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175
2		Except the above items (Includes CVT related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS".

SYSTEM READINESS TEST (SRT) CODE

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".

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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 Item

The table below shows required self-diagnostic items to set the SRT to "CMPLT".

SRT item (CONSULT-III indication)	Performance Priority*	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420, P0430
EVAP SYSTEM	2	EVAP control system purge flow monitoring	P0441
	1	EVAP control system	P0442
	2	EVAP control system	P0456
HO2S	2	Air fuel ratio (A/F) sensor 1	P0133, P0153
		Heated oxygen sensor 2	P0137, P0157
		Heated oxygen sensor 2	P0138, P0158
		Heated oxygen sensor 2	P0139, P0159
EGR/VVT SYSTEM	3	Intake valve timing control function	P0011

*: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT-III.

SRT Set Timing

SRT is set as "CMPLT" after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result		Diagnosis	Example				
			Ignition cycle				
			← ON →	OFF	← ON →	OFF	← ON →
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)	
		P0402	OK (1)	— (1)	— (1)	OK (2)	
		P1402	OK (1)	OK (2)	— (2)	— (2)	
		SRT of EGR	"CMPLT"	"CMPLT"	"CMPLT"	"CMPLT"	
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)	
		P0402	— (0)	— (0)	OK (1)	— (1)	
		P1402	OK (1)	OK (2)	— (2)	— (2)	
		SRT of EGR	"INCMP"	"INCMP"	"CMPLT"	"CMPLT"	

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NG exists	Case 3	P0400	OK	OK	—	—
		P0402	—	—	—	—
		P1402	NG	—	NG	NG (Consecutive NG)
		(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 showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate "CMPLT". → Case 1 above

When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate "CMPLT" at the time the respective self-diagnoses have at least one OK result. → Case 2 above

If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate "CMPLT". → Case 3 above

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary 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.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to "CMPLT" of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate "INCMP".

NOTE:

SRT can be set as "CMPLT" together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates "CMPLT".

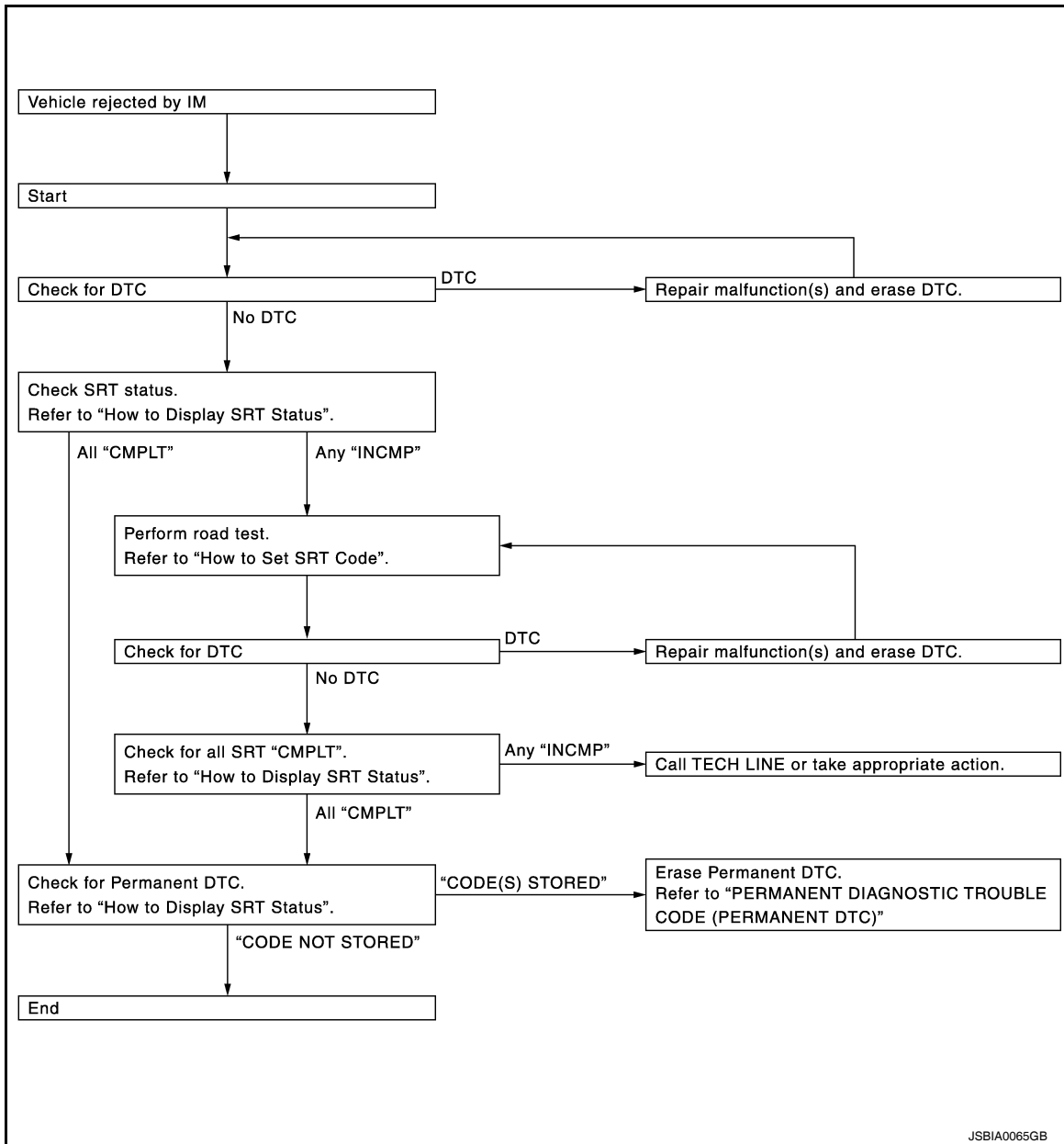
SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating "INCMP", review the flowchart diagnostic sequence referring to the following flowchart.

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How to Display SRT Status

WITH CONSULT-III

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-III.

For items whose SRT codes are set, "CMPLT" is displayed on the CONSULT-III screen; for items whose SRT codes are not set, "INCMP" is displayed.

NOTE:

- Though displayed on the CONSULT-III screen, "HO2S HTR" is not SRT item.
- "SRT STATUS" provides the presence or absence of permanent DTCs stored in ECM memory.

WITH GST

Selecting Service \$01 with GST

NO TOOLS

A SRT code itself cannot be displayed, however SRT status can.

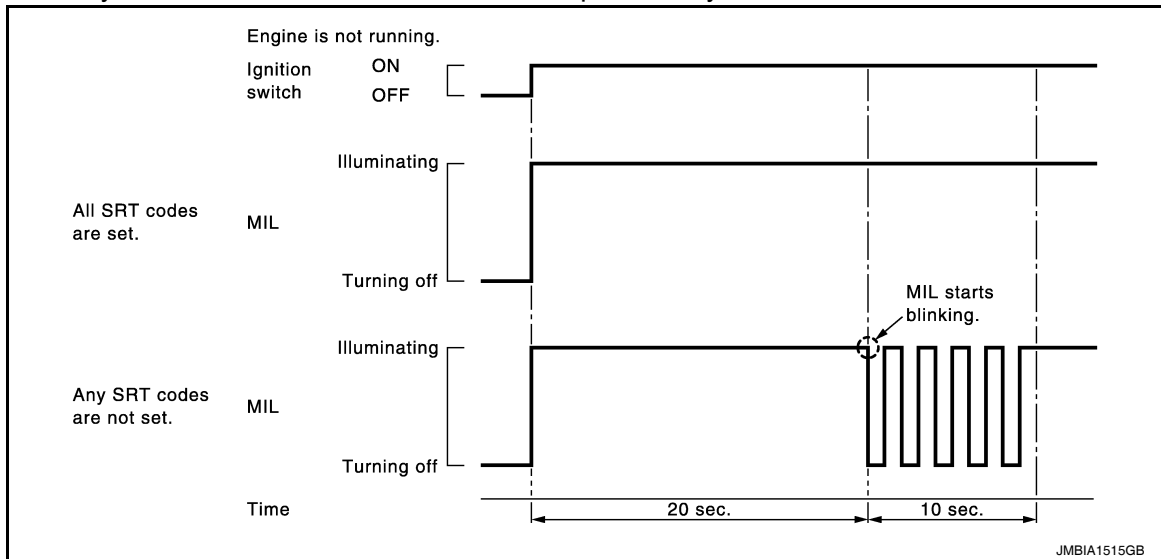
1. Turn ignition switch ON and wait 20 seconds.
2. SRT status is indicated as shown below.
 - When all SRT codes are set, MIL illuminates continuously.

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- When any SRT codes are not set, MIL will blink periodically for 10 seconds.



How to Set SRT Code

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions.

📖 WITH CONSULT-III

Perform corresponding DTC Confirmation Procedure one by one based on Performance Priority in the table on "SRT Item".

🚫 WITHOUT CONSULT-III

The most efficient driving pattern in which SRT codes can be properly set is explained below. The driving pattern should be performed one or more times to set all SRT codes.

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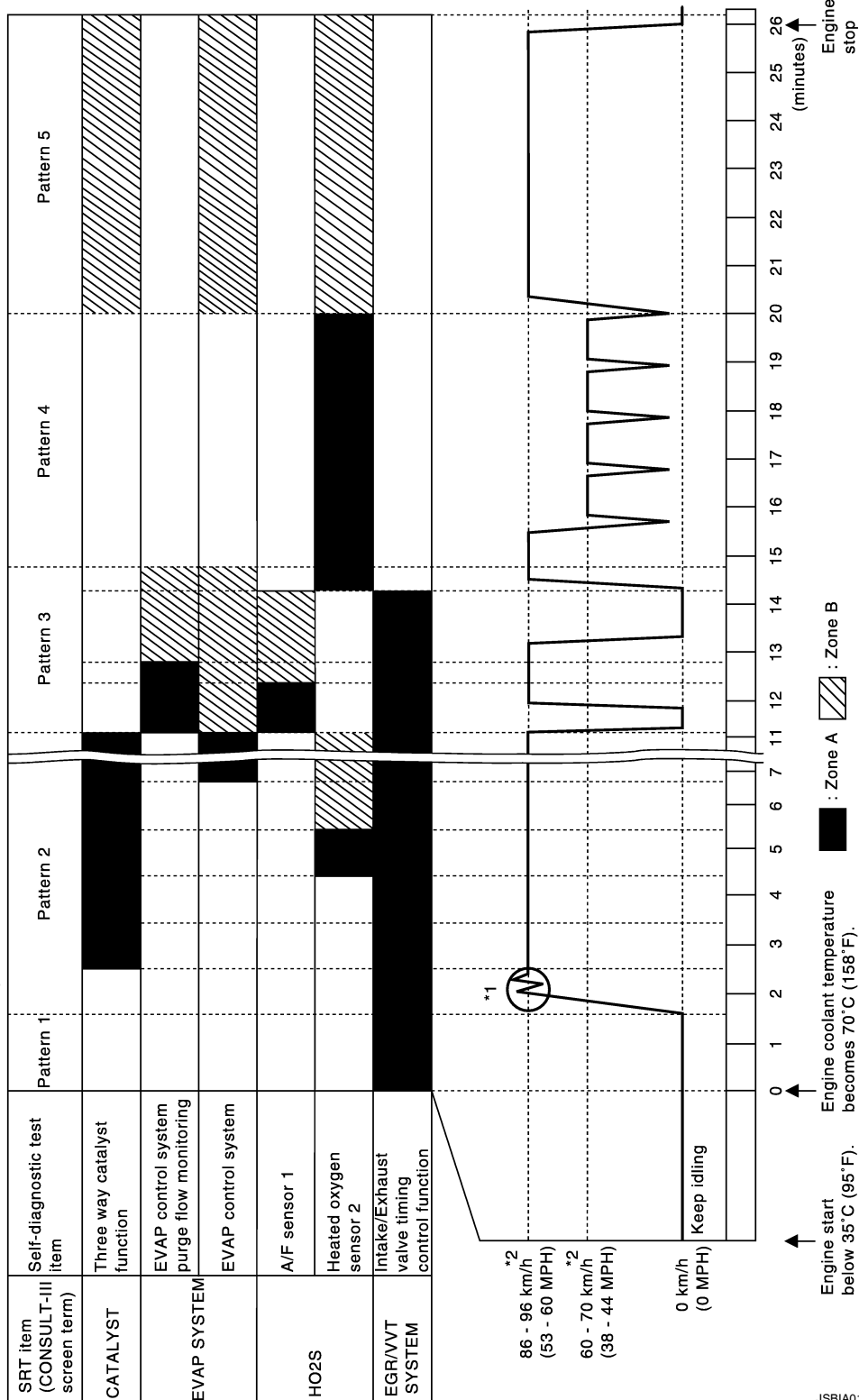
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Driving Pattern

Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.

Driving pattern



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NOTE:

- *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.

A
EC
C
D
E
F
G
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P

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Zone A refers to the range where the time, required for the diagnosis under normal conditions*, is the shortest.

Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.

Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

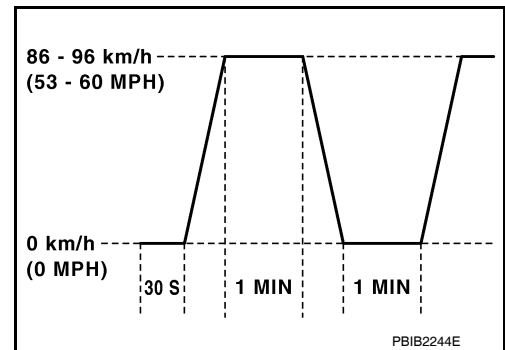
- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 46 and ground is 3.0 - 4.3 V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 46 and ground is lower than 1.4 V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 95 and ground is less than 4.1 V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

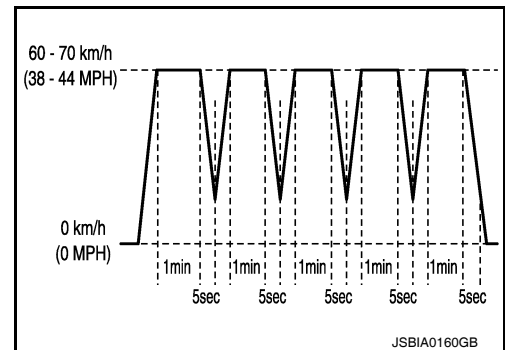
Pattern 3:

- Operate vehicle following the driving pattern shown in the figure.
- Release the accelerator pedal during deceleration of vehicle speed from 90 km/h (56 MPH) to 0 km/h (0 MPH).



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 maintain the speed.
- Release the accelerator pedal fully at least 5 seconds.
- Repeat the above two steps at least 5 times.



Pattern 5:

- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted again.

Suggested Transmission Gear Position for CVT Models

Set the selector lever position in the D.

Suggested upshift speeds for M/T models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

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	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:	For quick acceleration in low altitude areas	For high altitude areas [over 1,219 m (4,000 ft)]:
Gear change	ACCEL shift point km/h (MPH)	km/h (MPH)	km/h (MPH)
1st to 2nd	13 (8)	24 (15)	24 (15)
2nd to 3rd	27 (17)	40 (25)	40 (25)
3rd to 4th	40 (25)	53 (33)	65 (40)
4th to 5th	58 (36)	71 (44)	72 (45)
5th to 6th	82 (51)	82 (51)	82 (51)

Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate.

Do not exceed the maximum suggested speed (shown below) in any gear. For level road driving, use the highest gear suggested for that speed. Always observe posted speed limits and drive according to the road conditions to ensure safe operation. Do not over-rev the engine when shifting to a lower gear as it may cause engine damage or loss of vehicle control.

Gear	km/h (MPH)
1st	50 (30)
2nd	90 (55)
3rd	—
4th	—
5th	—
6th	—

PERMANENT DIAGNOSTIC TROUBLE CODE (PERMANENT DTC)

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.

Permanent DTC Item

For permanent DTC items, MIL turns ON. Refer to [EC-1144, "Emission-related Diagnostic Information"](#), "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS".

Permanent DTC Set Timing

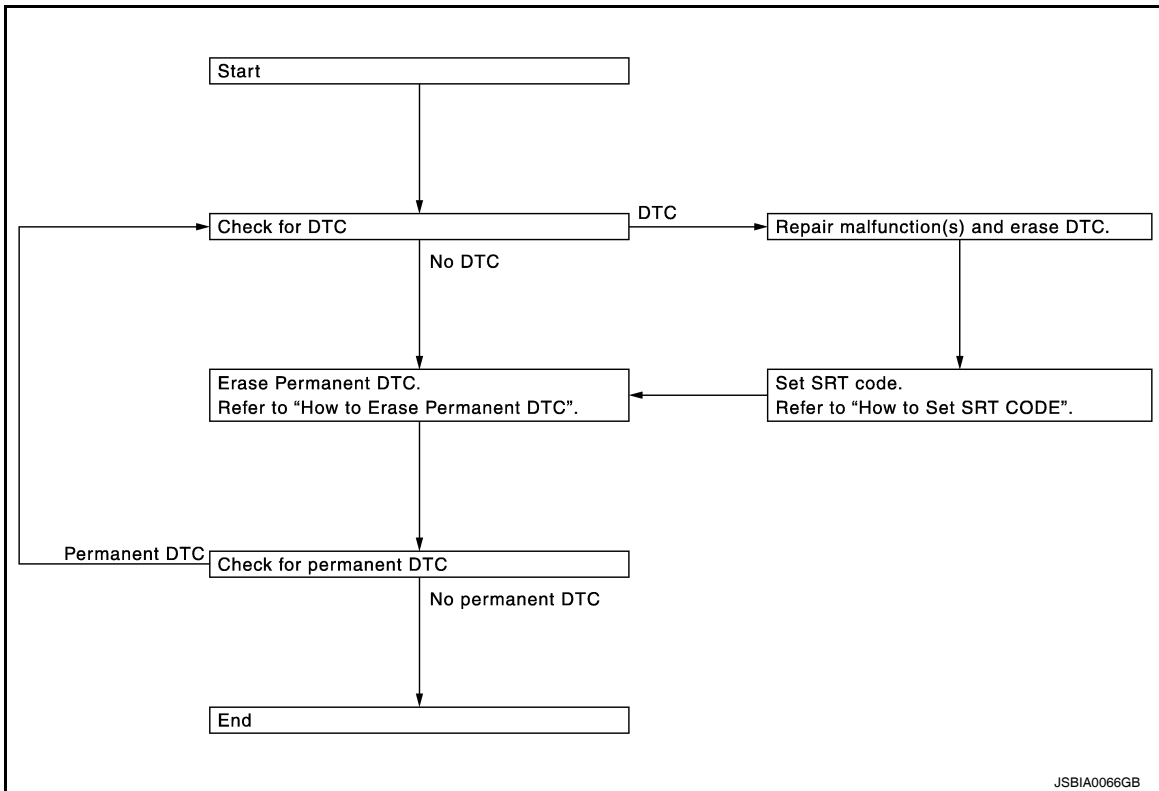
The setting timing of permanent DTC is stored in ECM with the lighting of MIL when a DTC is confirmed.

Permanent DTC Service Procedure

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How to Display Permanent DTC Status

WITH CONSULT-III

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. Select "PERMANENT DTC STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT-III.

NOTE:

Permanent DTCs stored in ECM memory are displayed on the CONSULT-III screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).

CAUTION:

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".

PERMANENT DTC & SRT CONFIRMATION : PERMANENT DTC STATUS		
CAUTION: Turn ignition switch from ON to OFF twice to update the information on the status screen.		
PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D
XXXX	INCMP	INCMP
XXXX	CMPLT	INCMP
XXXX	INCMP	CMPLT
XXXX	CMPLT	INCMP
XXXX	INCMP	INCMP
XXXX	INCMP	INCMP
The previous trip information is displayed.		

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SERVICE INFORMATION >

[QR25DE]

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.
4. Turn ignition switch ON.
5. Select Service \$0A with GST.

TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-III)

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 is displayed)

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
HO2S	01H	Air fuel ratio (A/F) sensor 1 (Bank 1)	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	89H	84H	The amount of shift in air fuel ratio
			P2A00	8AH	84H	The amount of shift in air fuel ratio
			P0130	8BH	0BH	Difference in sensor output voltage
			P0133	8CH	83H	Response gain at the limited frequency
			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
			P014D	90H	84H	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		
	02H	Heated oxygen sensor 2 (Bank 1)	P0138	07H	0CH	Minimum sensor output voltage for test cycle
			P0137	08H	0CH	Maximum sensor output voltage for test cycle
P0138			80H	0CH	Sensor output voltage	
P0139			81H	0CH	Difference in sensor output voltage	
03H	Heated oxygen sensor 3 (Bank 1)	P0143	07H	0CH	Minimum sensor output voltage for test cycle	
		P0144	08H	0CH	Maximum sensor output voltage for test cycle	
		P0146	80H	0CH	Sensor output voltage	
		P0145	81H	0CH	Difference in sensor output voltage	

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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[QR25DE]

Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
HO2S	05H	Air fuel ratio (A/F) sensor 1 (Bank 2)	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
			P0153	87H	04H	Response rate: Response ratio (Lean to Rich)
			P0153	88H	04H	Response rate: Response ratio (Rich to Lean)
			P2A03	89H	84H	The amount of shift in air fuel ratio
			P2A03	8AH	84H	The amount of shift in air fuel ratio
			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
			P015D	94H	01H	O2 Sensor Delayed Response - Lean to Rich Bank 2 Sensor 1
	06H	Heated oxygen sensor 2 (Bank 2)	P0158	07H	0CH	Minimum sensor output voltage for test cycle
			P0157	08H	0CH	Maximum sensor output voltage for test cycle
			P0158	80H	0CH	Sensor output voltage
			P0159	81H	0CH	Difference in sensor output voltage
	07H	Heated oxygen sensor 3 (Bank2)	P0163	07H	0CH	Minimum sensor output voltage for test cycle
			P0164	08H	0CH	Maximum sensor output voltage for test cycle
			P0166	80H	0CH	Sensor output voltage
			P0165	81H	0CH	Difference in sensor output voltage

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
CATA- LYST	21H	Three way catalyst function (Bank1)	P0420	80H	01H	O2 storage index
			P0420	82H	01H	Switching time lag engine exhaust index value
			P2423	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2423	84H	84H	O2 storage index in HC trap catalyst
	22H	Three way catalyst function (Bank2)	P0430	80H	01H	O2 storage index
			P0430	82H	01H	Switching time lag engine exhaust index value
			P2424	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2424	84H	84H	O2 storage index in HC trap catalyst
EGR SYSTEM	31H	EGR function	P0400	80H	96H	Low Flow Faults: EGR temp change rate (short term)
			P0400	81H	96H	Low Flow Faults: EGR temp change rate (long term)
			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
VVT SYSTEM	35H	VVT Monitor (Bank1)	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)
			P0014	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)
	36H	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)
			P0024	83H	9DH	VTC exhaust function diagnosis (VTC drive failure diagnosis)

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
EVAP SYSTEM	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)
	3CH	EVAP control system leak (Very small leak)	P0456	80H	05H	Leak area index (for more than 0.02 inch)
			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
O2 SENSOR HEATER	41H	A/F sensor 1 heater (Bank 1)	Low Input:P0031 High Input:P0032	81H	0BH	Converted value of Heater electric current to voltage
	42H	Heated oxygen sensor 2 heater (Bank 1)	Low Input:P0037 High Input:P0038	80H	0CH	Converted value of Heater electric current to voltage
	43H	Heated oxygen sensor 3 heater (Bank 1)	P0043	80H	0CH	Converted value of Heater electric current to voltage
	45H	A/F sensor 1 heater (Bank 2)	Low Input:P0051 High Input:P0052	81H	0BH	Converted value of Heater electric current to voltage
	46H	Heated oxygen sensor 2 heater (Bank 2)	Low Input:P0057 High Input:P0058	80H	0CH	Converted value of Heater electric current to voltage
	47H	Heated oxygen sensor 3 heater (Bank 2)	P0063	80H	0CH	Converted value of Heater electric current to voltage
Secondary Air	71H	Secondary Air system	P0411	80H	01H	Secondary Air Injection System Incorrect Flow Detected
			Bank1: P0491 Bank2: P0492	81H	01H	Secondary Air Injection System Insufficient 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 Switching Valve Stuck Open
			P2440	85H	01H	Secondary Air Injection System Switching 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
	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

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
MISFIRE	A1H	Multiple Cylinder Misfires	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
			P0301	89H	24H	Misfiring counter at 200 revolution of the first cylinder
			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

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Item	OBD-MID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
MISFIRE	A2H	No. 1 Cylinder Misfire	P0301	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving 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 driving 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 driving 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 driving 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 driving 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 driving 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 driving 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 driving cycles
			P0308	0CH	24H	Misfire counts for last/current driving cycles

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC

 **With CONSULT-III**

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 CVT related items (see [EC-1106](#)), skip step 1.
1. Erase DTC in TCM. Refer to [CVT-25](#).
 2. Select "ENGINE" with CONSULT-III.
 3. Select "SELF-DIAG RESULTS".

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4. Touch "ERASE". (DTC in ECM will be erased.)

With GST

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.

1. Select Service \$04 with GST (Generic Scan Tool).

No Tools

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.

1. Erase DTC in ECM. Refer to How to Erase Diagnostic Test Mode II (Self-diagnostic Results).

• **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**

• **The following data are cleared when the ECM memory is erased.**

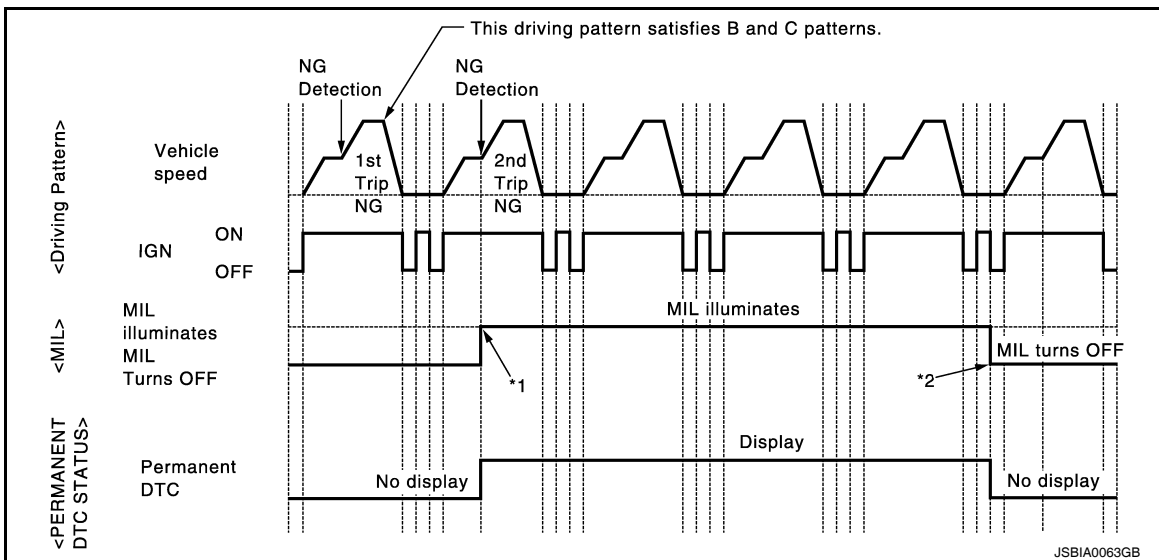
- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

How to Erase Permanent DTC

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 row.



*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 (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.

×: Applicable —: Not applicable

Group*	Perform "DTC CONFIRMATION PROCEDURE" for applicable DTCs.	Driving pattern	
		B	D
A	×	—	—
B	—	×	×

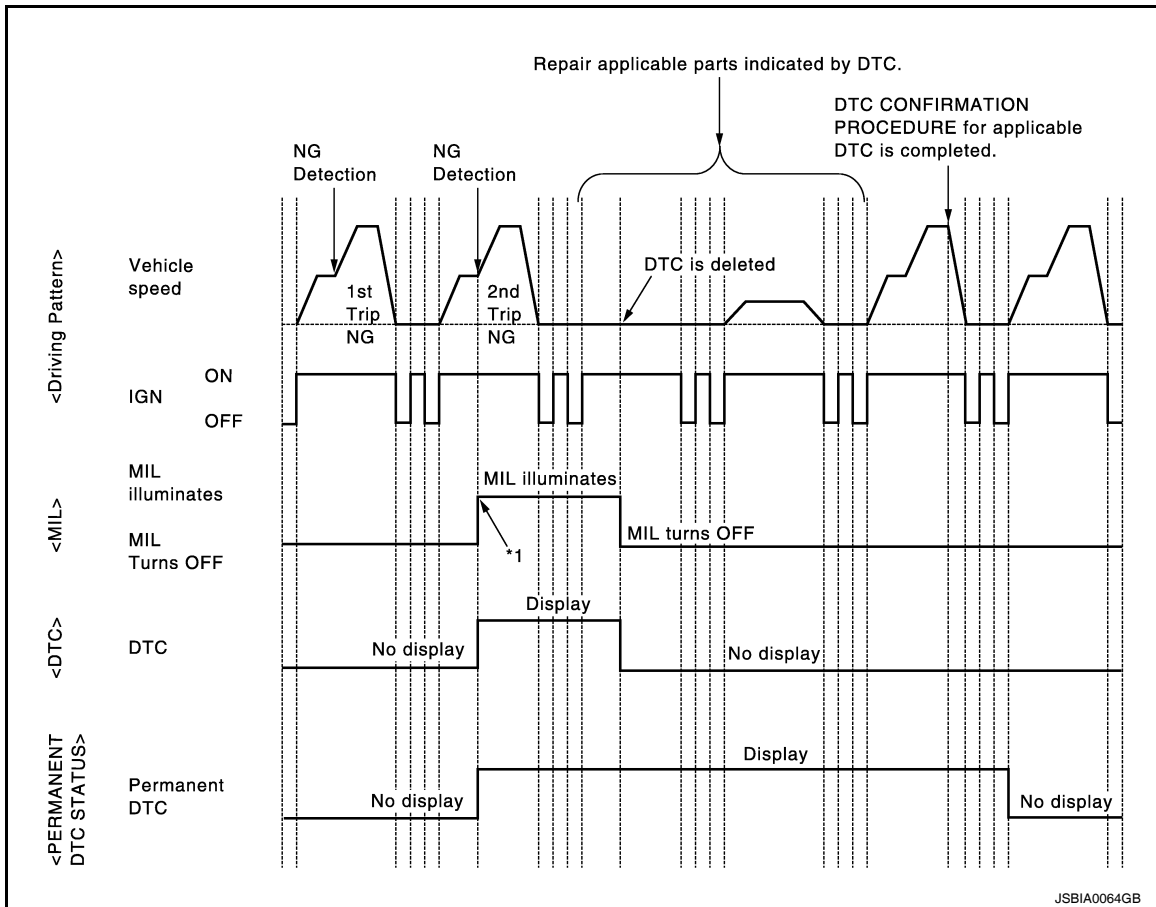
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*: For group, refer to [EC-1144, "Emission-related Diagnostic Information"](#), "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS".

Group A



*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.

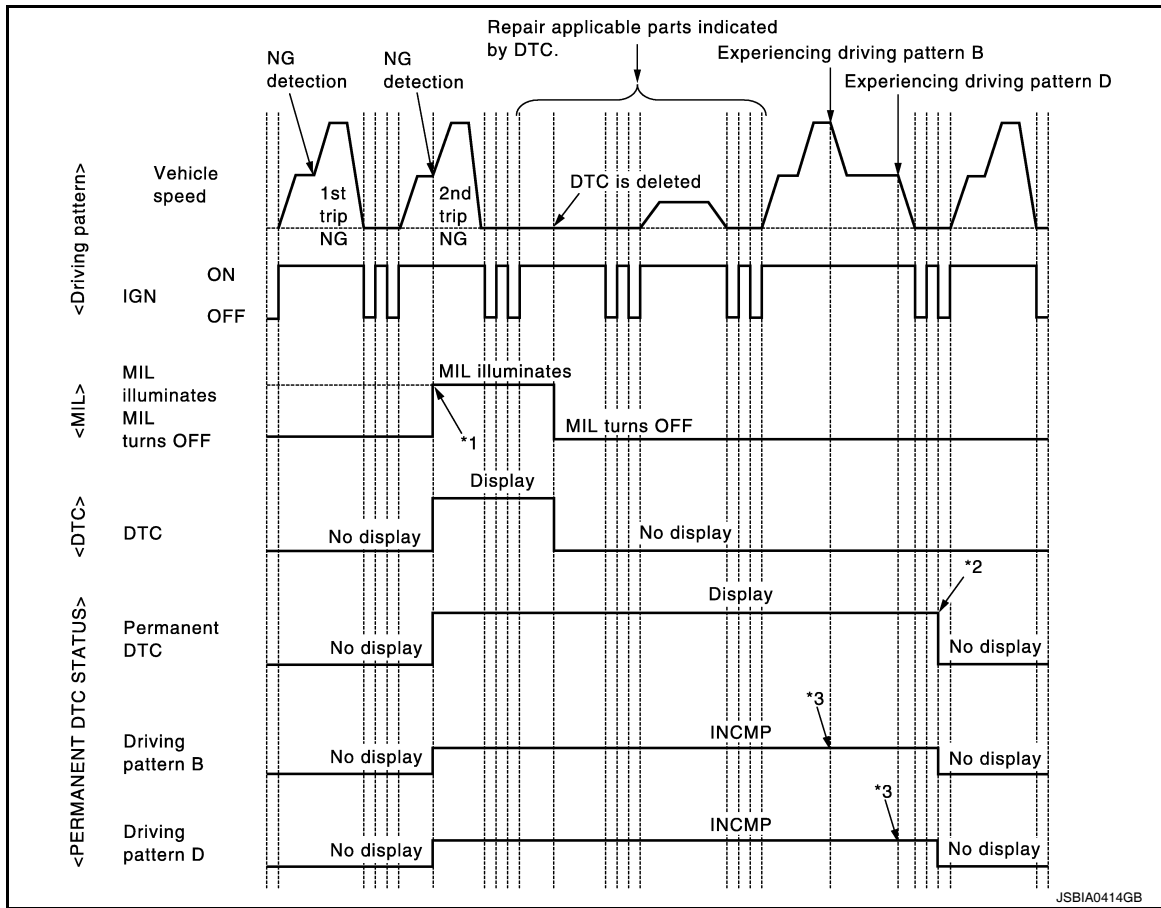
1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Check permanent DTC. Refer to [EC-1144, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
6. Perform "DTC CONFIRMATION PROCEDURE" for DTCs which are the same as permanent DTCs stored in ECM.
7. Turn ignition switch OFF and wait at least 10 seconds.
8. Turn ignition switch ON.
9. Turn ignition switch OFF and wait at least 10 seconds.
10. Turn ignition switch ON.
11. Check permanent DTC. Refer to [EC-1144, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
12. Check that the permanent DTCs have been erased.

Group B

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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*1: When the same malfunction is detected in two consecutive trips, MIL will illuminate.

*2: After experiencing Driving pattern B and D, permanent DTC is erased.

*3: 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.
- When experiencing both driving pattern B and D during the same trip, the experience of driving pattern D is counted by priority.

With CONSULT-III

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. Check permanent DTC. Refer to [EC-1144, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
6. Start engine and warm it up to normal operating temperature.
7. Use "PERMANENT DTC WORK SUPPORT" to drive the vehicle according to driving pattern B.


CAUTION:

- Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
8. Turn ignition switch OFF and wait at least 10 seconds.
 9. Turn ignition switch ON.
 10. Turn ignition switch OFF and wait at least 10 seconds.
 11. Turn ignition switch ON.

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12. Check permanent DTC. Refer to [EC-1144, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
 13. Drive the vehicle according to driving pattern D.
CAUTION:
 - Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
 14. Turn ignition switch OFF and wait at least 10 seconds.
 15. Turn ignition switch ON.
 16. Turn ignition switch OFF and wait at least 10 seconds.
 17. Turn ignition switch ON.
 18. Check permanent DTC. Refer to [EC-1144, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
 19. Check that the permanent DTCs have been erased.
-  **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.
 4. Turn ignition switch ON.
 5. Check permanent DTC. Refer to [EC-1144, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
 6. Start engine and warm it up to normal operating temperature.
 7. Drive the vehicle according to driving pattern B.
CAUTION:
 - Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
 8. Turn ignition switch OFF and wait at least 10 seconds.
 9. Turn ignition switch ON.
 10. Turn ignition switch OFF and wait at least 10 seconds.
 11. Turn ignition switch ON.
 12. Check permanent DTC. Refer to [EC-1144, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
 13. Drive the vehicle according to driving pattern D.
CAUTION:
 - Always drive at a safe speed.
 - Never erase self-diagnosis results.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, the counter of driving pattern B or D is reset.
 - If self-diagnosis results are erased during the trip of driving pattern B or D, an experience of driving pattern B and D during the same trip is not counted up.
 14. Turn ignition switch OFF and wait at least 10 seconds.
 15. Turn ignition switch ON.
 16. Turn ignition switch OFF and wait at least 10 seconds.
 17. Turn ignition switch ON.
 18. Check permanent DTC. Refer to [EC-1144, "Emission-related Diagnostic Information"](#), "How to Display Permanent DTC Status".
 19. Check that the permanent DTCs have been erased.

DRIVING PATTERN

Driving Pattern B

- Driving pattern B means a trip satisfying the following conditions.
 - Engine speed reaches 400 rpm or more.
 - Water temperature reaches 70°C (158°F) or more.

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- Vehicle speed of 70 – 120 km/h (44 – 75 MPH) is maintained for 60 seconds or more under the control of closed loop.
- Vehicle speed of 30 – 60 km/h (19 – 37 MPH) is maintained for 10 seconds or more under the control of closed loop.
- 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.
- The state of driving at 10 km/h (7 MPH) or more reaches 10 minutes or more in total.
- A lapse of 22 minutes or more after engine start.

CAUTION:

Always drive at a safe speed.

NOTE:

- Drive the vehicle at a constant velocity.
- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern B.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern B.

Driving Pattern D

- Driving pattern D means operating vehicle as per the following.
- 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.

CAUTION:

Always drive at a safe speed.

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.

Malfunction Indicator Lamp (MIL)

INFOID:000000006150382

DESCRIPTION

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.

1. The MIL illuminates when ignition switch is turned ON (engine is not running).

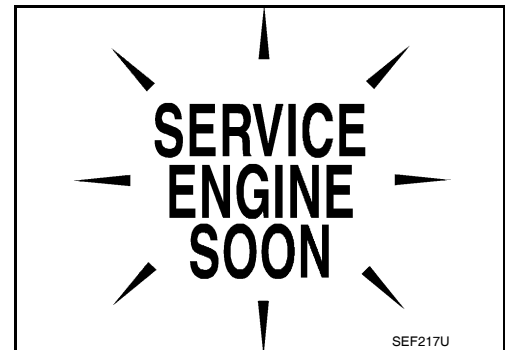
NOTE:

Check the MIL circuit if MIL does not illuminate. Refer to [EC-1658. "Wiring Diagram"](#).

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 DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following three functions.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position  Engine stopped 	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will illuminate to inform the driver that a malfunction has been detected. The following malfunctions will illuminate or blink the MIL in the 1st trip. <ul style="list-style-type: none"> • Misfire (Possible three way catalyst damage) • One trip detection diagnoses
Mode II	Ignition switch in ON position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by MIL illuminating 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 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.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut
--	--

MIL Flashing Without DTC

When any SRT codes are not set, MIL may flash without DTC. For the details, refer to [EC-1144, "Emission-related Diagnostic Information"](#).

HOW TO SWITCH DIAGNOSTIC TEST 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 malfunction.
- Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.

How to Set Diagnostic Test Mode II (Self-diagnostic Results)

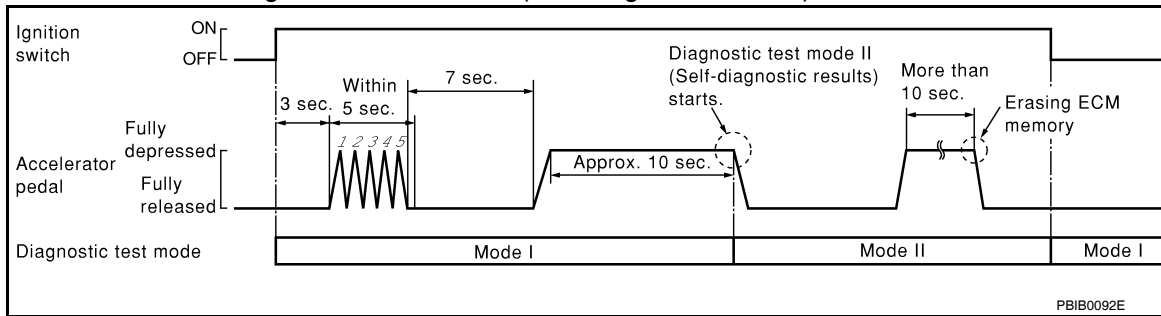
1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.
 - a. Fully depress the accelerator pedal.
 - b. Fully release the accelerator pedal.
3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MIL starts blinking.
4. Fully release the accelerator pedal.

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ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results).
Refer to "How to Set Diagnostic Test Mode II (Self-diagnostic Results)".
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.
The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb.
Refer to [DI-34](#) or [EC-1658](#).

DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MIL	Condition
ON	When the malfunction is detected.
OFF	No malfunction

These DTC numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

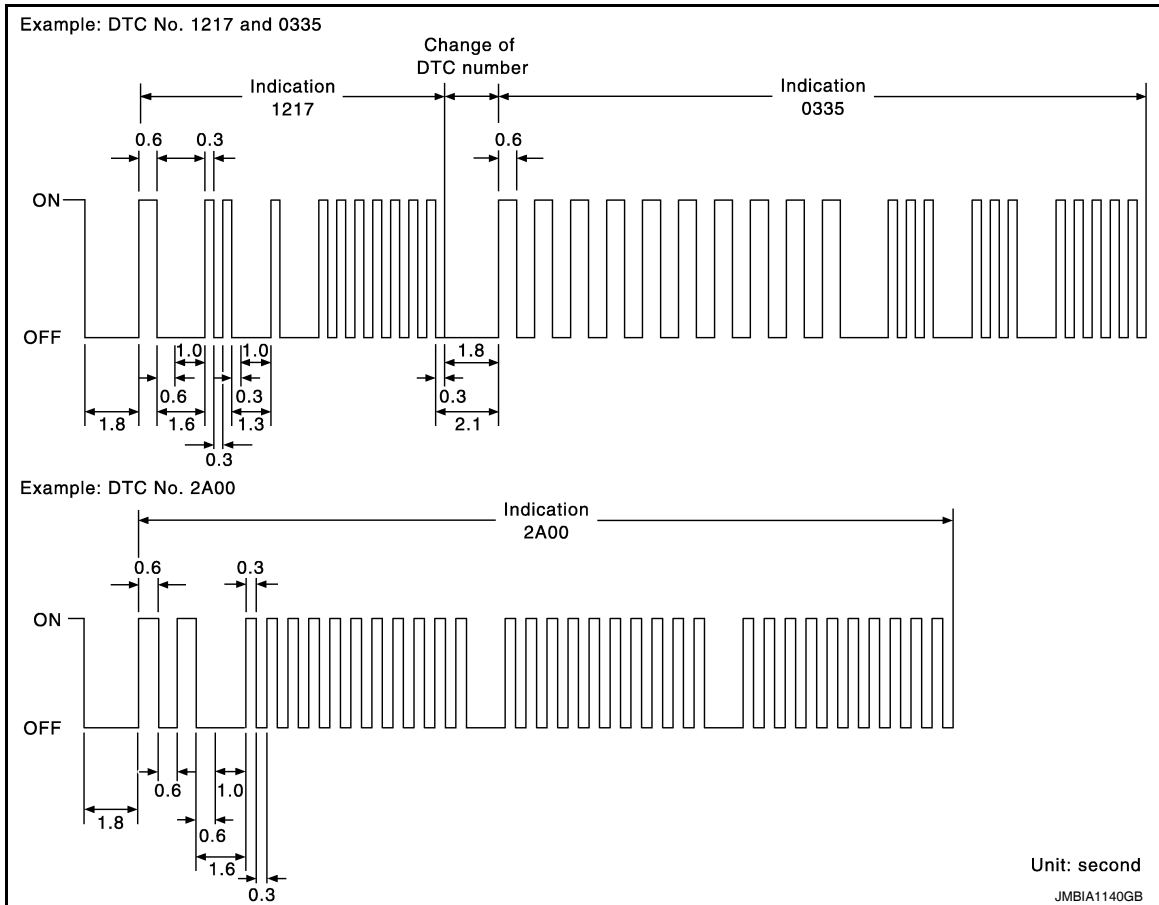
In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), 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 uniden-

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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tified codes can be identified by using the CONSULT-III 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. The “zero” is indicated by the number of ten flashes. The “A” is indicated by the number of eleven flash. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle. The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second 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-second OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See [EC-1106](#))

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back-up memory in the ECM by depressing accelerator pedal.

Refer to “How to Erase Diagnostic Test Mode II (Self-diagnostic Results)”.

- If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.
- Be careful not to erase the stored memory before starting trouble diagnoses.

OBD System Operation Chart

INFOID:000000006150383

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. For details, refer to [EC-1143, "Two Trip Detection Logic"](#).
- The MIL will go 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

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C) without the same malfunction recurring. The "TIME" in "SELF-DIAGNOSTIC RESULTS" mode of CONSULT-III 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.

SUMMARY CHART

Items	Fuel Injection System	Misfire	Other
MIL (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

For details about patterns B and C under "Fuel Injection System" and "Misfire", see "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 "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM".

*1: Clear timing is at the moment OK is detected.

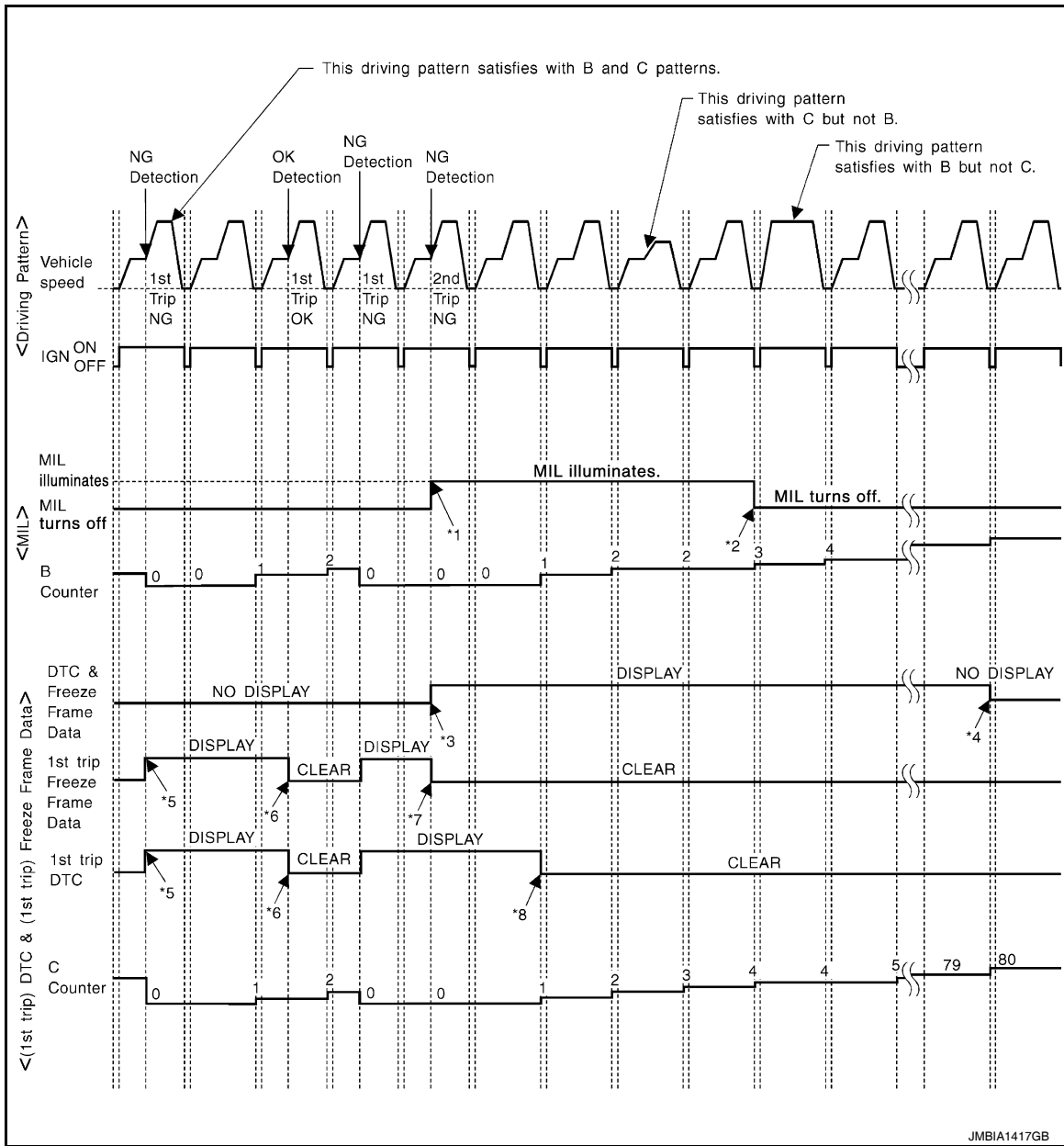
*2: Clear timing is when the same malfunction is detected in the 2nd trip.

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

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[QR25DE]



*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 (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

EXPLANATION FOR DRIVING PATTERNS FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MIL will go off when the B counter reaches 3. (*2 in "OBD SYSTEM OPERATION CHART")

<Driving Pattern C>

Driving pattern C means the vehicle operation as follows:

The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data) ± 375 rpm

Calculated load value: (Calculated load value in the freeze frame data) $\times (1 \pm 0.1)$ [%]

Engine coolant temperature (T) condition:

- When the freeze frame data shows lower than 70°C (158°F), "T" should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), "T" should be higher than or equal to 70°C (158°F).

Example:

If the stored freeze frame data is as follows:

Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)

To be satisfied with driving pattern C, the vehicle should run under the following conditions:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

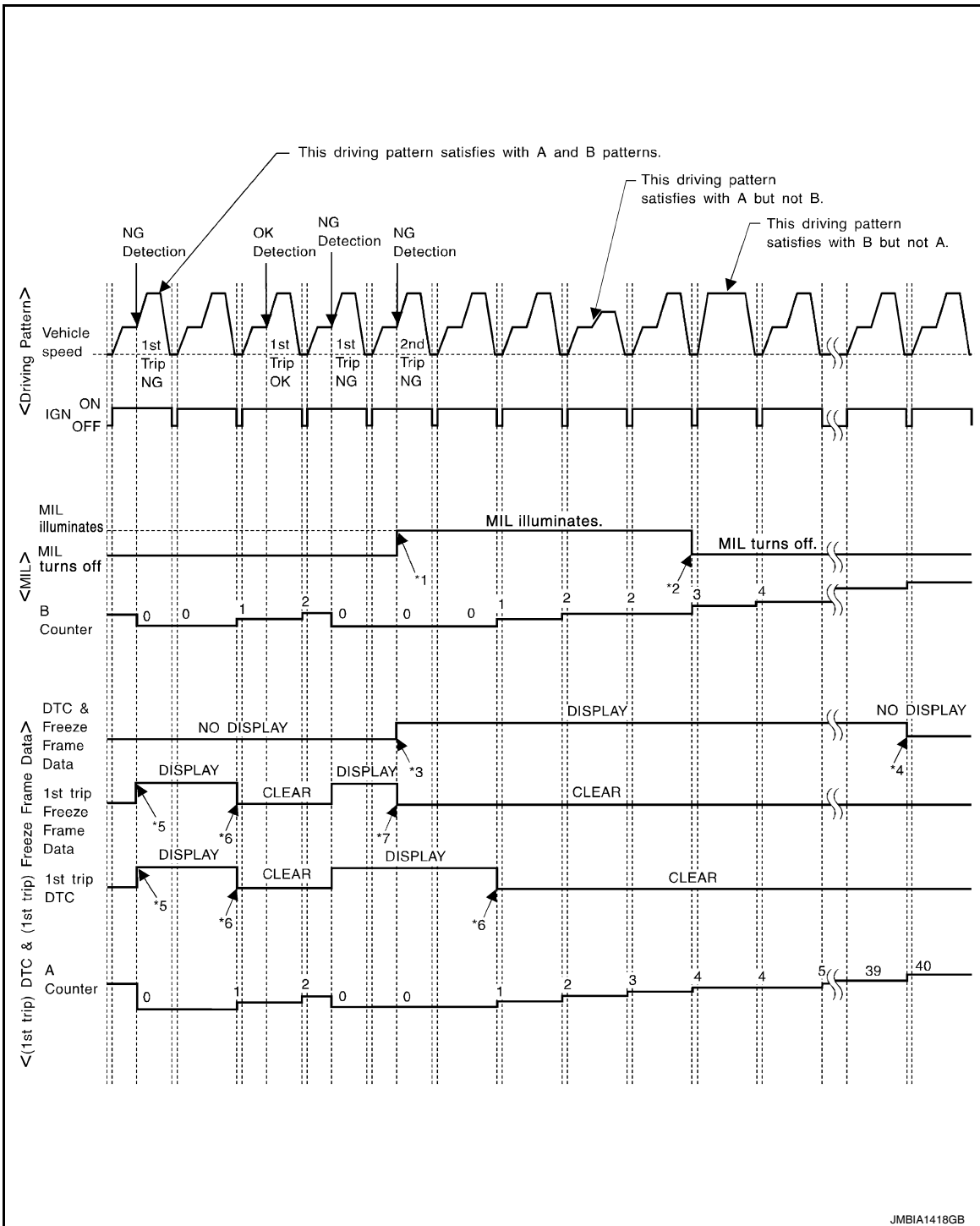
- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SERVICE INFORMATION >

[QR25DE]



*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 (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

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*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.)

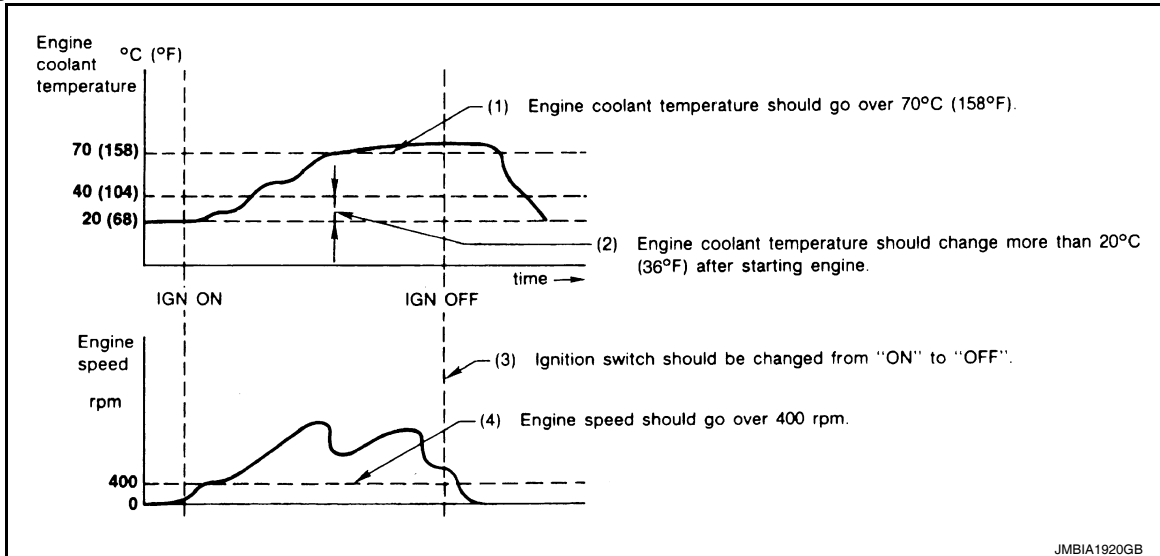
*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

<Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will go off when the B counter reaches 3 (*2 in "OBD SYSTEM OPERATION CHART").

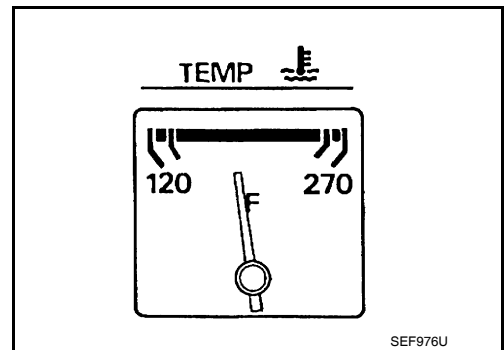
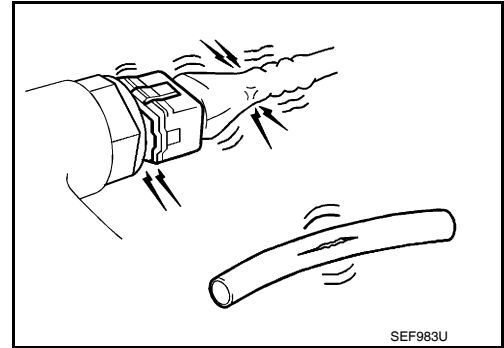
BASIC SERVICE PROCEDURE

Basic Inspection

INFOID:000000006150384

1. INSPECTION START

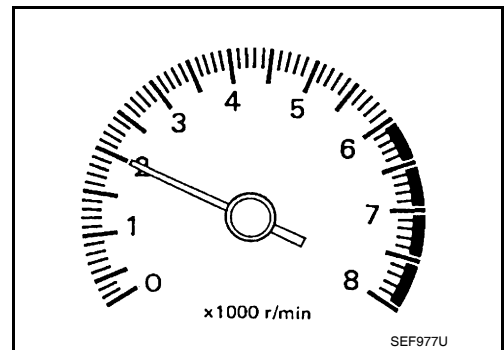
1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Wiring harness for improper connections, pinches and cut
 - Vacuum hoses 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.
 - Headlamp switch is OFF.
 - Air conditioner switch is OFF.
 - Rear window defogger switch is OFF.
 - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge. Check that engine stays below 1,000 rpm.



5. Run engine at approximately 2,000 rpm for approximately 2 minutes under no load.
6. Check that no DTC is displayed with CONSULT-III or GST.

OK or NG

- OK >> GO TO 3.
 NG >> GO TO 2.



2. REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding Diagnostic Procedure.

>> GO TO 3.

3. CHECK TARGET IDLE SPEED

Ⓜ With CONSULT-III

1. Run engine at approximately 2,000 rpm for approximately 2 minutes under no load.

BASIC SERVICE PROCEDURE

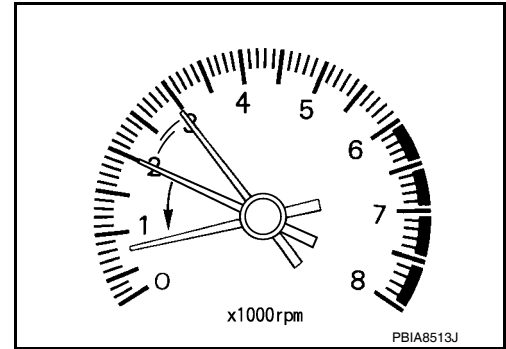
[QR25DE]

< SERVICE INFORMATION >

- Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for approximately 1 minute.
- Read idle speed in "DATA MONITOR" mode with CONSULT-III. Refer to [EC-1181, "Idle Speed and Ignition Timing Check"](#).

M/T: 800 ± 50 rpm (in Neutral position)

CVT: 650 ± 50 rpm (in P or N position)



⊗ Without CONSULT-III

- Run engine at approximately 2,000 rpm for approximately 2 minutes under no load.
- Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for approximately 1 minute.
- Check idle speed. Refer to [EC-1181, "Idle Speed and Ignition Timing Check"](#).

M/T: 800 ± 50 rpm (in Neutral position)

CVT: 650 ± 50 rpm (in P or N position)

OK or NG

- OK >> GO TO 10.
NG >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

- Stop engine.
- Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1183, "Idle Air Volume Learning"](#).

Is Idle Air Volume Learning carried out successfully?

Yes or No

- Yes >> GO TO 7.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

7. CHECK IDLE SPEED AGAIN

Ⓟ With CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Read idle speed in "DATA MONITOR" mode with CONSULT-III. Refer to [EC-1181, "Idle Speed and Ignition Timing Check"](#).

M/T: 800 ± 50 rpm (in Neutral position)

CVT: 650 ± 50 rpm (in P or N position)

⊗ Without CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Check idle speed. Refer to [EC-1181, "Idle Speed and Ignition Timing Check"](#).

M/T: 800 ± 50 rpm (in Neutral position)

CVT: 650 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.

NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Check crankshaft position sensor (POS) and circuit.
Refer to [EC-1415](#).
- Check camshaft position sensor (PHASE) and circuit.
Refer to [EC-1421](#).

OK or NG

OK >> GO TO 9.

NG >> 1. Repair or replace.
2. 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.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).

>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.
 2. Check ignition timing with a timing light.
Refer to [EC-1181, "Idle Speed and Ignition Timing Check"](#).
- Timing indicator (1)

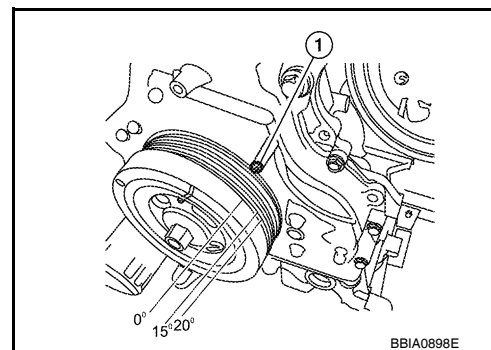
M/T: 10 ± 5° BTDC (in Neutral position)

CVT: 10 ± 5° BTDC (in P or N position)

OK or NG

OK >> GO TO 19.

NG >> GO TO 11.



11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-1183, "Idle Air Volume Learning"](#).

Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 14.

No >> 1. Follow the instruction of Idle Air Volume Learning.

BASIC SERVICE PROCEDURE

[QR25DE]

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2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

④ With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-III. Refer to [EC-1181, "Idle Speed and Ignition Timing Check"](#).

M/T: 800 ± 50 rpm (in Neutral position)

CVT: 650 ± 50 rpm (in P or N position)

⊗ Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed. Refer to [EC-1181, "Idle Speed and Ignition Timing Check"](#).

M/T: 800 ± 50 rpm (in Neutral position)

CVT: 650 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 15.

NG >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
 2. Check ignition timing with a timing light.
Refer to [EC-1181, "Idle Speed and Ignition Timing Check"](#).
- Timing indicator (1)

M/T: 10 ± 5° BTDC (in Neutral position)

CVT: 10 ± 5° BTDC (in P or N position)

OK or NG

OK >> GO TO 19

NG >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to [EM-164](#).

OK or NG

OK >> GO TO 17.

NG >> 1. Repair the timing chain installation.
2. GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

- Check crankshaft position sensor (POS) and circuit.
Refer to [EC-1415](#).
- Check camshaft position sensor (PHASE) and circuit.
Refer to [EC-1421](#).

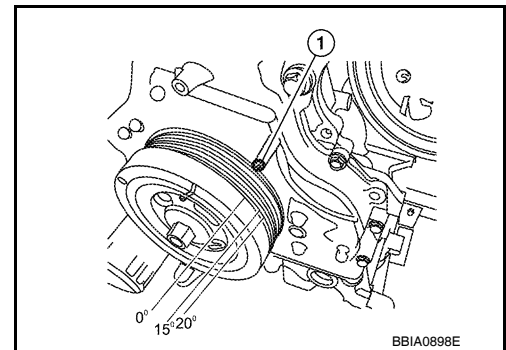
OK or NG

OK >> GO TO 18.

NG >> 1. Repair or replace.
2. 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, although this is rare.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).



>> GO TO 4.

19. INSPECTION END

Did you replace ECM, referring this Basic Inspection procedure?

Yes or No

Yes >> 1. Perform [EC-1183, "VIN Registration"](#).

2. **INSPECTION END**

No >> **INSPECTION END**

Idle Speed and Ignition Timing Check

INFOID:000000006150385

IDLE SPEED

 With CONSULT-III

Check idle speed in "DATA MONITOR" mode with CONSULT-III.


 With GST

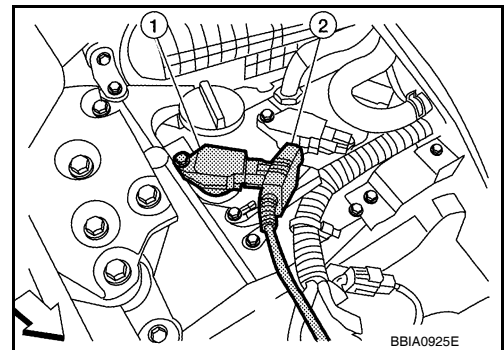
Check idle speed in Service \$01 with GST.

IGNITION TIMING

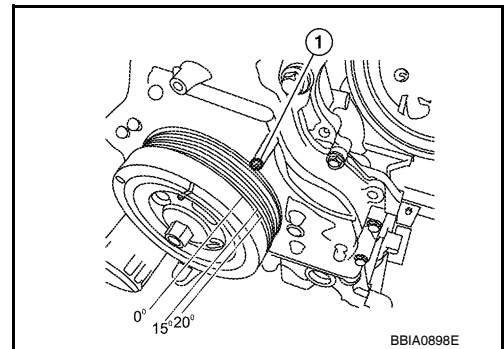
Any of following two methods may be used.

Method A

1. Attach timing light to loop wire as shown.
 - : Vehicle front
 - Ignition coil No. 1 (1)
 - Timing light (2)



2. Check ignition timing.
 - Timing indicator (1)



Method B

1. Remove No. 1 ignition coil (1). Refer to [EM-145, "Removal and Installation"](#).

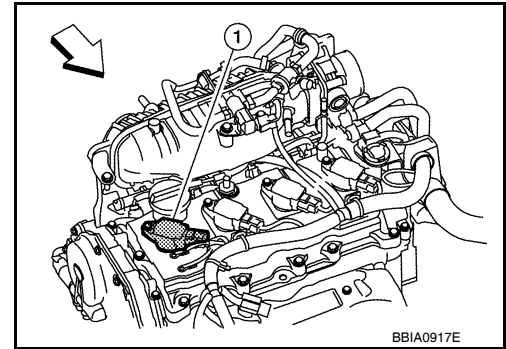
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BASIC SERVICE PROCEDURE

[QR25DE]

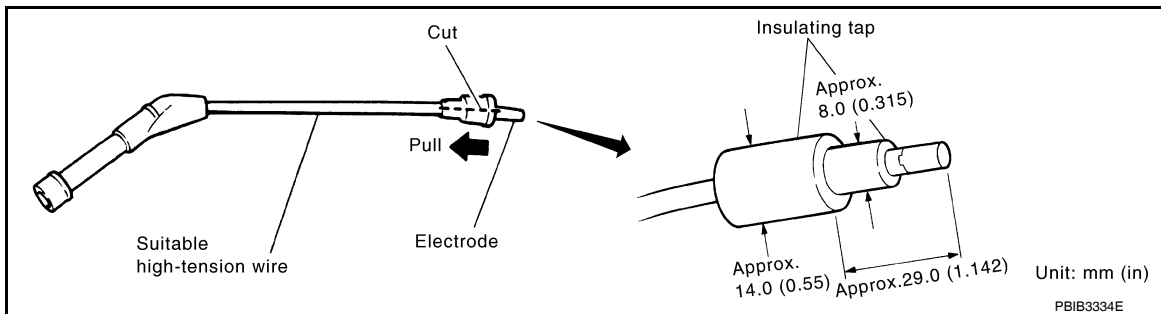
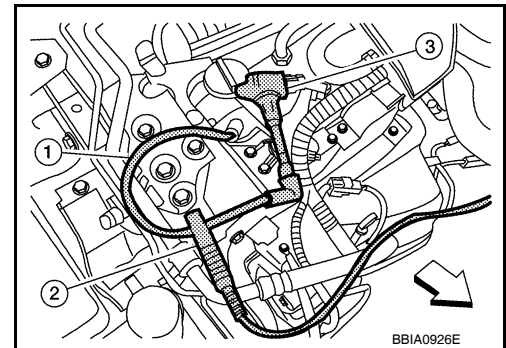
< SERVICE INFORMATION >

- ⇐: Vehicle front

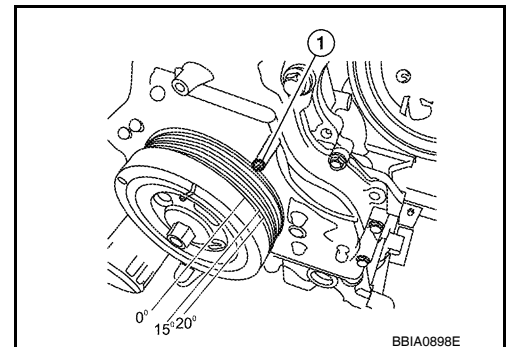


2. Connect No. 1 ignition coil (3) and No. 1 spark plug with suitable high-tension wire (1) as shown, and attach timing light (2) clamp to this wire.

- ⇐: Vehicle front



3. Check ignition timing.
 - Timing indicator (1)



Procedure After Replacing ECM

INFOID:000000006150386

When replacing ECM, the following procedure must be performed.

1. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-171, "ECM Re-communicating Function"](#).
2. Perform [EC-1183, "VIN Registration"](#).
3. Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).
4. Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).

BASIC SERVICE PROCEDURE

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[QR25DE]

5. Perform [EC-1183, "Idle Air Volume Learning"](#).

VIN Registration

INFOID:000000006150387

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).

OPERATION PROCEDURE

④ With CONSULT-III

1. Check the VIN of the vehicle and note it. Refer to [GI-45](#).
2. Turn ignition switch ON with engine stopped.
3. Select "VIN REGISTRATION" in "WORK SUPPORT" mode.
4. Follow the instruction on the CONSULT-III display.

Accelerator Pedal Released Position Learning

INFOID:000000006150388

DESCRIPTION

Accelerator Pedal Released Position Learning is a function of ECM to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

OPERATION PROCEDURE

1. Check that accelerator pedal is fully released.
2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF and wait at least 10 seconds.

Throttle Valve Closed Position Learning

INFOID:000000006150389

DESCRIPTION

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 the electric throttle control actuator or ECM is disconnected or electric throttle control actuator inside is cleaned.

OPERATION PROCEDURE

④ With CONSULT-III

1. Turn ignition switch ON.
2. Select "CLSD THL POS LEARN" in "WORK SUPPORT" mode of "ENGINE" using CONSULT-III.
3. Follow the instructions on the CONSULT-III 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-III

1. Start the engine.
NOTE:
Engine coolant temperature is 25°C (77°F) or less before engine starts.
2. Warm up the engine.
NOTE:
Raise engine coolant temperature until it reaches 65°C (149°F) or more.
3. 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.

Idle Air Volume Learning

INFOID:000000006150390

DESCRIPTION

BASIC SERVICE PROCEDURE

[QR25DE]

< SERVICE INFORMATION >

Idle Air Volume Learning is an operation to learn the idle air volume that keeps each engine within the specific range. It must be performed under any of the following conditions:

- Each time the electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of the specification.

PREPARATION

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 (CVT), Neutral (M/T)
- Electric load switch: OFF
(Air conditioner, headlamp rear window defogger)

On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started the headlamp will not be illuminated.

- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
 - For CVT models
- With CONSULT-III: Drive vehicle until "FLUID TEMP SE" in "DATA MONITOR" mode of "CVT" system indicates less than 0.9 V.
- Without CONSULT-III: Drive vehicle for 10 minutes.
 - For M/T models
- Drive vehicle for 10 minutes.

OPERATION PROCEDURE

☑ With CONSULT-III

1. Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).
2. Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.
6. Touch "START" and wait 20 seconds.
7. Check that "CMPLT" is displayed on CONSULT-III screen. If "CMPLT" is not displayed, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the DIAGNOSTIC PROCEDURE below.
8. Rev up the engine two or three times and check that idle speed and ignition timing are within the specifications.
Refer to [EC-1177, "Basic Inspection"](#).

Item	Specification
Idle speed	M/T: 800 ± 50 rpm (in Neutral position) CVT: 650 ± 50 rpm (in P or N position)
Ignition timing	M/T: 10 ± 5° BTDC (in Neutral position) CVT: 10 ± 5° BTDC (in P or N position)

⊗ Without CONSULT-III

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.**

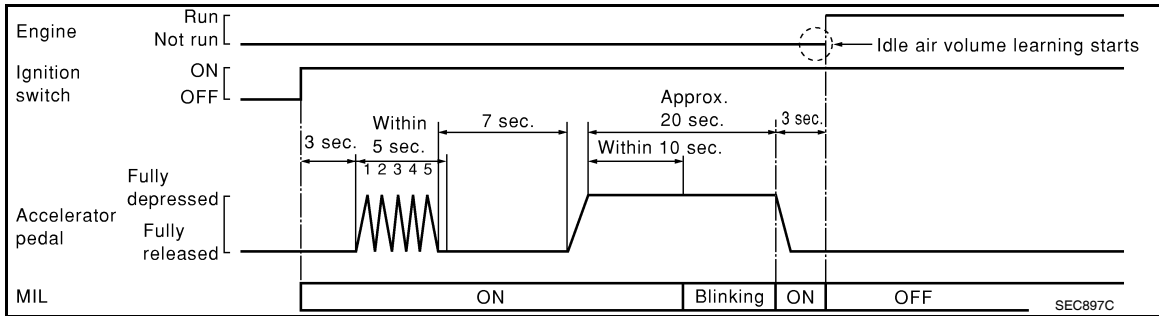
1. Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).
2. Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Turn ignition switch OFF and wait at least 10 seconds.

BASIC SERVICE PROCEDURE

[QR25DE]

< SERVICE INFORMATION >

6. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
7. Repeat the following procedure quickly five times within 5 seconds.
 - a. Fully depress the accelerator pedal.
 - b. Fully release the accelerator pedal.
8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
9. Fully release the accelerator pedal within 3 seconds after the MIL turned ON.
10. Start engine and let it idle.
11. Wait 20 seconds.



12. Rev up the engine two or three times and check that idle speed and ignition timing are within the specifications. Refer to [EC-1177, "Basic Inspection"](#).

Item	Specification
Idle speed	M/T: 800 ± 50 rpm (in Neutral position) CVT: 650 ± 50 rpm (in P or N position)
Ignition timing	M/T: 10 ± 5° BTDC (in Neutral position) CVT: 10 ± 5° BTDC (in P or N position)

13. If idle speed and ignition timing are not within the specification, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the DIAGNOSTIC PROCEDURE below.

DIAGNOSTIC PROCEDURE

If idle air volume learning cannot be performed successfully, proceed as follows:

1. Check that throttle valve is fully closed.
2. Check PCV valve operation.
3. Check that downstream of throttle valve is free from air leakage.
4. When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.

It is useful to perform [EC-1228](#).

5. If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:
 - Engine stalls.
 - Erroneous idle.

Fuel Pressure Check

INFOID:000000006150391

FUEL PRESSURE RELEASE

☐ With CONSULT-III


1. Turn ignition switch ON.
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-III.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.

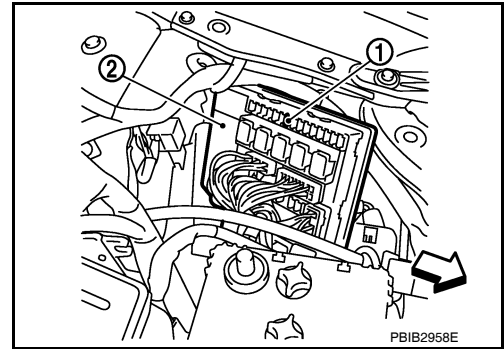
☒ Without CONSULT-III

BASIC SERVICE PROCEDURE

[QR25DE]

< SERVICE INFORMATION >

1. Remove fuel pump fuse (1) located in IPDM E/R (2).
 - : Vehicle front
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.



FUEL PRESSURE CHECK

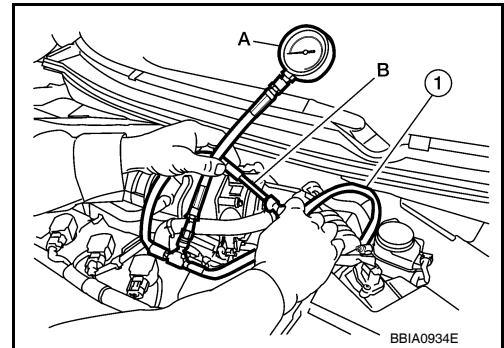
CAUTION:

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 B16 models never 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)] (A) and Fuel Pressure Adapter [SST (J-44321-6)] (B) to check fuel pressure.

1. Release fuel pressure to zero. Refer to “FUEL PRESSURE RELEASE”.
2. Remove fuel hose using Quick Connector Release [SST (J-45488)]. Refer to [EM-148](#).
 - Never twist or kink fuel hose because it is plastic hose.
 - Never remove fuel hose (1) from quick connector.
 - Keep fuel hose connections clean.
3. Install Fuel Pressure Adapter [SST (J-44321-6)] and Fuel Pressure Gauge kit [SST (J-44321)] as shown in figure.
 - Never 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.
6. Read the indication of fuel pressure gauge.
 - During fuel pressure check, check for fuel leakage from fuel connection every 3 minutes.



At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

7. If result is unsatisfactory, go to next step.
8. Check the following.
 - Fuel hoses and fuel tubes for clogging
 - Fuel filter for clogging
 - Fuel pump
 - Fuel pressure regulator for cloggingIf OK, replace fuel pressure regulator. Refer to [FL-6, "Removal and Installation"](#) and [EC-1113, "Precaution"](#).
If NG, repair or replace.
9. Before disconnecting Fuel Pressure Gauge and Fuel Pressure Adapter [SST (J-44321-6)], release fuel pressure to zero. Refer to “FUEL PRESSURE RELEASE”.

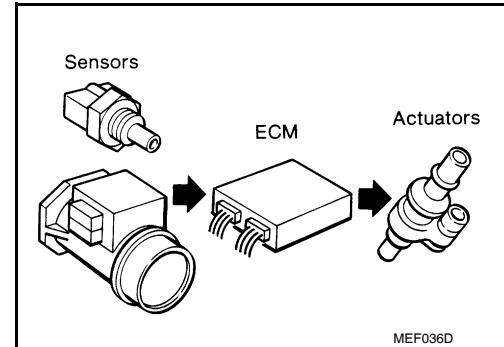
TROUBLE DIAGNOSIS

Trouble Diagnosis Introduction

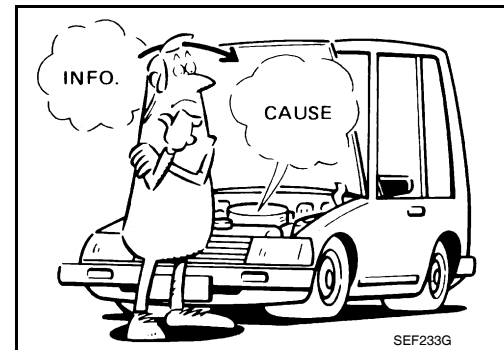
INFOID:000000006150392

INTRODUCTION

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no malfunctions such as vacuum leaks, fouled spark plugs, or other malfunctions with the engine.



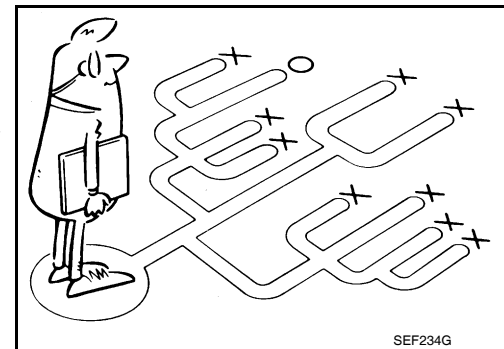
It is much more difficult to diagnose an incident that occurs intermittently rather than continuously. Most intermittent incidents are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



A visual check only may not find the cause of the incidents. A road test with CONSULT-III (or GST) or a circuit tester connected should be performed. Follow the Work Flow on "WORK FLOW".

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drivability complaint. The customer can supply good information about such incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A Diagnostic Worksheet like the example on "Worksheet Sample" should be used.

Start your diagnosis by looking for conventional malfunctions first. This will help troubleshoot drivability malfunctions on an electronically controlled engine vehicle.



WORK FLOW

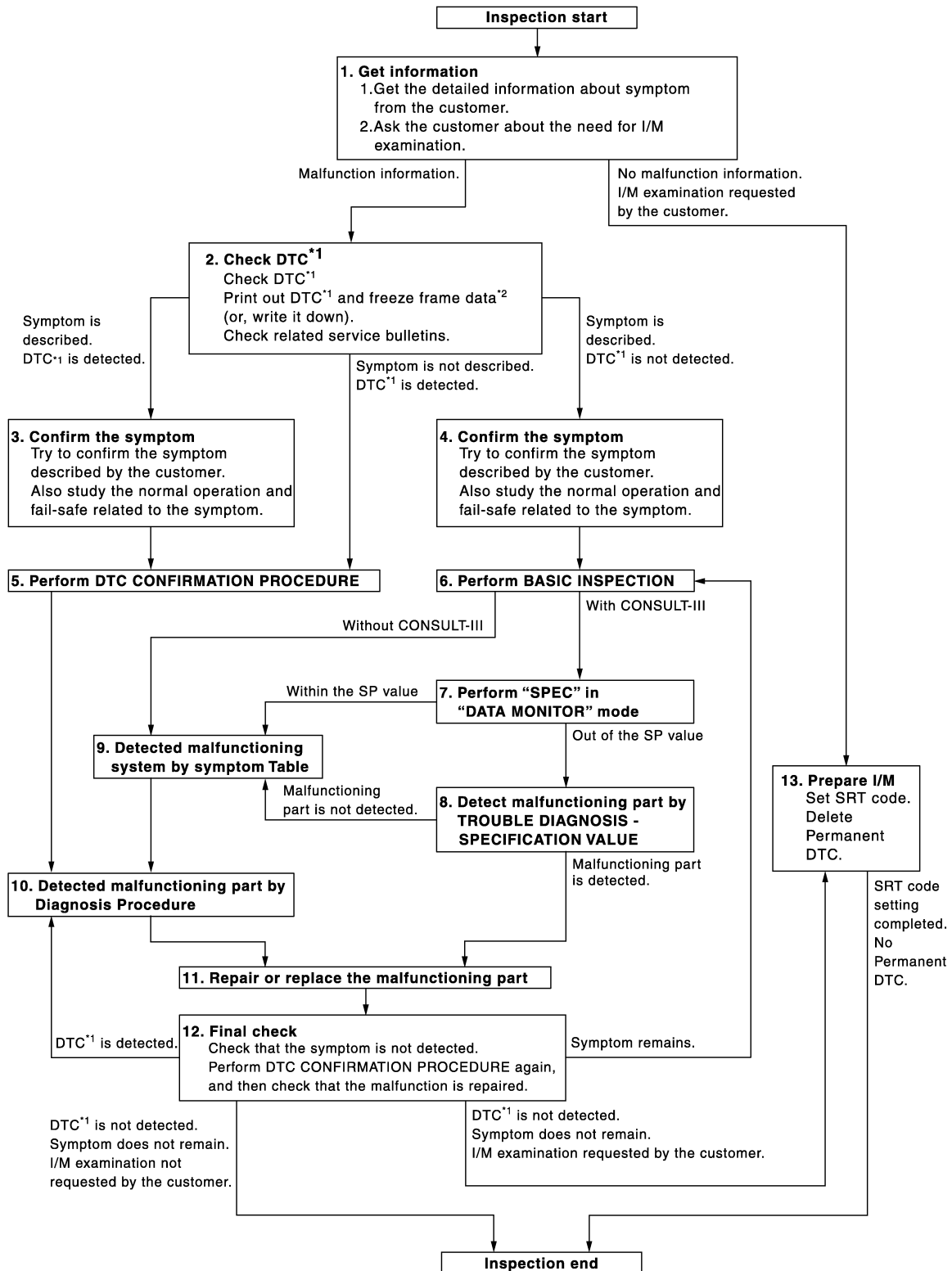
Overall Sequence

A
EC
C
D
E
F
G
H
I
J
K
L
M
N
O
P

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]



JSBIA0067GB

*1: Include 1st trip DTC.

*2: Include 1st trip freeze frame data.

Detailed Flow

1. GET INFORMATION FOR SYMPTOM

TROUBLE DIAGNOSIS

[QR25DE]

< SERVICE INFORMATION >

1. 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".
2. Ask if the customer requests I/M examination.

Malfunction information, obtained>>GO TO 2.

No malfunction information, but a request for I/M examination>>GO TO 13.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.
 - Record DTC and freeze frame data. (Print them out with CONSULT-III or GST.)
 - Erase DTC. (Refer to [EC-1144, "Emission-related Diagnostic Information"](#).)
 - Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Table is useful. Refer to [EC-1194, "Symptom Matrix Chart"](#).)
3. Check related service bulletins for information.

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.

Diagnosis Work Sheet is useful to verify the incident.

Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.

Also study the normal operation and fail-safe related to the symptom.

Diagnosis Work Sheet is useful to verify the incident.

Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then make sure that DTC is detected again.

If two or more DTCs are detected, refer to [EC-1192, "DTC Inspection Priority Chart"](#) and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- 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 CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 10.

NO >> Check according to [EC-1236, "Description"](#).

6.PERFORM BASIC INSPECTION

Perform [EC-1177, "Basic Inspection"](#).

Do you have CONSULT-III?

YES >> GO TO 7.

NO >> GO TO 9.

< SERVICE INFORMATION >

7. PERFORM SPEC IN DATA MONITOR MODE**With CONSULT-III**

Make sure that "MAS A/F SE-B1", "B/FUEL SCHDL", "A/F ALPHA-B1", and "A/F ALPHA-B2" are within the SP value using CONSULT-III "SPEC" in "DATA MONITOR" mode. Refer to [EC-1228, "Inspection Procedure"](#).

Is the measurement value within the SP value?

- YES >> GO TO 9.
NO >> GO TO 8.

8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to [EC-1228, "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 [EC-1194, "Symptom Matrix Chart"](#) 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 [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#).

Is a malfunctioning part detected?

- YES >> GO TO 11.
NO >> Monitor input data from related sensors or check voltage of related ECM terminals using CONSULT-III. Refer to [EC-1207, "ECM Terminal and Reference Value"](#), [EC-1224, "CONSULT-III Reference Value in Data Monitor Mode"](#).

11. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it. Refer to [EC-1144, "Emission-related Diagnostic Information"](#).

>> GO TO 12.

12. FINAL CHECK

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 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 (Transmission Control Module). Refer to [EC-1144, "Emission-related Diagnostic Information"](#).
NO-2 >> I/M examination, requested from the customer: GO TO 13.

13. PREPARE FOR I/M EXAMINATION

1. Set SRT codes. Refer to [EC-1144, "Emission-related Diagnostic Information"](#).
2. Erase permanent DTCs. Refer to [EC-1144, "Emission-related Diagnostic Information"](#).

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]

DTC Inspection Priority Chart

INFOID:000000006150393

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	<ul style="list-style-type: none"> • U0101 U0140 U1001 CAN communication line • P0101 P0102 P0103 Mass air flow sensor • P0112 P0113 P0127 Intake air temperature sensor • P0116 P0117 P0118 P0125 Engine coolant temperature sensor • P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor • P0128 Thermostat function • P0181 P0182 P0183 Fuel tank temperature sensor • P0327 P0328 Knock sensor • P0335 Crankshaft position sensor (POS) • P0340 Camshaft position sensor (PHASE) • P0460 P0461 P0462 P0463 Fuel level sensor • P0500 Vehicle speed sensor • P0605 P0607 ECM • P0643 Sensor power supply • P0705 Transmission range switch • P0850 Park/Neutral position (PNP) switch • P1610 - P1615 NATS • P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor
2	<ul style="list-style-type: none"> • P0031 P0032 P0051 P0052 Air fuel ratio (A/F) sensor 1 heater • P0037 P0038 P0057 P0058 Heated oxygen sensor 2 heater • P0075 Intake valve timing control solenoid valve • P0130 P0131 P0132 P0133 P0150 P0151 P0152 P0153 P2A00 P2A03 Air fuel ratio (A/F) sensor 1 • P0137 P0138 P0139 P0157 P0158 P0159 Heated oxygen sensor 2 • P0441 EVAP control system purge flow monitoring • P0443 P0444 P0445 EVAP canister purge volume control solenoid valve • P0447 P0448 EVAP canister vent control valve • P0451 P0452 P0453 EVAP control system pressure sensor • P0603 ECM power supply • P0710 P0715 P0720 P0740 P0744 P0745 P0746 P0776 P0778 P0840 P1740 CVT related sensors, solenoid valves and switches • P1217 Engine over temperature (OVERHEAT) • P1777 P1778 CVT step motor • P1805 Brake switch • P2100 P2103 Throttle control motor relay • P2101 Electric throttle control function • P2118 Throttle control motor
3	<ul style="list-style-type: none"> • P0011 Intake valve timing control • P0171 P0172 P0174 P0175 Fuel injection system function • P0300 - P0304 Misfire • P0420 P0430 Three way catalyst function • P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) • P0455 EVAP control system (GROSS LEAK) • P0506 P0507 Idle speed control system • P1148 P1168 Closed loop control • P1212 TCS communication line • P1421 Cold start control • P1564 ASCD steering switch • P1572 ASCD brake switch • P1574 ASCD vehicle speed sensor • P1715 Input speed sensor • P2119 Electric throttle control actuator

Fail-safe Chart

INFOID:000000006150394

When the DTC listed below is detected, the ECM enters fail-safe mode and the MIL illuminates.

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]

DTC No.	Detected items	Engine operating condition in fail-safe mode								
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 temperature sensor circuit	<p>Engine coolant temperature will be determined by ECM based on the following condition. CONSULT-III displays the engine coolant temperature decided by ECM.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Engine coolant temperature decided (CONSULT-III display)</th> </tr> </thead> <tbody> <tr> <td>Just as ignition switch is turned ON or START</td> <td style="text-align: center;">40°C (104°F)</td> </tr> <tr> <td>Approx. 4 minutes or more after engine starting</td> <td style="text-align: center;">80°C (176°F)</td> </tr> <tr> <td>Except as shown above</td> <td style="text-align: center;">40 - 80°C (104 - 176°F) (Depends on the time)</td> </tr> </tbody> </table> <p>When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.</p>	Condition	Engine coolant temperature decided (CONSULT-III display)	Just as ignition switch is turned ON or START	40°C (104°F)	Approx. 4 minutes or more after engine starting	80°C (176°F)	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
Condition	Engine coolant temperature decided (CONSULT-III display)									
Just as ignition switch is turned ON or START	40°C (104°F)									
Approx. 4 minutes or more after engine starting	80°C (176°F)									
Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)									
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	<p>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. So, the acceleration will be poor.</p>								
P0500	Vehicle speed sensor	When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (Highest) while engine is running.								
P0643	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P2100 P2103	Throttle control relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
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 actuator	<p>(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.</p> <p>(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.</p> <p>(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P (CVT), Neutral (M/T) position, and engine speed will not exceed 1,000 rpm or more.</p>								
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	<p>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. So, the acceleration will be poor.</p>								

- 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 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.

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]

Engine operating condition in fail-safe mode

Engine speed will not rise more than 2,500 rpm due to the fuel cut

Symptom Matrix Chart

INFOID:000000006150395

SYSTEM — BASIC ENGINE CONTROL SYSTEM

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-1639
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-1185
	Fuel injector circuit	1	1	2	3	2		2	2			2			EC-1634
	Evaporative emission system	3	3	4	4	4	4	4	4	4	4	4			EC-1127
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-1138
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			EC-1177
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-1572 , EC-1576 , EC-1582 , EC-1586
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-1177
	Ignition circuit	1	1	2	2	2		2	2			2			EC-1644
Power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-1237
Mass air flow sensor circuit		1	1	2	2	2		2	2			2			EC-1273 , EC-1280
Engine coolant temperature sensor circuit		1	1	2	2	2	3	2	2	3	1	2			EC-1294 , EC-1304
Throttle position sensor circuit			1	2		2	2	2	2	2		2			EC-1299 , EC-1400 , EC-1545 , EC-1546 , EC-1600
Accelerator pedal position sensor circuit				3	2	1	2			2					EC-1520 , EC-1588 , EC-1593 , EC-1605
Air fuel ratio (A/F) sensor 1 circuit			1	2	3	2		2	2			2			EC-1312 , EC-1320 , EC-1328 , EC-1336 , EC-1612

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Knock sensor circuit			2	2							3			EC-1411
Crankshaft position sensor (POS) circuit	2	2												EC-1415
Camshaft position sensor (PHASE) circuit	2	2												EC-1421
Vehicle speed signal circuit		2	3		3						3			EC-1508 , EC-1564
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-1514 , EC-1517
Intake valve timing control solenoid valve circuit	3	3	2		1	3	2	2	3		3			EC-1268
Park/neutral position (PNP) signal circuit			3		3	3	3	3	3		3			EC-1525
Refrigerant pressure sensor circuit		2				3	3	3	3		4			EC-1653
Electrical load signal circuit						3	3	3	3					EC-1632
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	MTC-28
ABS actuator and electric unit (control unit)			4											BRC-10

1 - 6: The numbers refer to the order of inspection.
(continued on next TABLE)

SYSTEM — ENGINE MECHANICAL & OTHER

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TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]

		SYMPTOM												Reference page														
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATSWATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)													
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA														
Fuel	Fuel tank	5													FL-10													
	Fuel piping			5	5	5		5	5			5			5	EM-148												
	Vapor lock	5																		—								
	Valve deposit																			—								
	Poor fuel (Heavy weight gasoline, Low octane)	5		5	5	5		5	5			5			5	5	5	5	5	5	5	—						
Air	Air duct														EM-133													
	Air cleaner														EM-133													
	Air leakage from air duct (Mass air flow sensor —electric throttle control actuator)														5	5	5	5	5	5	5	5	5	5	5	5	5	EM-133
	Electric throttle control actuator														5	5	5	5	5	5	5	5	5	5	5	5	5	EM-135
	Air leakage from intake manifold/Collector/Gasket														5	5	5	5	5	5	5	5	5	5	5	5	5	EM-135
Cranking	Battery	1	1	1		1		1	1			1		1	SC-5													
	Generator circuit														SC-26													
	Starter circuit	3													SC-11													
	Signal plate/Flywheel/Drive plate	6													EM-189													
	Park/neutral position (PNP) switch (M/T) Transmission range switch (CVT)	4													MT-66 (without LSD) or MT-144 (with LSD) CVT-61 (A/T)													
Engine	Cylinder head	5	5	5	5	5		5	5			5	3		EM-175													
	Cylinder head gasket														4	3	EM-175											
	Cylinder block																											
	Piston																								4			
	Piston ring	6													6	6	6	6		6	6			6			EM-175	
	Connecting rod																											
	Bearing																											
	Crankshaft																											

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Valve mechanism	Timing chain														EM-164
	Camshaft														EM-153
	Intake valve timing control	5	5	5	5	5		5	5			5			EM-164
	Intake valve												3		EM-175
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			EM-140 , EX-11
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5	2		EM-142 , LU-20 , LU-22 , LU-16
	Oil level (Low)/Filthy oil														LU-18
Cooling	Radiator/Hose/Radiator filler cap														CO-44
	Thermostat									5					CO-51
	Water pump														CO-48
	Water gallery	5	5	5	5	5		5	5		2	5			CO-51
	Cooling fan									5					CO-46
	Coolant level (low)/Contaminated coolant														CO-39
NVIS (NISSAN Vehicle Immobilizer System — NATS)		1	1												BL-171

1 - 6: The numbers refer to the order of inspection.

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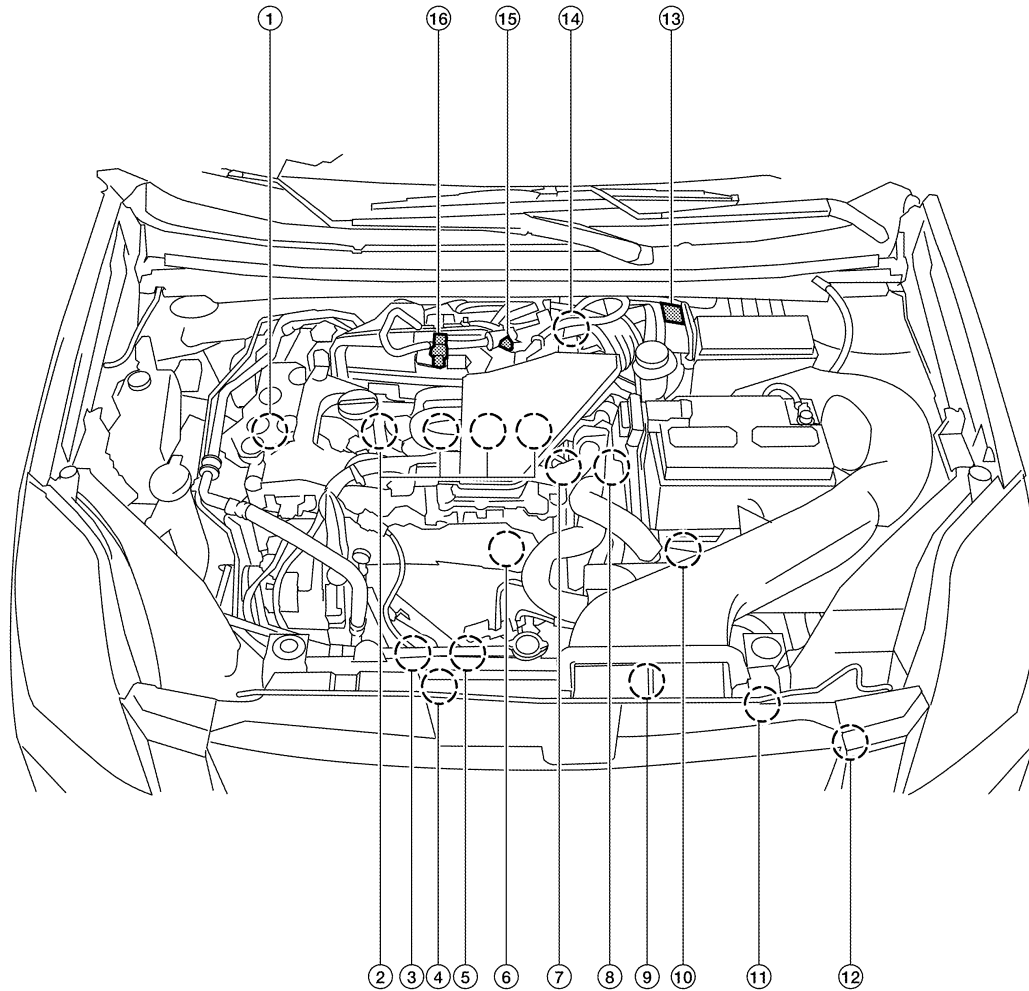
TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]

Engine Control Component Parts Location

INFOID:000000006150396



B8IA0896E

- | | | |
|---|---|--|
| 1. Intake valve timing control solenoid valve | 2. Ignition coil (with power transistor) and spark plug, | 3. A/F sensor 1 (Bank 1) |
| 4. Cooling fan motor-1 | 5. A/F sensor 1 (Bank 2) | 6. Knock sensor and crankshaft position sensor (POS) |
| 7. Camshaft position sensor (PHASE) | 8. Engine coolant temperature sensor | 9. Cooling fan motor-2 |
| 10. ECM | 11. Park/neutral position (PNP) switch (M/T)
Transmission range switch (CVT) | 12. Refrigerant pressure sensor |
| 13. Mass air flow sensor (with intake air temperature sensor) | 14. Electric throttle control actuator (with built in throttle position sensor, throttle control motor) | 15. EVAP service port |
| 16. EVAP canister purge volume control solenoid valve | | |

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]

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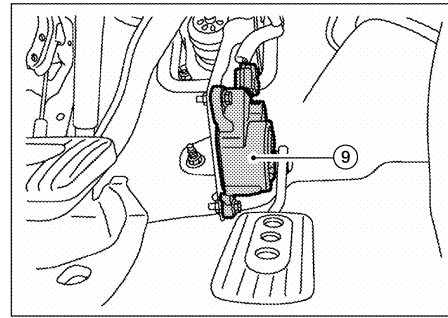
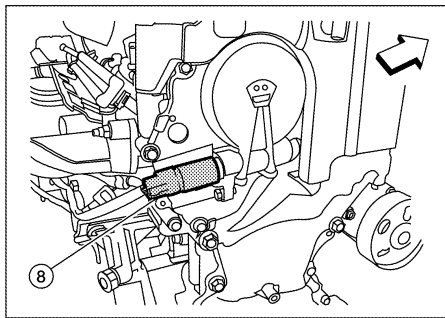
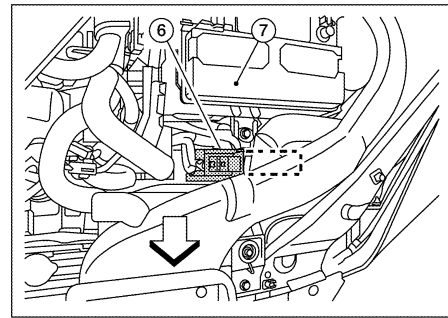
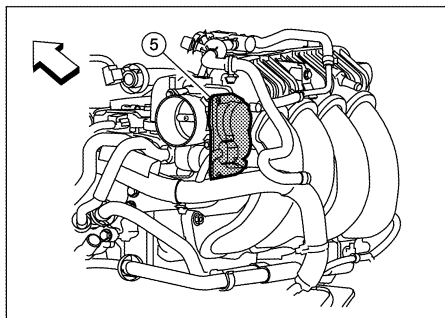
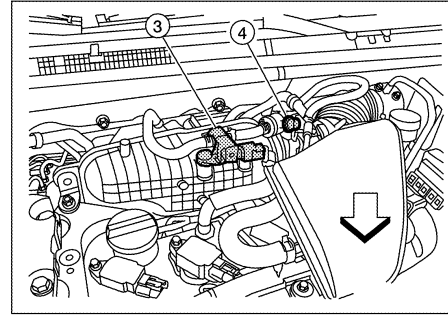
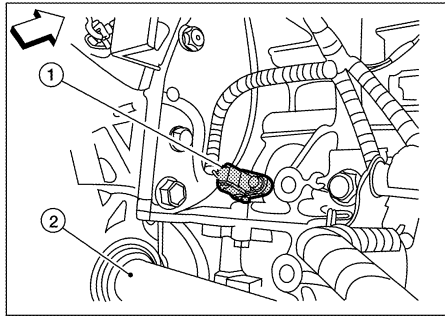
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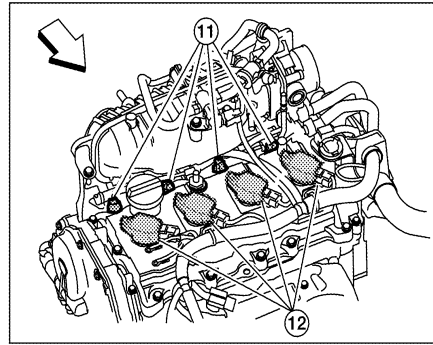
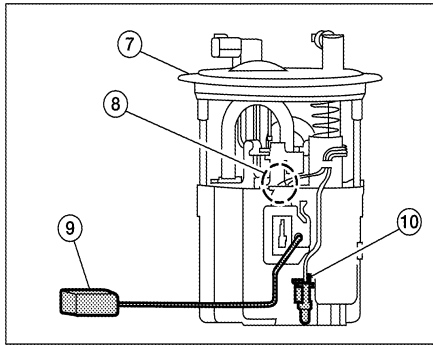
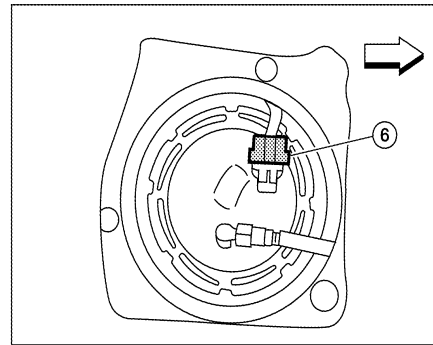
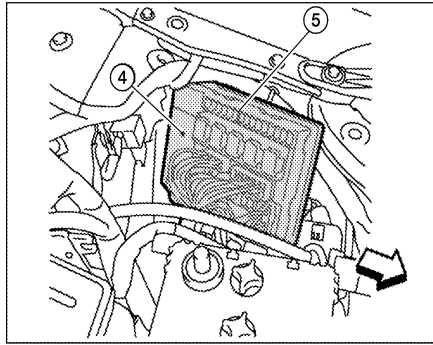
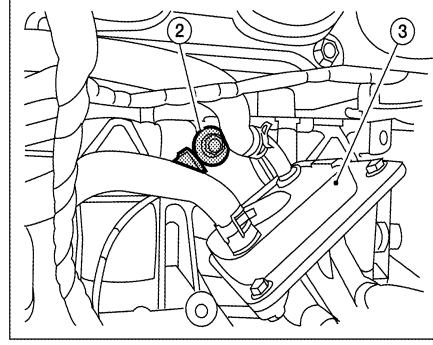
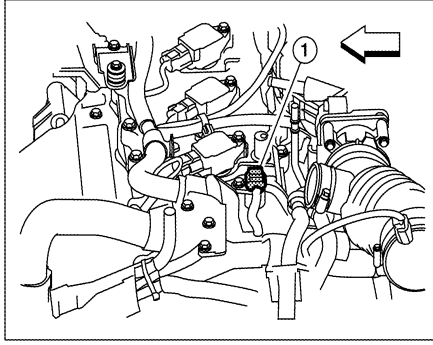
↔ : Vehicle front

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| 1. Crankshaft position sensor (POS) | 2. Drive shaft (RH) | 3. EVAP canister purge volume control solenoid valve |
| 4. EVAP service port | 5. Electric throttle control actuator | 6. ECM |
| 7. Battery | 8. Intake valve timing control solenoid valve | 9. Accelerator pedal position sensor |

TROUBLE DIAGNOSIS

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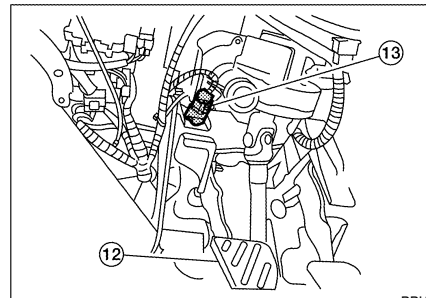
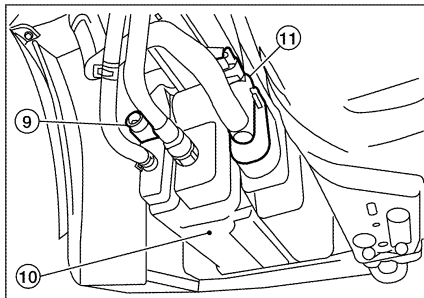
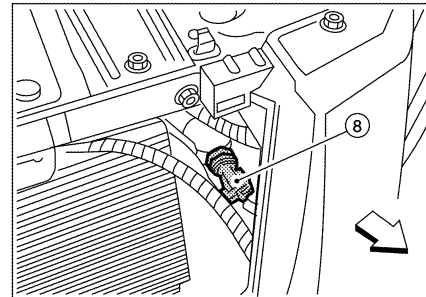
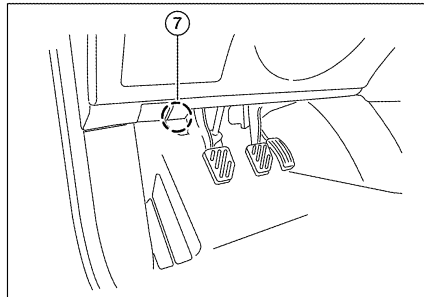
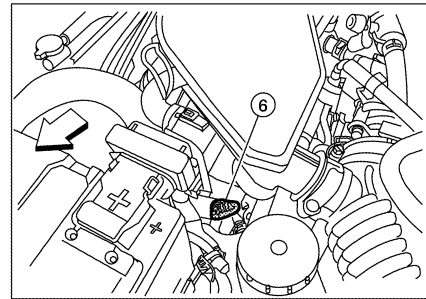
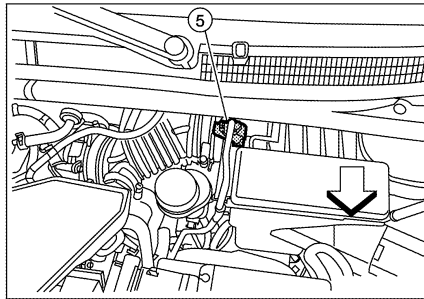
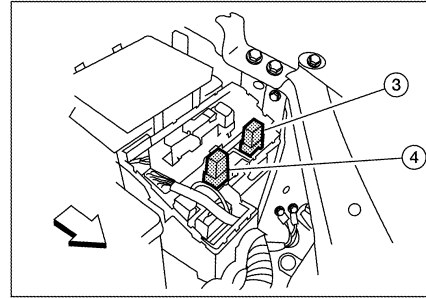
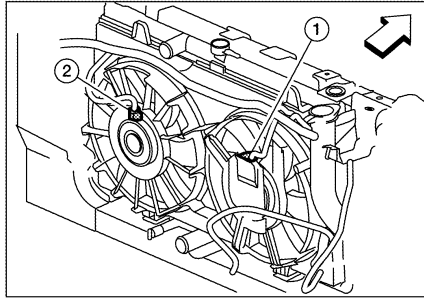
← : Vehicle front

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| 1. Camshaft position sensor (PHASE) | 2. Knock sensor | 3. Engine oil cooler |
| 4. IPDM E/R | 5. Fuel pump fuse | 6. Fuel level sensor unit and fuel pump harness connector (view with inspection hole cover removed.) |
| 7. Fuel level sensor unit and fuel pump assembly | 8. Fuel pressure regulator | 9. Fuel level sensor |
| 10. Fuel tank temperature sensor | 11. Fuel injector | 12. Ignition coil (with power transistor) and spark plug |

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]



⇐ Vehicle front

- 1. Cooling fan motor-1
- 4. Cooling fan relay-4
- 7. Data link connector
- 10. EVAP canister
- 13. ASCD clutch switch

- 2. Cooling fan motor-2
- 5. Mass air flow sensor (with intake air temperature sensor)
- 8. Refrigerant pressure sensor
- 11. EVAP canister vent control valve

- 3. Cooling fan relay-5
- 6. Engine coolant temperature sensor
- 9. EVAP control system pressure sensor
- 12. Clutch pedal

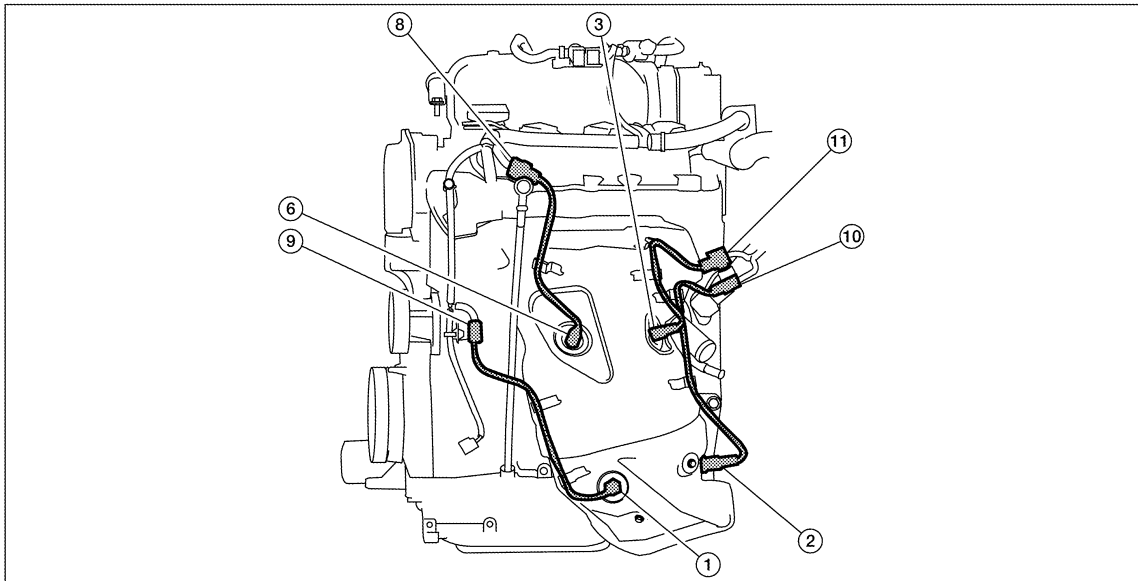
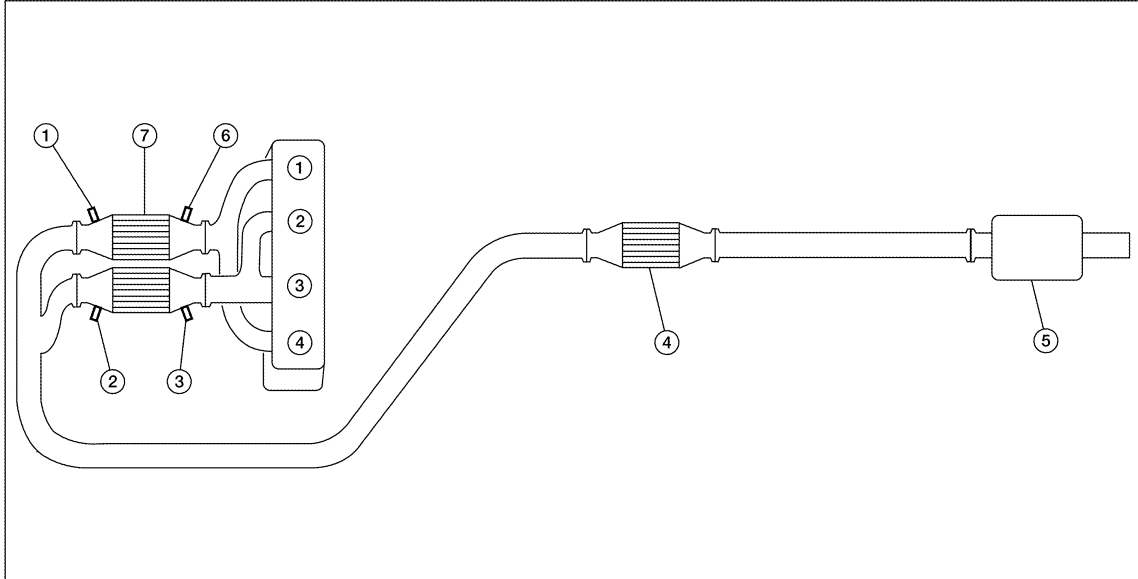
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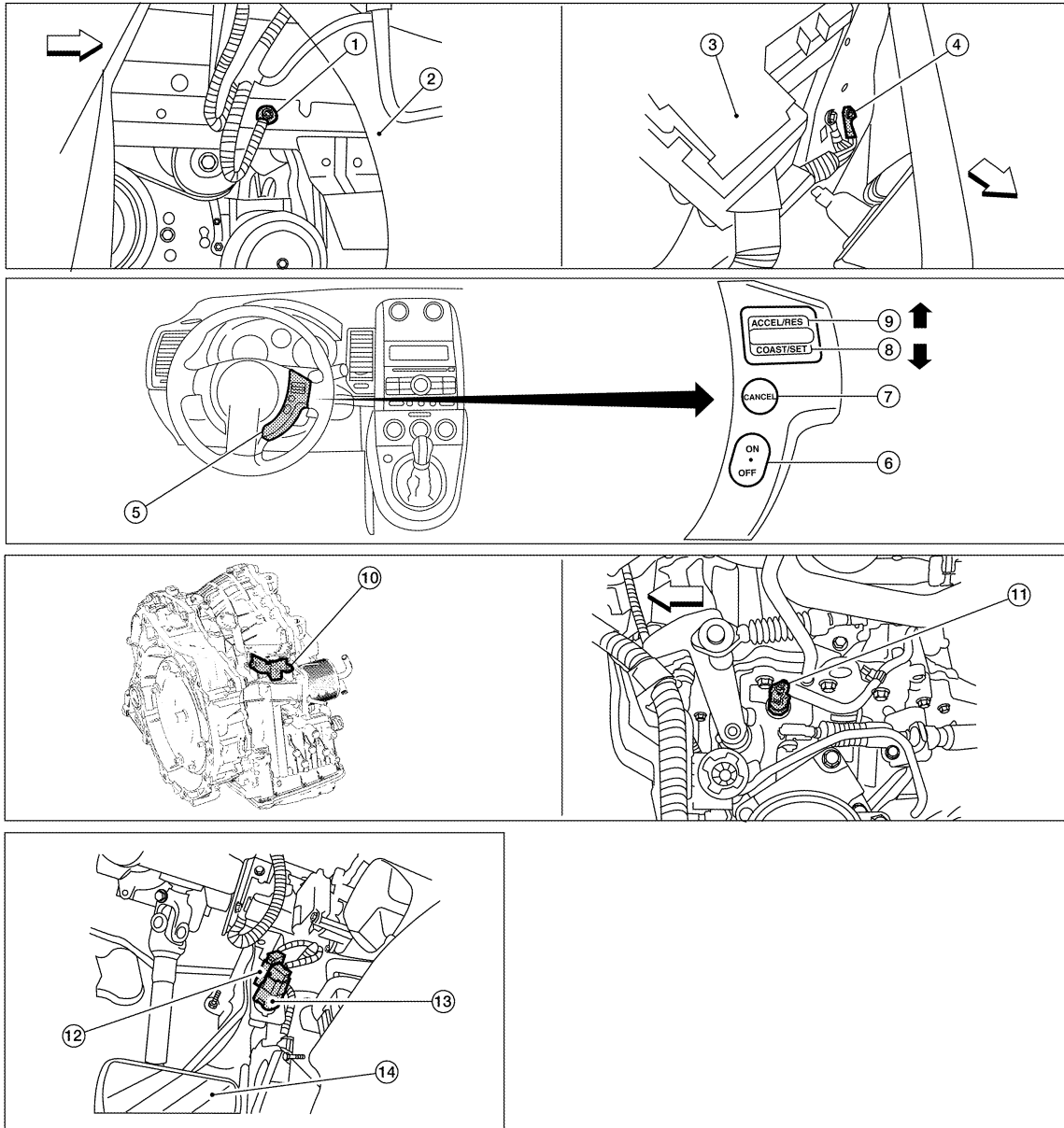
↶ : Vehicle front

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| 1. Heated oxygen sensor 2 (Bank 1) | 2. Heated oxygen sensor 2 (Bank 2) | 3. Air fuel ratio (A/F) sensor 1 (Bank 2) |
| 4. Three-way catalyst (under floor) | 5. Muffler | 6. Air fuel ratio (A/F) sensor 1 (Bank 1) |
| 7. Three-way catalyst (manifold) | 8. Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector | 9. Heated oxygen sensor 2 (Bank 1) harness connector |
| 10. Heated oxygen sensor 2 (Bank 2) harness connector | 11. Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector | |

TROUBLE DIAGNOSIS

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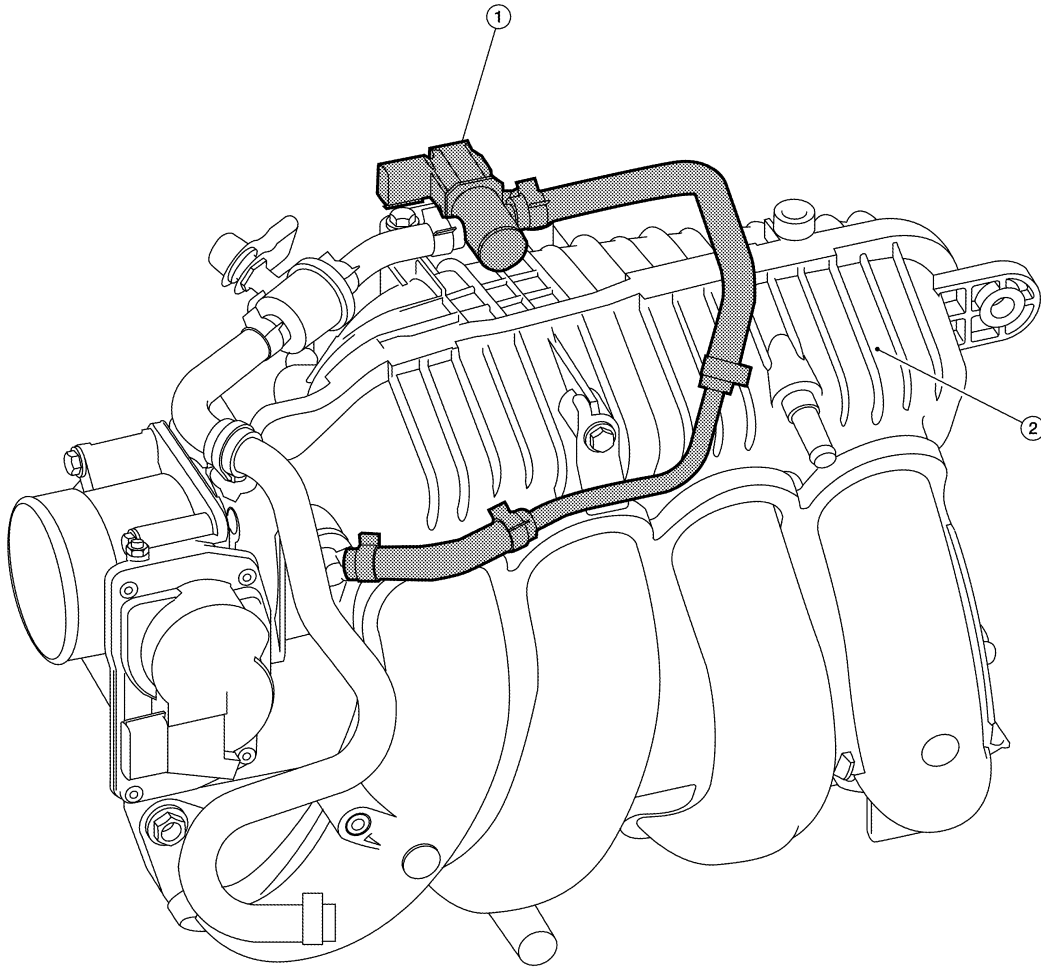
← : Vehicle front

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| 1. Body ground E9 (view with front RH and fender protect PH removed.) | 2. Washer tank | 3. Fuse and fusible link box |
| 4. Body ground E15 | 5. ASCD steering switch | 6. MAIN switch |
| 7. CANCEL switch | 8. SET/COAST switch | 9. RESUME/ACCELERATOR switch |
| 10. Transmission range switch (CVT models) | 11. PNP switch (M/T models) (view with air cleaner assembly removed) | 12. ASCD brake switch |
| 13. Stop lamp switch | 14. Brake pedal | |

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Vacuum Hose Drawing

INFOID:000000006150397



BBIA0897E

1. EVAP canister purge volume control solenoid valve 2. Intake manifold collector

NOTE:

Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses. Refer to [EC-1118, "Schematic"](#) for Vacuum Control System.

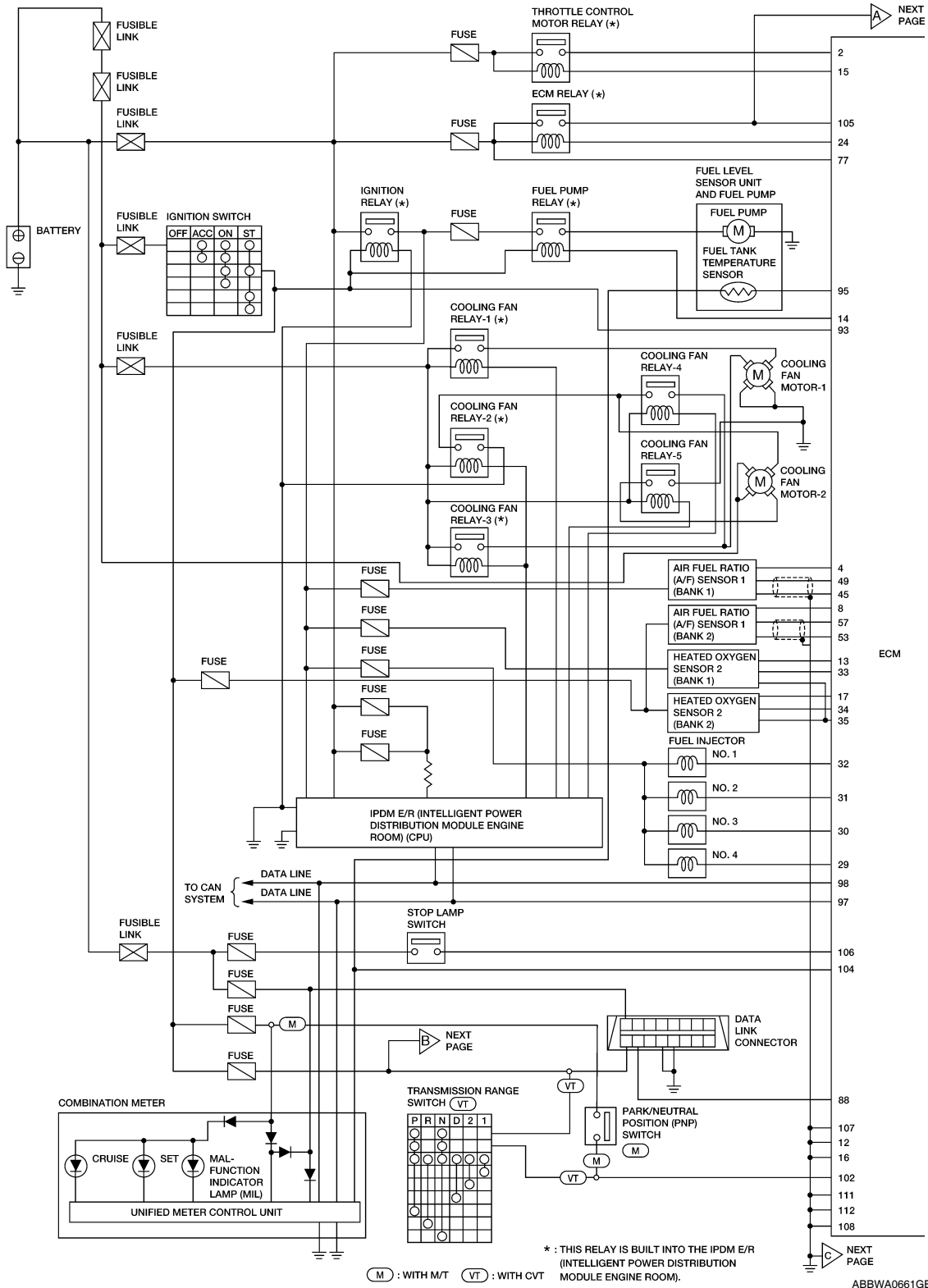
TROUBLE DIAGNOSIS

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[QR25DE]

Circuit Diagram

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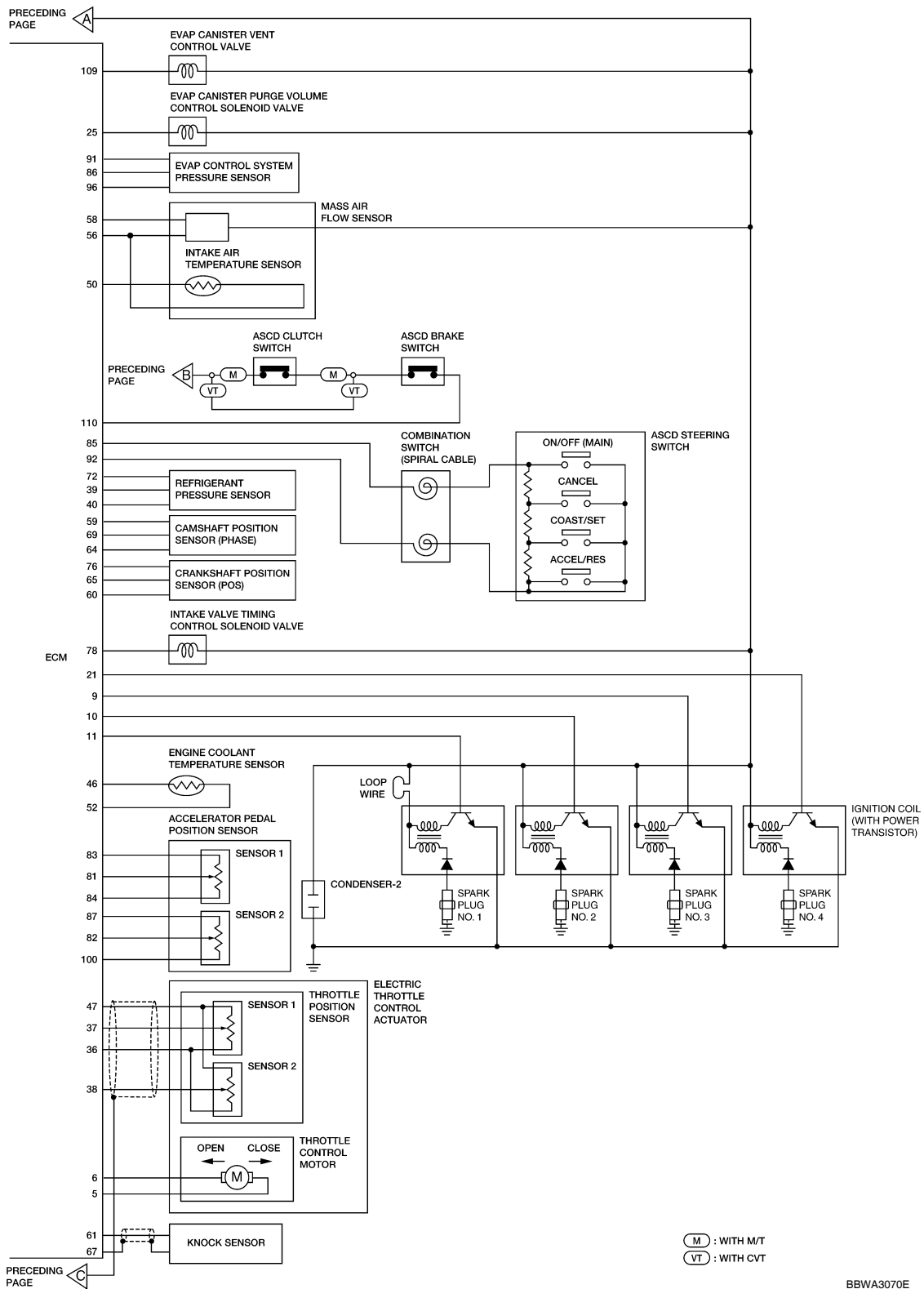
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TROUBLE DIAGNOSIS

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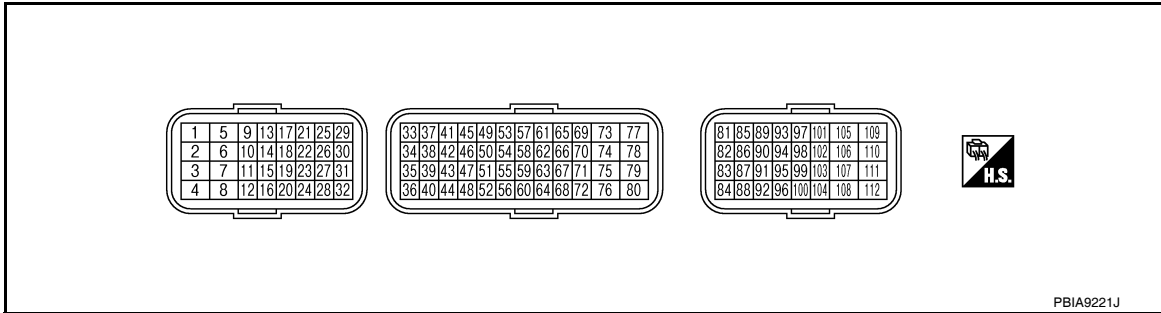
TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]

ECM Harness Connector Terminal Layout

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PBIA9221J

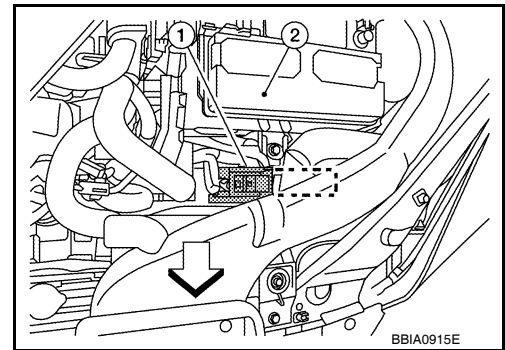
ECM Terminal and Reference Value

INFOID:000000006150400

PREPARATION

ECM (1) is located in the engine room left side near battery.

- ↵: Vehicle front
- Battery (2)



B8IA0915E

ECM INSPECTION TABLE

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

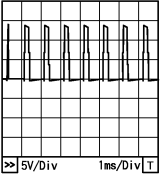
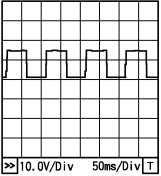
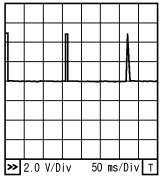
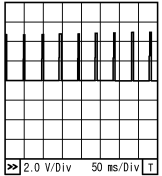
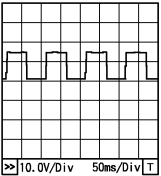
Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
4	BR/W	A/F sensor 1 heater (Bank 1)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ 10.0V/Div 50ms/Div T PBIA8148J
5	W	Throttle control motor (Open)	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	0 - 14 V★ 5V/Div 1ms/Div T PBIA8150J

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

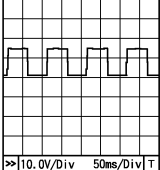
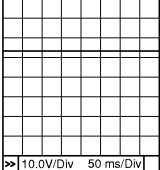

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
6	L/R	Throttle control motor (Close)	<p>[Ignition switch: ON]</p> <ul style="list-style-type: none"> • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released 	<p style="text-align: center;">0 - 14 V★</p>  <p style="text-align: right; font-size: small;">PBIA8149J</p>
8	BR/Y	A/F sensor 1 heater (Bank 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed (More than 140 seconds after starting engine) 	<p style="text-align: center;">Approximately 2.9 - 8.8 V★</p>  <p style="text-align: right; font-size: small;">PBIA8148J</p>
9 10 11 21	Y BR/Y V G	Ignition signal No. 3 Ignition signal No. 2 Ignition signal No. 1 Ignition signal No. 4	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle.</p>	<p style="text-align: center;">0 - 0.1 V★</p>  <p style="text-align: right; font-size: small;">PBIA9265J</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,500 rpm. 	<p style="text-align: center;">0 - 0.2 V★</p>  <p style="text-align: right; font-size: small;">PBIA9266J</p>
12 16	B B	ECM ground	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Idle speed 	Body ground
13	B	Heated oxygen sensor 2 heater (Bank 1)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	<p style="text-align: center;">Approximately 10 V★</p>  <p style="text-align: right; font-size: small;">PBIA8148J</p>
			<p>[Ignition switch: ON]</p> <ul style="list-style-type: none"> • Engine stopped <p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
14	B/O	Fuel pump relay	<p>[Ignition switch: ON]</p> <ul style="list-style-type: none"> • For 1 second after turning ignition switch ON <p>[Engine is running]</p>	0 - 1.0 V
			<p>[Ignition switch: ON]</p> <ul style="list-style-type: none"> • More than 1 second after turning ignition switch ON 	BATTERY VOLTAGE (11 - 14 V)

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

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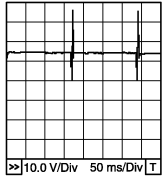
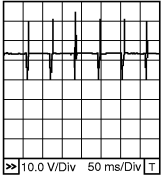
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V
17	R/L	Heated oxygen sensor 2 heater (Bank 2)	[Engine is running] <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★  <small>PBIA8148J</small>
			[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped [Engine is running] <ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
24	R/B	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none"> • For a few seconds after turning ignition switch OFF 	0 - 1.0 V
			[Ignition switch: OFF] <ul style="list-style-type: none"> • More than a few seconds after turning ignition switch OFF 	BATTERY VOLTAGE (11 - 14 V)
25	W/B	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting. 	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIB0505E</small>
			[Engine is running] <ul style="list-style-type: none"> • Engine speed: Approx. 2,000 rpm (More than 100 seconds after starting engine) 	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIB0520E</small>

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TROUBLE DIAGNOSIS

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[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
29 30 31 32	R O GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle.</p>	<p style="text-align: center;">BATTERY VOLTAGE (11 - 14 V)★</p>  <p style="text-align: right; font-size: small;">PBIB0529E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	<p style="text-align: center;">BATTERY VOLTAGE (11 - 14 V)★</p>  <p style="text-align: right; font-size: small;">PBIA4943J</p>
33	G	Heated oxygen sensor 2 (Bank 1)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
34	W	Heated oxygen sensor 2 (Bank 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
35	B	Sensor ground (Heated oxygen sensor 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
36	G	Sensor ground (Throttle position sensor)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V
37	R	Throttle position sensor 1	<p>[Ignition switch: ON]</p> <ul style="list-style-type: none"> • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released 	More than 0.36 V
			<p>[Ignition switch: ON]</p> <ul style="list-style-type: none"> • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed 	Less than 4.75 V
38	W	Throttle position sensor 2	<p>[Ignition switch: ON]</p> <ul style="list-style-type: none"> • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released 	Less than 4.75 V
			<p>[Ignition switch: ON]</p> <ul style="list-style-type: none"> • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed 	More than 0.36 V

TROUBLE DIAGNOSIS

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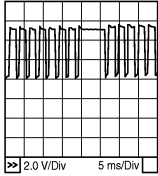
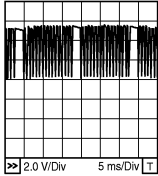

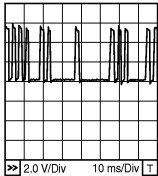
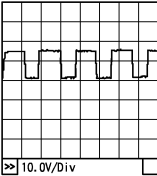
[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	A
39	L	Refrigerant pressure sensor	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Both A/C switch and blower fan switch: ON (Compressor operates) 	1.0 - 4.0 V	EC
40	R/G	Sensor ground (Refrigerant pressure sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V	C
45	W	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	Approximately 1.8 V Output voltage varies with air fuel ratio.	D
46	P	Engine coolant temperature sensor	[Engine is running]	Approximately 0 - 4.8 V Output voltage varies with engine coolant temperature.	E
47	B	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V	F
49	B	A/F sensor 1 (Bank 1)	[Ignition switch: ON]	Approximately 2.2 V	G
50	BR/Y	Intake air temperature sensor	[Engine is running]	Approximately 0 - 4.8 V Output voltage varies with intake air temperature.	H
52	GR	Sensor ground (Engine coolant temperature sensor)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V	I
53	W	A/F sensor 1 (Bank 2)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	Approximately 1.8 V Output voltage varies with air fuel ratio.	J
56	B	Sensor ground	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V	K
57	R	A/F sensor 1 (Bank 2)	[Ignition switch: ON]	Approximately 2.2 V	L
58	V	Mass air flow sensor	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	0.9 - 1.1 V	M
			[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,500 rpm 	1.4 - 1.7 V	N
59	G/Y	Sensor power supply [Camshaft position sensor (PHASE)]	[Ignition switch: ON]	Approximately 5 V	O
60	B	Sensor ground [Crankshaft position sensor (POS)]	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V	P
61	W	Knock sensor	[Engine is running] <ul style="list-style-type: none"> • Idle speed 	Approximately 2.5V	
64	B	Sensor ground [Camshaft position sensor (PHASE)]	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V	

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[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	Y	Crankshaft position sensor (POS)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle.</p>	<p>Approximately 4.0 V★</p>  <p style="text-align: right; font-size: small;">PBIB2998E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed: 2,000 rpm 	<p>Approximately 4.0 V★</p>  <p style="text-align: right; font-size: small;">PBIB2999E</p>
67	GR	Sensor ground (Knock sensor)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	<p>Approximately 0 V</p>
69	R	Camshaft position sensor (PHASE)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle.</p>	<p>1.0 - 2.0 V★</p>  <p style="text-align: right; font-size: small;">PBIB2986E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed: 2,000 rpm. 	<p>1.0 - 2.0 V★</p>  <p style="text-align: right; font-size: small;">PBIB2987E</p>
72	G/W	Sensor power supply (Refrigerant pressure sensor)	<p>[Ignition switch: ON]</p>	<p>Approximately 5 V</p>
76	G/R	Sensor power supply [Crankshaft position sensor (POS)]	<p>[Ignition switch: ON]</p>	<p>Approximately 5 V</p>
77	Y/R	Power supply for ECM (Back-up)	<p>[Ignition switch: OFF]</p>	<p>BATTERY VOLTAGE (11 - 14 V)</p>
78	Y/R	Intake valve timing control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	<p>BATTERY VOLTAGE (11 - 14 V)</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • When revving engine up to 2,000 rpm quickly 	<p>7 - 10 V★</p>  <p style="text-align: right; font-size: small;">PBIA4937J</p>

TROUBLE DIAGNOSIS

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[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	A
81	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V	EC
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V	C
82	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V	D
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V	E
83	O	Sensor power supply (Accelerator pedal position sensor 1)	[Ignition switch: ON]	Approximately 5 V	F
84	B/W	Sensor ground (Accelerator pedal position sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	G
85	L/Y	ASC D steering switch	[Ignition switch: ON] • ASC D steering switch: OFF	Approximately 4 V	H
			[Ignition switch: ON] • MAIN switch: Pressed	Approximately 0 V	I
			[Ignition switch: ON] • CANCEL switch: Pressed	Approximately 1 V	J
			[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	Approximately 3 V	K
			[Ignition switch: ON] • SET/COAST switch: Pressed	Approximately 2 V	L
86	R/Y	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8 V	M
87	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	[Ignition switch: ON]	Approximately 5 V	N
88	P/L	DATA link connector	—	—	O
91	V/W	Sensor power supply (EVAP control system pressure sensor)	[Ignition switch: ON]	Approximately 5 V	P
92	B/Y	Sensor ground (ASC D steering switch)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	P
93	B/R	Ignition switch	[Ignition switch: OFF]	0 V	O
			[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)	P
95	G/O	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8 V Output voltage varies with fuel tank temperature	P
96	V/R	Sensor ground (EVAP control system pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V	P
97	P	CAN communication line	—	—	P
98	L	CAN communication line	—	—	P

TROUBLE DIAGNOSIS

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[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
100	B	Sensor ground (Accelerator pedal position sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
102	BR/R	PNP signal	[Ignition switch: ON] • Selector lever: P or N (CVT), Neutral (M/T)	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON] • Except above	Approximately 0 V
104	B/P	Sensor ground (Fuel tank temperature sen- sor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
106	R/G	Stop lamp switch	[Ignition switch: OFF] • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)
107 108	B B	ECM ground	[Engine is running] • Idle speed	Body ground
109	L/Y	EVAP canister vent control valve	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
110	G/B	ASCD brake switch	[Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly de- pressed (M/T)	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully re- leased (M/T)	BATTERY VOLTAGE (11 - 14 V)
111 112	B B	ECM ground	[Engine is running] • Idle speed	Body ground

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

CONSULT-III Function (ENGINE)

INFOID:000000006150401

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-III screen.
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.
Active Test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function Test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
DTC & SRT Confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
Ecu Identification	ECM part number can be read.

*: 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

TROUBLE DIAGNOSIS

[QR25DE]

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- System readiness test (SRT) codes
- Test values

WORK SUPPORT MODE

Work Item

Work item	Condition	USAGE
FUEL PRESSURE RELEASE	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • the idle air volume that keeps the engine within the specified range is memorized in ECM. 	When learning the idle air volume
SELF-LEARNING CONT	<ul style="list-style-type: none"> • The coefficient of self-learning control mixture ratio returns to the original coefficient. 	When clearing the coefficient of self-learning control value
EVAP SYSTEM CLOSE	Close the EVAP canister vent control valve in order to make EVAP system close under the following conditions. <ul style="list-style-type: none"> • IGN SW "ON" • Engine not running • Ambient temperature is above 0°C (32°F). • No vacuum and no high pressure in EVAP system • Fuel tank temp. 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-III will discontinue it and display appropriate instruction. <p>NOTE: When starting engine, CONSULT-III may display "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", even in using charged battery.</p>	When detecting EVAP vapor leak point of EVAP system
TARGET IDLE RPM ADJ*	<ul style="list-style-type: none"> • Idle condition 	When setting target idle speed
TARGET IGN TIM ADJ*	<ul style="list-style-type: none"> • Idle condition 	When adjusting target ignition timing
CLSD THL POS LEARN	<ul style="list-style-type: none"> • Ignition on and engine stopped. 	When learning the throttle valve closed position
VIN REGISTRATION	<ul style="list-style-type: none"> • In this mode, VIN is registered in ECM. 	When registering VIN in ECM

*: This function is not necessary in the usual service procedure.

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC and 1st trip DTC, refer to [EC-1144, "Emission-related Diagnostic Information"](#).

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.

How to Erase DTC and 1st Trip DTC

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 [EC-1144, "Emission-related Diagnostic Information"](#)), skip step 1.

1. Erase DTC in TCM. Refer to [CVT-5, "DTC No. Index"](#).
2. Select "ENGINE" with CONSULT-III.
3. Select "SELF-DIAG RESULTS".
4. Touch "ERASE". (DTC in ECM will be erased.)

Freeze Frame Data and 1st Trip Freeze Frame Data

TROUBLE DIAGNOSIS

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[QR25DE]

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	<ul style="list-style-type: none"> The engine control component part/control system has a trouble code, it is displayed as PXXXX. (Refer to EC-1106.)
FUEL SYS-B1	<ul style="list-style-type: none"> “Fuel injection system status” at the moment a malfunction is detected is displayed. One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enrichment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop
FUEL SYS-B2	
CAL/LD VALUE [%]	<ul style="list-style-type: none"> The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	<ul style="list-style-type: none"> “Long-term fuel trim” at the moment a malfunction is detected is displayed. The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
L-FUEL TRM-B2 [%]	
S-FUEL TRM-B1 [%]	<ul style="list-style-type: none"> “Short-term fuel trim” at the moment a malfunction is detected is displayed. The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
S-FUEL TRM-B2 [%]	
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH-P/S [%]	<ul style="list-style-type: none"> The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> The intake air temperature at the moment a malfunction is detected is displayed.
INT MANI PRES [kPa]	<ul style="list-style-type: none"> 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

Monitored Item

x: Applicable

Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	<ul style="list-style-type: none"> Indicates the engine speed computed from the signals of the crankshaft position sensor (POS) and camshaft position sensor (PHASE). 	<ul style="list-style-type: none"> Accuracy becomes poor if engine speed drops below the idle rpm. If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1	V	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor is displayed. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in “SPEC”.
B/FUEL SCHDL	ms	<ul style="list-style-type: none"> “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	<ul style="list-style-type: none"> When engine is running specification range is indicated in “SPEC”.
A/F ALPHA-B1	%	<ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. When engine is running specification range is indicated in “SPEC”. This data also includes the data for the air/fuel ratio learning control.
A/F ALPHA-B2	%		

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Monitored item	Unit	Description	Remarks
COOLAN TEMP/S	°C or °F	<ul style="list-style-type: none"> The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed. 	<ul style="list-style-type: none"> 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)	V	<ul style="list-style-type: none"> The A/F signal computed from the input signal of the A/F sensor 1 is displayed. 	
A/F SEN1 (B2)	V		
HO2S2 (B1)	V	<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 2 is displayed. 	
HO2S2 (B2)	V		
HO2S2 MNTR (B1)	RICH/LEAN	<ul style="list-style-type: none"> Display of heated oxygen sensor 2 signal: 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. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
HO2S2 MNTR (B2)	RICH/LEAN		
VHCL SPEED SE	km/h or mph	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal is displayed. 	
BATTERY VOLT	V	<ul style="list-style-type: none"> The power supply voltage of ECM is displayed. 	
ACCEL SEN 1	V	<ul style="list-style-type: none"> The accelerator pedal position sensor signal voltage is displayed. 	<ul style="list-style-type: none"> ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
ACCEL SEN 2	V		
TP SEN 1-B1	V	<ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. 	<ul style="list-style-type: none"> TP SEN 2-B1 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
TP SEN 2-B1	V		
FUEL T/TMP SE	°C or °F	<ul style="list-style-type: none"> The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed. 	
VEHICLE SPEED	km/h or mph	<ul style="list-style-type: none"> Indicates the vehicle speed computed from the output speed sensor signal. 	
INT/A TEMP SE	°C or °F	<ul style="list-style-type: none"> The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated. 	
EVAP SYS PRES	V	<ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. 	
FUEL LEVEL SE	V	<ul style="list-style-type: none"> The signal voltage of the fuel level sensor is displayed. 	
START SIGNAL	ON/OFF	<ul style="list-style-type: none"> Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage. 	<ul style="list-style-type: none"> After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS	ON/OFF	<ul style="list-style-type: none"> Indicates idle position [ON/OFF] computed by the ECM according to the accelerator pedal position sensor signal. 	
AIR COND SIG	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal. 	
P/N POSI SW	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position (PNP) signal. 	
PW/ST SIGNAL	ON/OFF	<ul style="list-style-type: none"> [ON/OFF] condition of the power steering system (determined by the signal sent from EPS control unit) is indicated. 	
LOAD SIGNAL	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF: Both rear window defogger switch and lighting switch are OFF. 	

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[QR25DE]

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Monitored item	Unit	Description	Remarks
IGNITION SW	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch. 	
HEATER FAN SW	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the heater fan switch signal. 	
BRAKE SW	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the stop lamp switch signal. 	
I/P PULLY SPD	rpm	<ul style="list-style-type: none"> Indicates the engine speed computed from the input speed sensor signal. 	
INJ PULSE-B1	msec	<ul style="list-style-type: none"> Indicates the actual fuel injection pulse width compensated by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain computed value is indicated.
INJ PULSE-B2	msec		
IGN TIMING	BTDC	<ul style="list-style-type: none"> Indicates the ignition timing computed by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
CAL/LD VALUE	%	<ul style="list-style-type: none"> "Calculated load value" indicates the value of the current airflow divided by peak airflow. 	
MASS AIRFLOW	g/s	<ul style="list-style-type: none"> Indicates the mass airflow computed by ECM according to the signal voltage of the mass air flow sensor. 	
PURG VOL C/V	%	<ul style="list-style-type: none"> Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 	
INT/V TIM (B1)	°CA	<ul style="list-style-type: none"> Indicates [°CA] of intake camshaft advanced angle. 	
INT/V SOL (B1)	%	<ul style="list-style-type: none"> The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signal) is indicated. The advance angle becomes larger as the value increases 	
AIR COND RLY	ON/OFF	<ul style="list-style-type: none"> The air conditioner relay control condition (determined by ECM according to the input signals) is indicated. 	
FUEL PUMP RLY	ON/OFF	<ul style="list-style-type: none"> Indicates the fuel pump relay control condition determined by ECM according to the input signals. 	
VENT CONT/V	ON/OFF	<ul style="list-style-type: none"> The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON: Closed OFF: Open 	
THRTL RELAY	ON/OFF	<ul style="list-style-type: none"> Indicates the throttle control motor relay control condition determined by the ECM according to the input signals. 	
COOLING FAN	HI/LOW/OFF	<ul style="list-style-type: none"> Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI: High speed operation LOW: Low speed operation OFF: Stop 	
HO2S2 HTR (B1)	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals. 	
HO2S2 HTR (B2)	ON/OFF		

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Monitored item	Unit	Description	Remarks
IDL A/V LEARN	YET/CMPLT	<ul style="list-style-type: none"> Display the condition of idle air volume learning YET: Idle Air Volume Learning has not been performed yet. CMPLT: Idle Air Volume Learning has already been performed successfully. 	
TRVL AFTER MIL	km or mile	<ul style="list-style-type: none"> Distance traveled while MIL is activated. 	
A/F S1 HTR (B1)	%	<ul style="list-style-type: none"> Indicates A/F sensor 1 heater control value computed by ECM according to the input signals. The current flow to the heater becomes larger as the value increases. 	
A/F S1 HTR (B2)	%		
AC PRESS SEN	V	<ul style="list-style-type: none"> The signal voltage from the refrigerant pressure sensor is displayed. 	
VHCL SPEED SE	km/h or mph	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed signal sent from TCM is displayed. 	
SET VHCL SPD	km/h or mph	<ul style="list-style-type: none"> The preset vehicle speed is displayed. 	
MAIN SW	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from MAIN switch signal. 	
CANCEL SW	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from CANCEL switch signal. 	
RESUME/ACC SW	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from RESUME/ACCELERATE switch signal. 	
SET SW	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from SET/COAST switch signal. 	
BRAKE SW1	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ASCD brake switch signal. 	
BRAKE SW2	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of stop lamp switch signal. 	
VHCL SPD CUT	NON/CUT	<ul style="list-style-type: none"> Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed increased to excessively high compared with the ASCD set speed, and ASCD operation is cut off. 	
LO SPEED CUT	NON/CUT	<ul style="list-style-type: none"> 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. 	
AT OD MONITOR	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of CVT according to the input signal from the TCM. 	<ul style="list-style-type: none"> For M/T models always "OFF" is displayed
AT OD CANCEL	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of CVT cancel signal sent from the TCM. 	<ul style="list-style-type: none"> For M/T models always "OFF" is displayed
CRUISE LAMP	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals. 	
SET LAMP	ON/OFF	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals. 	
A/F ADJ-B1		<ul style="list-style-type: none"> Indicates the correction factor stored in ECM. The factor is calculated from the difference between the target air/fuel ratio stored in ECM and the air/fuel ratio calculated from air fuel ratio (A/F) sensor 1 signal. 	
A/F ADJ-B2			

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Monitored item	Unit	Description	Remarks
HO2 S2 DIAG1 (B1)	INCMP/CMPLT	<ul style="list-style-type: none"> Indicates DTC P0139 self-diagnosis (delayed response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
HO2 S2 DIAG1 (B2)	INCMP/CMPLT	<ul style="list-style-type: none"> Indicates DTC P0159 self-diagnosis (delayed response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
HO2 S2 DIAG2 (B1)	INCMP/CMPLT	<ul style="list-style-type: none"> Indicates DTC P0139 self-diagnosis (slow response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
HO2 S2 DIAG2 (B2)	INCMP/CMPLT	<ul style="list-style-type: none"> Indicates DTC P0159 self-diagnosis (slow response) condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
A/F SEN1 DIAG2 (B1)*	INCMP/CMPLT	<ul style="list-style-type: none"> Indicates DTC P014C or P014D self-diagnosis condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
A/F SEN1 DIAG2 (B2)*	INCMP/CMPLT	<ul style="list-style-type: none"> Indicates DTC P014E or P014F self-diagnosis condition. INCMP: Self-diagnosis is incomplete. CMPLT: Self-diagnosis is complete. 	
THRTL STK CNT B1*	—	—	

*: 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.

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Fuel injector Air fuel ratio (A/F) sensor 1
IGNITION TIMING	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Perform Idle Air Volume Learning.
POWER BALANCE	<ul style="list-style-type: none"> Engine: After warming up, idle the engine. A/C switch OFF Selector lever: P or N (CVT), Neutral (M/T) Cut off each fuel injector signal one at a time using CONSULT-III. 	Engine runs rough or dies.	<ul style="list-style-type: none"> Harness and connectors Compression Fuel injector Power transistor Spark plug Ignition coil
COOLING FAN*	<ul style="list-style-type: none"> Ignition switch: ON Turn the cooling fan "LOW", "HI" and "OFF" with CONSULT-III. 	Cooling fan moves and stops.	<ul style="list-style-type: none"> Harness and connectors Cooling fan relay Cooling fan motor
ENG COOLANT TEMP	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Engine coolant temperature sensor Fuel injector

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TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
FUEL PUMP RELAY	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT-III and listen to operating sound. 	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> Harness and connectors Fuel pump relay
PURG VOL CONT/V	<ul style="list-style-type: none"> Engine: After warming up, run engine at 1,500 rpm. Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-III. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> Harness and connectors EVAP canister purge volume control solenoid valve
FUEL/T TEMP SEN	<ul style="list-style-type: none"> Change the fuel tank temperature using CONSULT-III. 		
VENT CONTROL/V	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn solenoid valve "ON" and "OFF" with the CONSULT-III and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> Harness and connectors EVAP canister vent control valve
V/T ASSIGN ANGLE	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change intake valve timing using CONSULT-III. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connectors Intake valve timing control solenoid valve

*: Leaving cooling fan OFF with CONSULT-III while engine is running may cause the engine to overheat.

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

- For items whose SRT codes are set, "CMPLT" is displayed on the CONSULT-III 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

How to display permanent DTC status

- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON.
- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON.
- Select "PERMANENT DTC STATUS" in "DTC & SRT CONFIRMATION" mode with CONSULT-III.

NOTE:

Permanent DTCs stored in ECM memory are displayed on the CONSULT-III screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).

CAUTION:

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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”.

PERMANENT DTC & SRT CONFIRMATION : PERMANENT DTC STATUS																							
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> CAUTION: Turn ignition switch from ON to OFF twice to update the information on the status screen. </div> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 33%;">PERMANENT DTC</th> <th style="width: 33%;">DRIVING PATTERN B</th> <th style="width: 33%;">DRIVING PATTERN D</th> </tr> </thead> <tbody> <tr><td>XXXX</td><td>INCOMP</td><td>INCOMP</td></tr> <tr><td>XXXX</td><td>CMPLT</td><td>INCOMP</td></tr> <tr><td>XXXX</td><td>INCOMP</td><td>CMPLT</td></tr> <tr><td>XXXX</td><td>CMPLT</td><td>INCOMP</td></tr> <tr><td>XXXX</td><td>INCOMP</td><td>INCOMP</td></tr> <tr><td>XXXX</td><td>INCOMP</td><td>INCOMP</td></tr> </tbody> </table> <div style="text-align: right; margin-top: 10px;"> The previous trip information is displayed. </div>			PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D	XXXX	INCOMP	INCOMP	XXXX	CMPLT	INCOMP	XXXX	INCOMP	CMPLT	XXXX	CMPLT	INCOMP	XXXX	INCOMP	INCOMP	XXXX	INCOMP	INCOMP
PERMANENT DTC	DRIVING PATTERN B	DRIVING PATTERN D																					
XXXX	INCOMP	INCOMP																					
XXXX	CMPLT	INCOMP																					
XXXX	INCOMP	CMPLT																					
XXXX	CMPLT	INCOMP																					
XXXX	INCOMP	INCOMP																					
XXXX	INCOMP	INCOMP																					

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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.

DTC WORK SUPPORT Mode

Test mode	Test item	Corresponding DTC No.	Reference page
EVAPORATIVE SYSTEM	EVP SML LEAK P0442/P1442*	P0455	EC-1487
	EVP V/S LEAK P0456/P1456*	P0442	EC-1437
		P0456	EC-1494
	PURG VOL CN/V P1444	P0443	EC-1444
	PURG FLOW P0441	P0441	EC-1432
A/F SEN1	A/F SEN1 (B1) P1278/P1279	P0133	EC-1336
	A/F SEN1 (B1) P1276	P0130	EC-1312
	A/F SEN1 (B2) P1288/P1289	P0153	EC-1336
	A/F SEN1 (B2) P1286	P0150	EC-1312
HO2S2	HO2S2 (B1) P1146	P0138	EC-1354
	HO2S2 (B1) P1147	P0137	EC-1345
	HO2S2 (B1) P0139	P0139	EC-1365
	HO2S2 (B2) P1166	P0158	EC-1354
	HO2S2 (B2) P1167	P0157	EC-1345
	HO2S2 (B2) P0159	P0159	EC-1365

*: DTC P1442 and P1456 does not apply to B16 models but appears in DTC Work Support Mode screens.

Generic Scan Tool (GST) Function

INFOID:000000006150402

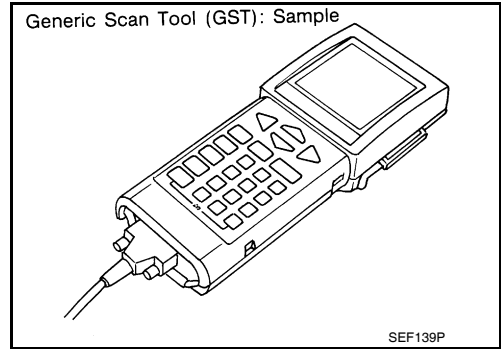
DESCRIPTION

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Generic Scan Tool (OBD II scan tool) complying with SAE J1978/ISO 15031-4 has several functions explained below. ISO15765-4 is used as the protocol. The name GST or Generic Scan Tool is used in this service manual.



FUNCTION

Diagnostic test mode		Function
Service \$01	READINESS TESTS	This diagnostic service gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
Service \$02	(FREEZE DATA)	This diagnostic service gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-1214, "CONSULT-III Function (ENGINE)" .
Service \$03	DTCs	This diagnostic service gains access to emission-related power train trouble codes which were stored by ECM.
Service \$04	CLEAR DIAG INFO	This diagnostic service can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> • Clear number of diagnostic trouble codes (Service \$01) • Clear diagnostic trouble codes (Service \$03) • Clear trouble code for freeze frame data (Service \$01) • Clear freeze frame data (Service \$02) • Reset status of system monitoring test (Service \$01) • Clear on board monitoring test results (Service \$06 and \$07)
Service \$06	(ON BOARD TESTS)	This diagnostic service accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
Service \$07	(ON BOARD TESTS)	This diagnostic service enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
Service \$08	—	This diagnostic service can close EVAP system in ignition switch ON position (Engine stopped). When this diagnostic service is performed, EVAP canister vent control valve can be closed. In the following conditions, this diagnostic service cannot function. <ul style="list-style-type: none"> • Low ambient temperature • Low battery voltage • Engine running • Ignition switch OFF • Low fuel temperature • Too much pressure is applied to EVAP system
Service \$09	(CALIBRATION ID)	This diagnostic service enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.
Service \$0A*	PERMANENT DTCs	This diagnostic service gains access to permanent DTCs which were stored by ECM.

NOTE:

*: Service \$0A is not applied for regions where it is not mandated.

INSPECTION PROCEDURE

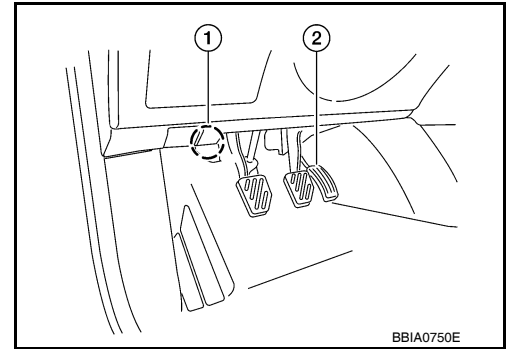
1. Turn ignition switch OFF.

TROUBLE DIAGNOSIS

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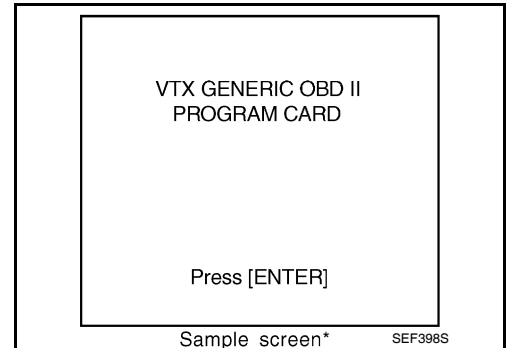
< SERVICE INFORMATION >

2. Connect GST to data link connector (1).
 - Accelerator pedal (2)



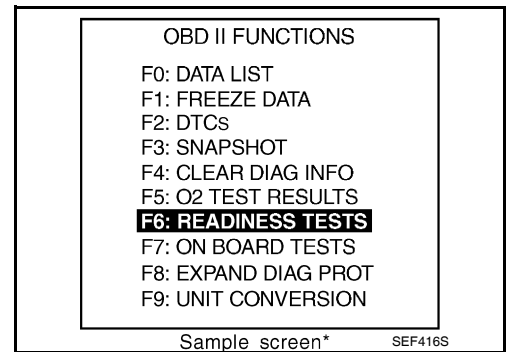
3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.

(*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic service according to each service procedure.

For further information, see the GST Operation Manual of the tool maker.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150403

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor item	Condition	Specification
ENG SPEED	• Run engine and compare CONSULT-III value with the tachometer indication.	Almost the same speed as the tachometer indication.
MAS A/F SE-B1	See EC-1228 .	
B/FUEL SCHDL	See EC-1228 .	
A/F ALPHA-B1 A/F ALPHA-B2	See EC-1228 .	
COOLAN TEMP/S	• Engine: After warming up	More than 70°C (158°F)
A/F SEN1 (B1) A/F SEN1 (B2)	• Engine: After warming up	Maintaining engine speed at 2,000 rpm Fluctuates around 2.2 V

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Monitor item	Condition	Specification
HO2S2 (B1) HO2S2 (B2)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	LEAN ↔ RICH
VHCL SPEED SE	<ul style="list-style-type: none"> • Turn drive wheels and compare CONSULT-III value with the speedometer indication. 	Almost the same speed as the speedometer indication.
BATTERY VOLT	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) 	11 - 14 V
ACCEL SEN 1	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) • Selector lever: D (CVT), 1st (M/T) 	Accelerator pedal: Fully released 0.6 - 0.9 V
		Accelerator pedal: Fully depressed 4.0 - 4.8 V
ACCEL SEN 2*	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) • Selector lever: D (CVT), 1st (M/T) 	Accelerator pedal: Fully released 0.6 - 0.9 V
		Accelerator pedal: Fully depressed 3.9 - 4.8 V
TP SEN 1-B1 TP SEN 2-B1*	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) 	Accelerator pedal: Fully released More than 0.36 V
	<ul style="list-style-type: none"> • Selector lever: D (CVT), 1st (M/T) 	Accelerator pedal: Fully depressed Less than 4.75 V
VEHICLE SPEED	<ul style="list-style-type: none"> • Turn drive wheels and compare CONSULT-III value with speedometer indication. 	Almost the same speed as the speedometer indication
EVAP SYS PRES	<ul style="list-style-type: none"> • Ignition switch: ON 	1.8 - 4.8 V
START SIGNAL	<ul style="list-style-type: none"> • Ignition switch: ON → START → ON 	OFF → ON → OFF
CLSD THL POS	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) 	Accelerator pedal: Fully released ON
		Accelerator pedal: Slightly depressed OFF
AIR COND SIG	<ul style="list-style-type: none"> • Engine: After warming up, idle the engine 	Air conditioner switch: OFF OFF
		Air conditioner switch: ON (Compressor operates.) ON
P/N POSI SW	<ul style="list-style-type: none"> • Ignition switch: ON 	Selector lever: P or N (CVT), Neutral (M/T) ON
		Selector lever: Except above position OFF
PW/ST SIGNAL	<ul style="list-style-type: none"> • Engine: After warming up, idle the engine 	Steering wheel: Not being turned. OFF
		Steering wheel: Being turned. ON
LOAD SIGNAL	<ul style="list-style-type: none"> • Ignition switch: ON 	Rear window defogger switch: ON and/or Lighting switch: 2nd position ON
		Rear window defogger switch is OFF and lighting switch: OFF OFF
IGNITION SW	<ul style="list-style-type: none"> • Ignition switch: ON → OFF → ON 	ON → OFF → ON
HEATER FAN SW	<ul style="list-style-type: none"> • Engine: After warming up, idle the engine 	Heater fan: Operating ON
		Heater fan: Not operating OFF
BRAKE SW	<ul style="list-style-type: none"> • Ignition switch: ON 	Brake pedal: Fully released OFF
		Brake pedal: Slightly depressed ON
I/P PULLY SPD	<ul style="list-style-type: none"> • Vehicle speed: More than 20 km/h (12 MPH) 	Almost the same speed as the tachometer indication
INJ PULSE-B1	<ul style="list-style-type: none"> • Engine: After warming up • Selector lever: P or N (CVT), Neutral (M/T) 	Idle 2.0 - 3.0 msec
INJ PULSE-B2	<ul style="list-style-type: none"> • Air conditioner switch: OFF • No load 	2,000 rpm 1.9 - 2.9 msec

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Monitor item	Condition	Specification
IGN TIMING	<ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load Idle	5° - 15° BTDC
	2,000 rpm	25° - 45° BTDC
CAL/LD VALUE	<ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load Idle	10% - 35%
	2,500 rpm	10% - 35%
MASS AIRFLOW	<ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load Idle	1.0 - 4.0 g/s
	2,500 rpm	4.0 - 10.0 g/s
PURG VOL C/V	<ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load Idle (Accelerator pedal: Not depressed even slightly, after engine starting)	0%
	2,000 rpm	20 - 90%
INT/V TIM (B1)	<ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load Idle	-5° - 5°CA
	2,000 rpm	Approx. 0° - 20°CA
INT/V SOL (B1)	<ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load Idle	0%
	2,000 rpm	Approx. 0% - 60%
AIR COND RLY	<ul style="list-style-type: none"> Engine: After warming up, idle the engine Air conditioner switch: OFF	OFF
	Air conditioner switch: ON (Compressor operates)	ON
FUEL PUMP RLY	<ul style="list-style-type: none"> For 1 seconds after turning ignition switch ON Engine running or cranking 	ON
	• Except above conditions	OFF
VENT CONT/V	• Ignition switch: ON	OFF
THRTL RELAY	• Ignition switch: ON	ON
COOLING FAN	<ul style="list-style-type: none"> Engine: After warming up, idle the engine Air conditioner switch: OFF Engine coolant temperature is 97°C (207°F) or less	OFF
	Engine coolant temperature is between 98°C (208°F) and 99°C (210°F)	LOW
	Engine coolant temperature is 100°C (212°F) or more	HIGH
HO2S2 HTR (B1) HO2S2 HTR (B2)	<ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	ON
	• Engine speed: Above 3,600 rpm	OFF
TRVL AFTER MIL	<ul style="list-style-type: none"> Ignition switch: ON Vehicle has traveled after MIL has turned ON.	0 - 65,535 km (0 - 40,723 mile)
A/F S1 HTR (B1) A/F S1 HTR (B2)	<ul style="list-style-type: none"> Engine: After warming up, idle the engine (More than 140 seconds after starting engine.) 	4 - 100%
AC PRESS SEN	<ul style="list-style-type: none"> Both A/C switch and blower fan switch: ON (Compressor operates) 	1.0 - 4.0 V
	• Engine: Idle	

TROUBLE DIAGNOSIS

< SERVICE INFORMATION >

[QR25DE]

Monitor item	Condition	Specification
VHCL SPEED SE	• Turn drive wheels and compare the CONSULT-III value with speedometer indication.	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 switch: Released OFF
CANCEL SW	• Ignition switch: ON	CANCEL switch: Pressed ON
		CANCEL switch: Released OFF
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: Pressed ON
		RESUME/ACCELERATE switch: Released OFF
SET SW	• Ignition switch: ON	SET/COAST switch: Pressed ON
		SET/COAST switch: Released OFF
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	• Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T) ON
		• Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T) OFF
BRAKE SW2 (Stop lamp switch)	• Ignition switch: ON	Brake pedal: Fully released OFF
		Brake pedal: Slightly depressed ON
CRUISE LAMP	• Ignition switch: ON MAIN switch: Pressed at the 1st time → 2nd time	ON → OFF
SET LAMP	• MAIN switch: ON • When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating ON
		ASCD: Not operating OFF
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (delayed response) is complete.	CMPLT
HO2 S2 DIAG1 (B2)	DTC P0159 self-diagnosis (delayed response) is incomplete.	INCMP
	DTC P0159 self-diagnosis (delayed response) is complete.	CMPLT
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (slow response) is complete.	CMPLT
HO2 S2 DIAG2 (B2)	DTC P0159 self-diagnosis (slow response) is incomplete.	INCMP
	DTC P0159 self-diagnosis (slow response) is complete.	CMPLT
A/F SEN1 DIAG2 (B1)	NOTE: The item is indicated, but not used.	—
A/F SEN1 DIAG2 (B2)	NOTE: The item is indicated, but not used.	—

*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< SERVICE INFORMATION >

[QR25DE]

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Description

INFOID:000000006150404

The specification (SP) value indicates the tolerance of the value that is displayed in "SPEC" of "DATA MONITOR" mode with CONSULT-III during normal operation of the Engine Control System. When the value in "SPEC" of "DATA MONITOR" mode is within the SP value, the Engine Control System is confirmed OK. When the value in "SPEC" of "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 light the MIL.

The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 /B2 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

Testing Condition

INFOID:000000006150405

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm², 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
- CVT models: After the engine is warmed up to normal operating temperature, drive vehicle until "FLUID TEMP SE" fluid temperature sensor signal) indicates more than 60°C (140°F).
- M/T models: After the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
- Electrical load: Not applied
- Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.
- Engine speed: Idle

Inspection Procedure

INFOID:000000006150406

NOTE:

Perform "SPEC" in "DATA MONITOR" mode in maximum scale display.

1. Perform [EC-1177, "Basic Inspection"](#).
2. Confirm that the testing conditions indicated above are met.
3. 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-III.
4. Check that monitor items are within the SP value.
5. If NG, go to [EC-1228, "Diagnosis Procedure"](#).

Diagnosis Procedure

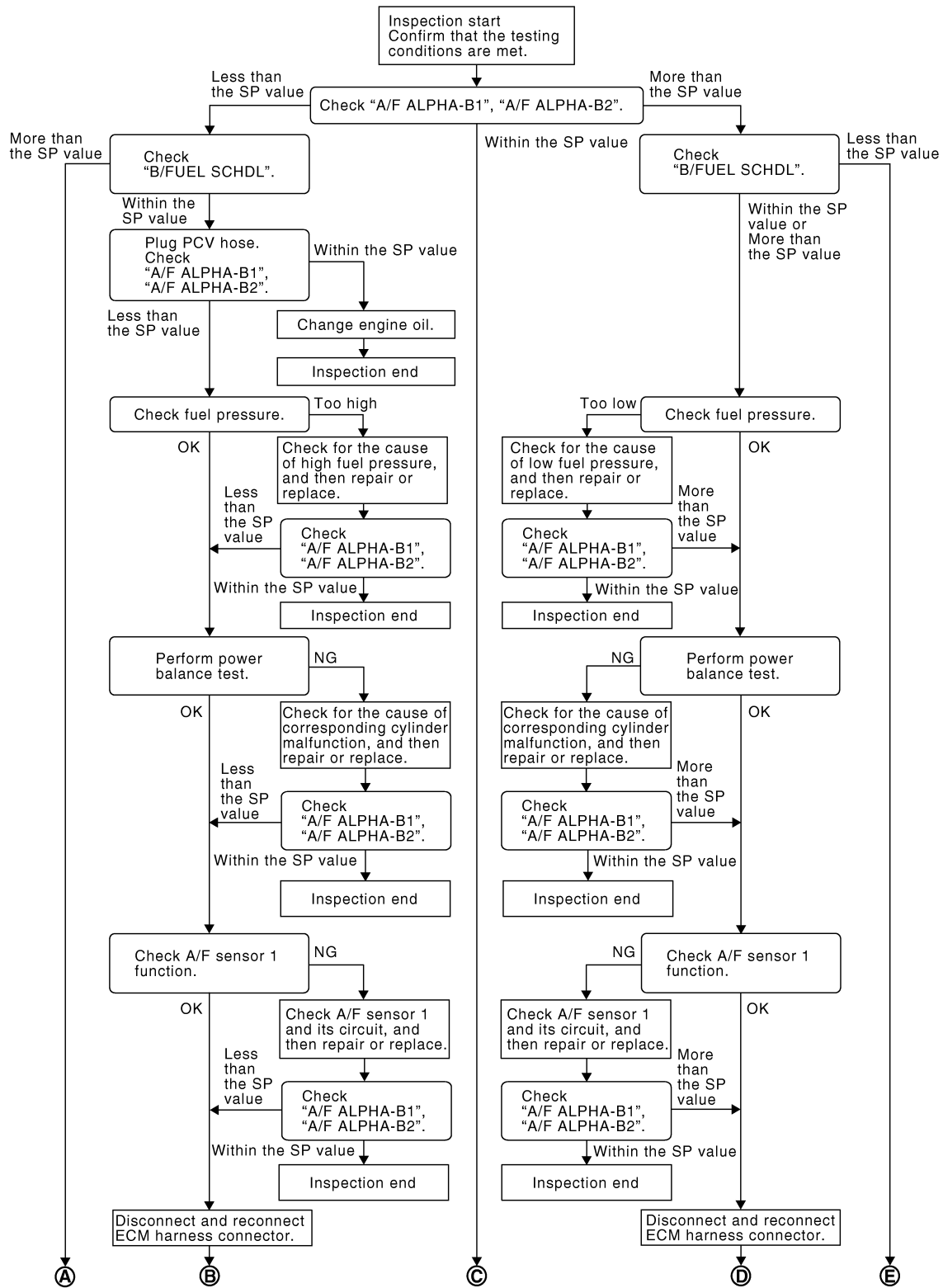
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OVERALL SEQUENCE

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< SERVICE INFORMATION >

[QR25DE]



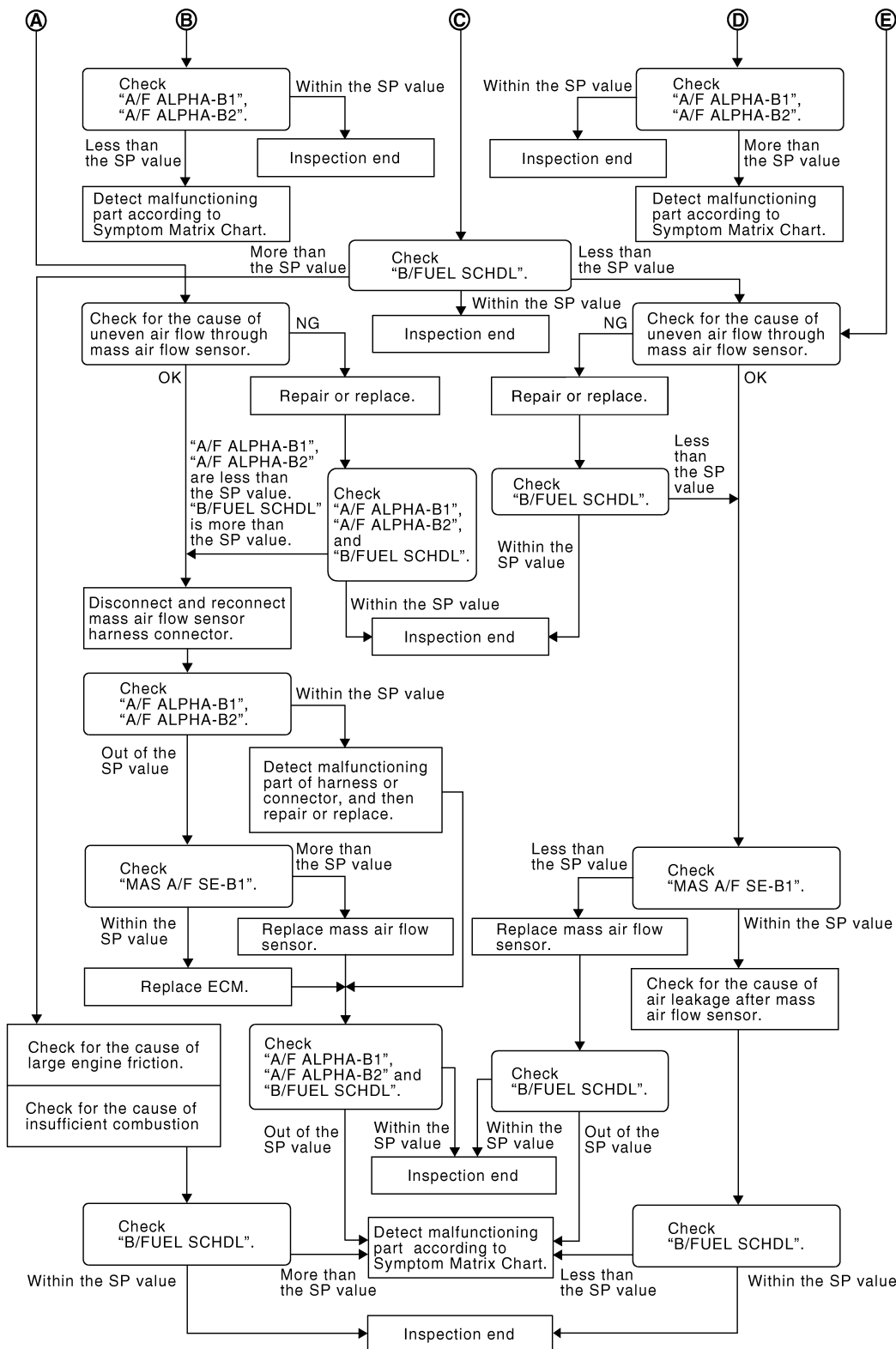
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TROUBLE DIAGNOSIS - SPECIFICATION VALUE

< SERVICE INFORMATION >

[QR25DE]



PBIB3214E

DETAILED PROCEDURE

1. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

1. Start engine.
2. Confirm that the testing conditions are met. Refer to [EC-1228, "Testing Condition"](#).
3. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that the each indication is within the SP value.

NOTE:

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QR25DE]

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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.

OK or NG

OK >> GO TO 17.

NG (Less than the SP value)>>GO TO 2.

NG (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.

OK or NG

OK >> GO TO 4.

NG (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.

OK or NG

OK >> GO TO 6.

NG (More than the SP value)>>GO TO 6.

NG (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 "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that the each indication is within the SP value.

OK or NG

OK >> GO TO 5.

NG >> GO TO 6.

5.CHANGE ENGINE OIL

1. Stop the engine.
2. Change engine oil. Refer to [MA-36. "ENGINE OIL : Changing 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 condition.

>> INSPECTION END

6.CHECK FUEL PRESSURE

Check fuel pressure. (Refer to [EC-1185. "Fuel Pressure Check"](#).)

OK or NG

OK >> GO TO 9.

NG (Fuel pressure is too high)>>Replace fuel pressure regulator, refer to [FL-6. "Removal and Installation"](#) and [EC-1113. "Precaution"](#). GO TO 8.

NG (Fuel pressure is too low)>>GO TO 7.

7.DETECT MALFUNCTIONING PART

1. Check the following.
 - Clogged and bent fuel hose and fuel tube
 - Clogged fuel filter
 - Fuel pump and its circuit (Refer to [EC-1639](#).)
2. If NG, repair or replace the malfunctioning part. (Refer to [EC-1185. "Fuel Pressure Check"](#).)

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QR25DE]

< SERVICE INFORMATION >

If OK, replace fuel pressure regulator. Refer to [FL-6, "Removal and Installation"](#) and [EC-1113, "Precaution"](#).

>> GO TO 8.

8. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

1. Start engine.
2. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that the each indication is within the SP value.

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 9.

9. PERFORM POWER BALANCE TEST

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Check that the each cylinder produces a momentary engine speed drop.

OK or NG

- OK >> GO TO 12.
NG >> GO TO 10.

10. DETECT MALFUNCTIONING PART

1. Check the following.
 - Ignition coil and its circuit (Refer to [EC-1644](#).)
 - Fuel injector and its circuit (Refer to [EC-1634](#).)
 - Intake air leakage
 - Low compression pressure (Refer to [EM-175, "On-Vehicle Service"](#).)
2. If NG, repair or replace the malfunctioning part.
If OK, replace fuel injector. (It may be caused by leakage from fuel injector or clogging.) Refer to [EM-148, "Removal and Installation"](#).

>> GO TO 11.

11. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

1. Start engine.
2. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that the each indication is within the SP value.

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 12.

12. CHECK A/F SENSOR 1 FUNCTION

Perform all DTC Confirmation Procedure related with A/F sensor 1.

- For DTC P0130, P0150 refer to [EC-1312, "DTC Confirmation Procedure"](#).
- For DTC P0131, P0151 refer to [EC-1320, "DTC Confirmation Procedure"](#).
- For DTC P0132, P0152 refer to [EC-1328, "DTC Confirmation Procedure"](#).
- For DTC P0133, P0153 refer to [EC-1336, "DTC Confirmation Procedure"](#).
- For DTC P2A00, P2A03 refer to [EC-1612, "DTC Confirmation Procedure"](#).

OK or NG

- OK >> GO TO 15.
NG >> GO TO 13.

13. CHECK A/F SENSOR 1 CIRCUIT

Perform Diagnostic Procedure according to corresponding DTC.

>> GO TO 14.

14. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

1. Start engine.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QR25DE]

< SERVICE INFORMATION >

2. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that the each indication is within the SP value.

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 15.

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.
2. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that the each indication is within the SP value.

OK or NG

- OK >> **INSPECTION END**
NG >> Detect malfunctioning part according to [EC-1194. "Symptom Matrix Chart"](#).

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.

OK or NG

- OK >> **INSPECTION END**
NG (More than the SP value)>>GO TO 18.
NG (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 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

OK or NG

- OK >> GO TO 21.
NG >> 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-B1" and "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the each indication is within the SP value.

OK or NG

- OK >> **INSPECTION END**
NG ("B/FUEL SCHDL" is more, "A/F ALPHA-B1", "A/F ALPHA-B2" is less than the SP value)>>GO TO 21.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QR25DE]

< SERVICE INFORMATION >

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.
2. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for damage and then reconnect it again.

>> GO TO 22.

22. CHECK "A/F ALPHA-B1", "A/F ALPHA-B2"

1. Start engine.
2. Select "A/F ALPHA-B1", "A/F ALPHA-B2" in "SPEC" of "DATA MONITOR" mode, and check that the each indication is within the SP value.

OK or NG

OK >> 1. Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to [EC-1273](#).

2. GO TO 29.

NG >> GO TO 23.

23. CHECK "MAS A/F SE-B1"

Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP value.

OK or NG

OK >> GO TO 24.

NG (More than the SP value) >> Replace mass air flow sensor, refer to [EM-133, "Removal and Installation"](#), and then GO TO 29.

24. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS(NATS) system and registration of all NVIS(NATS) ignition key IDs. Refer to [BL-171, "ECM Re-communicating Function"](#).
3. Perform [EC-1183, "VIN Registration"](#).
4. Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-1183, "Idle Air Volume Learning"](#).

>> GO TO 29.

25. 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

OK or NG

OK >> GO TO 27.

NG >> Repair or replace malfunctioning part, and then GO TO 26.

26. CHECK "B/FUEL SCHDL"

Select "B/FUEL SCHDL" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**

NG (Less than the SP value) >> GO TO 27.

27. CHECK "MAS A/F SE-B1"

Select "MAS A/F SE-B1" in "SPEC" of "DATA MONITOR" mode, and check that the indication is within the SP value.

OK or NG

OK >> GO TO 28.

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QR25DE]

< SERVICE INFORMATION >

NG (Less than the SP value)>>Replace mass air flow sensor, refer to [EM-133. "Removal and Installation"](#), and then GO TO 30.

28.CHECK INTAKE SYSTEM

Check for the cause of air leak 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
- Open stuck, breakage, hose disconnection, or cracks of PCV valve
- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve
- Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts
- Malfunctioning seal of intake air system, etc.

>> GO TO 30.

29.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 the each indication is within the SP value.

OK or NG

OK >> **INSPECTION END**

NG >> Detect malfunctioning part according to [EC-1194. "Symptom Matrix Chart"](#).

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.

OK or NG

OK >> **INSPECTION END**

NG >> Detect malfunctioning part according to [EC-1194. "Symptom Matrix Chart"](#).

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

< SERVICE INFORMATION >

[QR25DE]

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

Description

INFOID:000000006150408

Intermittent incidents may occur. In many cases, the malfunction resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on (1st trip) DTC visits. Realize also that the most frequent cause of Intermittent Incidents occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific malfunctioning area.

Common Intermittent Incidents Report Situations

STEP in Work Flow	Situation
2	The CONSULT-III is used. The SELF-DIAG RESULTS screen shows time data other than 0 or [1t].
3 or 4	The symptom described by the customer does not recur.
5	(1st trip) DTC does not appear during the DTC Confirmation Procedure.
10	The Diagnostic Procedure for PXXXX does not indicate the malfunctioning area.

Diagnosis Procedure

INFOID:000000006150409

1.INSPECTION START

Erase (1st trip) DTCs.

Refer to [EC-1144, "Emission-related Diagnostic Information"](#).

>> GO TO 2.

2.CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.

Refer to [EC-1242, "Ground Inspection"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3.SEARCH FOR ELECTRICAL INCIDENT

Perform [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "INCIDENT SIMULATION TESTS".

OK or NG

OK >> GO TO 4.

NG >> Repair or replace.

4.CHECK CONNECTOR TERMINALS

Refer to [GI-23, "How to Check Terminal"](#), "HOW TO PROBE CONNECTORS", "How to Check Enlarged Contact Spring of Terminal".

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace connector.

POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[QR25DE]

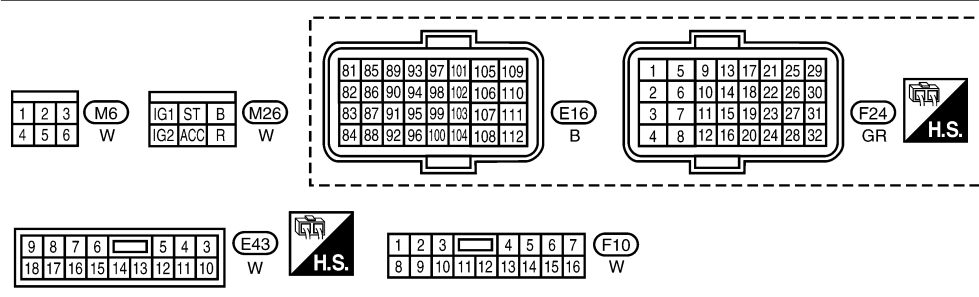
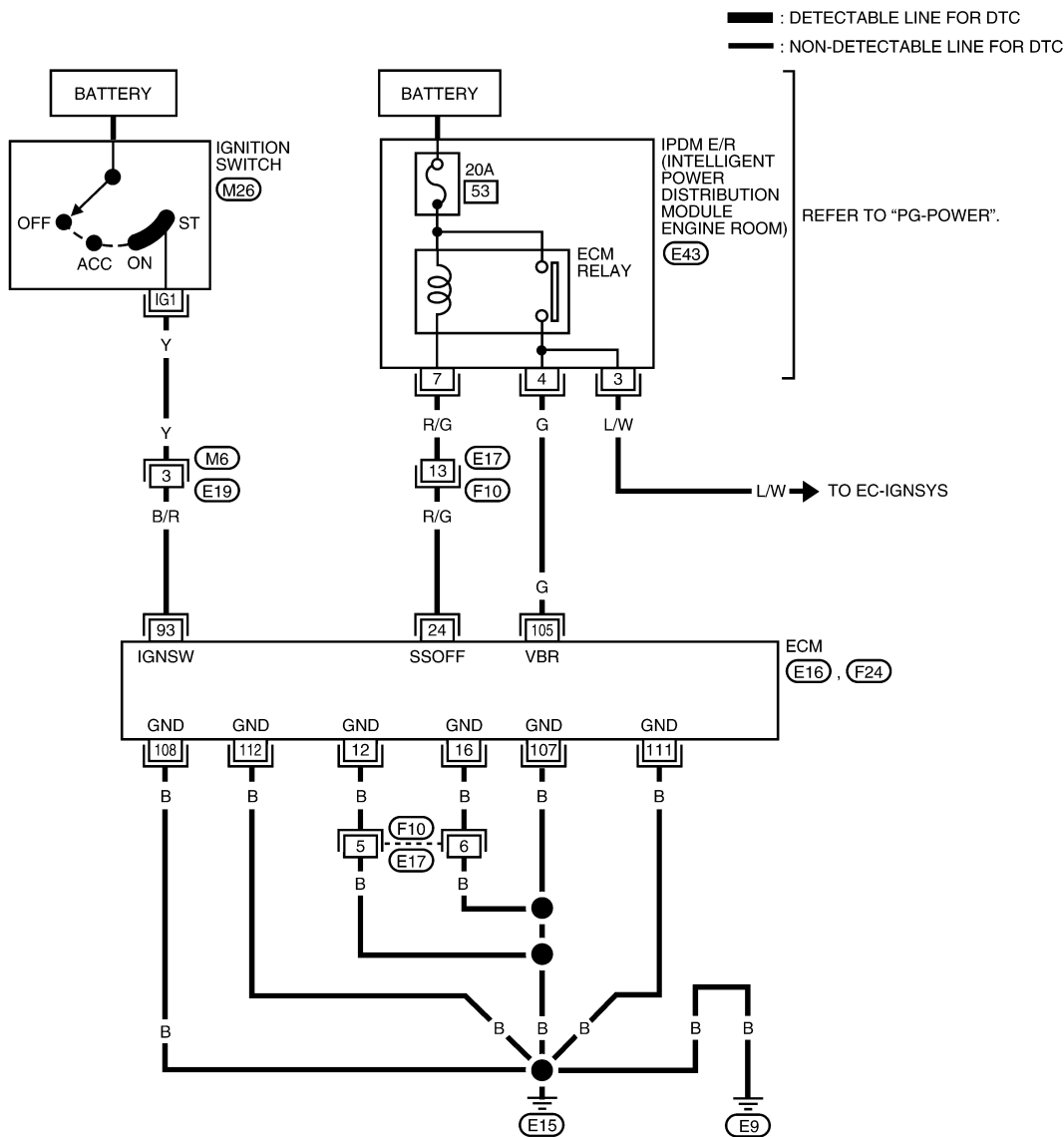
POWER SUPPLY AND GROUND CIRCUIT

Wiring Diagram

INFOID:000000006150410

EC-MAIN-01

EC



ABBWA0662GB

Specification data are reference values and are measured between each terminal and ground.
CAUTION: Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[QR25DE]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
12 16	B B	ECM ground	[Engine is running] • Idle speed	Body ground
24	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
93	B/R	Ignition switch	[Ignition switch: OFF]	0 V
			[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
107 108	B B	ECM ground	[Engine is running] • Idle speed	Body ground
111 112	B B	ECM ground	[Engine is running] • Idle speed	Body ground

Diagnosis Procedure

INFOID:000000006150411

1. INSPECTION START

Start engine.

Is engine running?

Yes or No

- Yes >> GO TO 8.
- No >> GO TO 2.

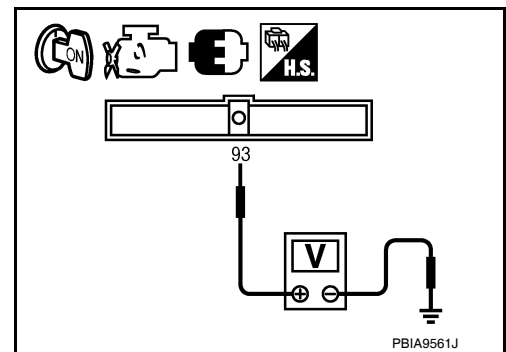
2. CHECK ECM POWER SUPPLY CIRCUIT-I

- Turn ignition switch OFF and then ON.
- Check voltage between ECM terminal 93 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M6, E19
- Harness for open or short between ECM and ignition switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK GROUND CONNECTIONS

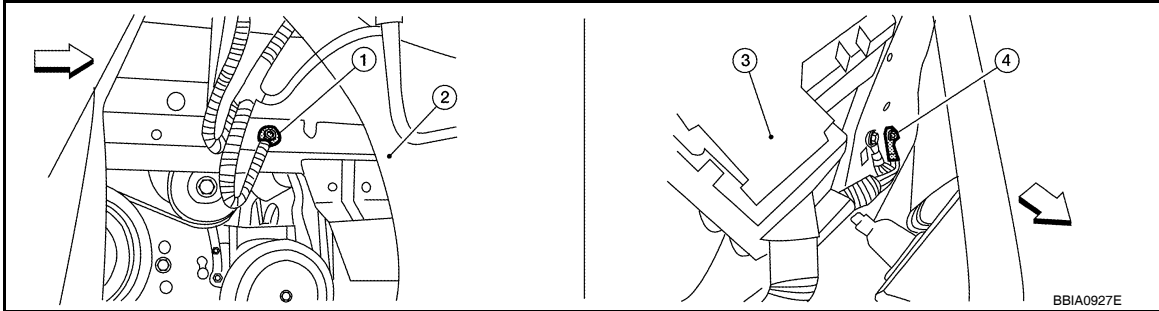
- Turn ignition switch OFF.
- Loosen and retighten ground screws on the body.

POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[QR25DE]

Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 5.
NG >> Repair or replace ground connections.

5. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 12, 16, 107, 108, 111, 112 and ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F10, E17
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

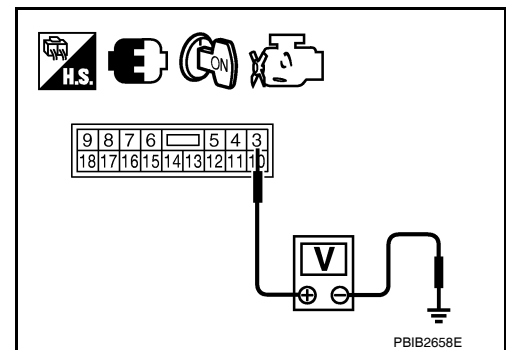
7. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connector.
2. Turn ignition switch ON.
3. Check voltage between IPDM E/R terminal 3 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> Go to [EC-1644](#).
NG >> GO TO 8.



8. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON and then OFF.

POWER SUPPLY AND GROUND CIRCUIT

[QR25DE]

< SERVICE INFORMATION >

3. Check voltage between ECM terminal 105 and ground with CONSULT-III or tester.

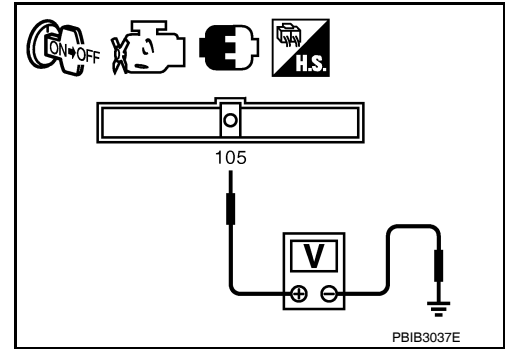
Voltage: After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0 V.

OK or NG

OK >> GO TO 14.

NG (Battery voltage does not exist.)>>GO TO 9.

NG (Battery voltage exists for more than a few seconds.)>>GO TO 11.



9. CHECK ECM POWER SUPPLY CIRCUIT-IV

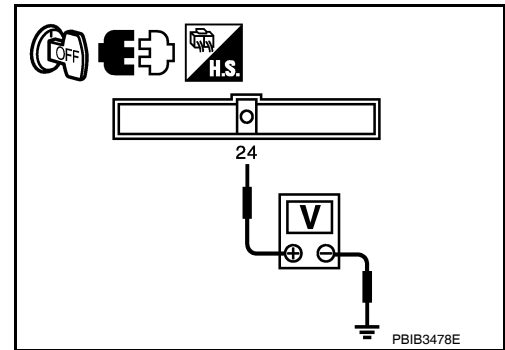
1. Turn ignition switch OFF and wait at least 10 seconds.
2. Check voltage between ECM terminal 24 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 10.

NG >> GO TO 11.



10. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between ECM terminal 105 and IPDM E/R terminal 4. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 17.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between ECM terminal 24 and IPDM E/R terminal 7. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

POWER SUPPLY AND GROUND CIRCUIT

[QR25DE]

< SERVICE INFORMATION >

13. CHECK 20 A FUSE

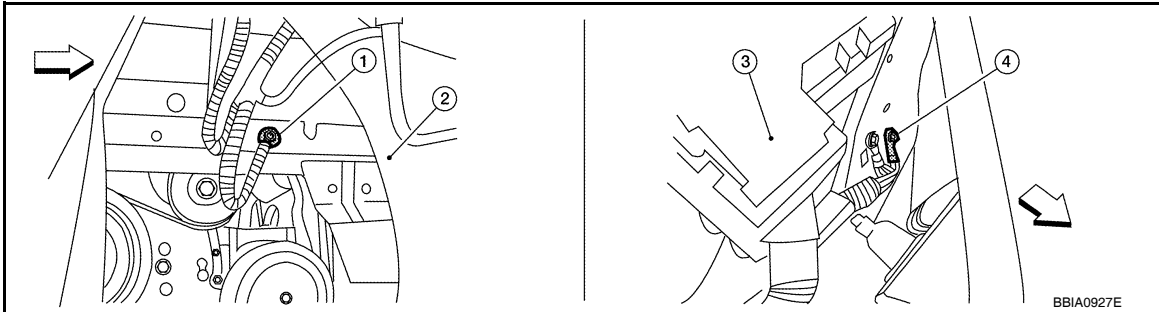
1. Disconnect 20 A fuse from IPDM E/R. For the fuse number, refer to [EC-1237, "Wiring Diagram"](#). For the fuse arrangement, refer to [PG-24, "IPDM E/R Terminal Arrangement"](#).
2. Check 20 A fuse.

OK or NG

- OK >> GO TO 17.
NG >> Replace 20 A fuse.

14. CHECK GROUND CONNECTIONS

Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



⇐: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 15.
NG >> Repair or replace ground connections.

15. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 12, 16, 107, 108, 111, 112 and ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 17.
NG >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F10, E17
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

17. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-18](#).
NG >> Repair open circuit or short to power in harness or connectors.

POWER SUPPLY AND GROUND CIRCUIT

< SERVICE INFORMATION >

[QR25DE]

Ground Inspection

INFOID:000000006150412

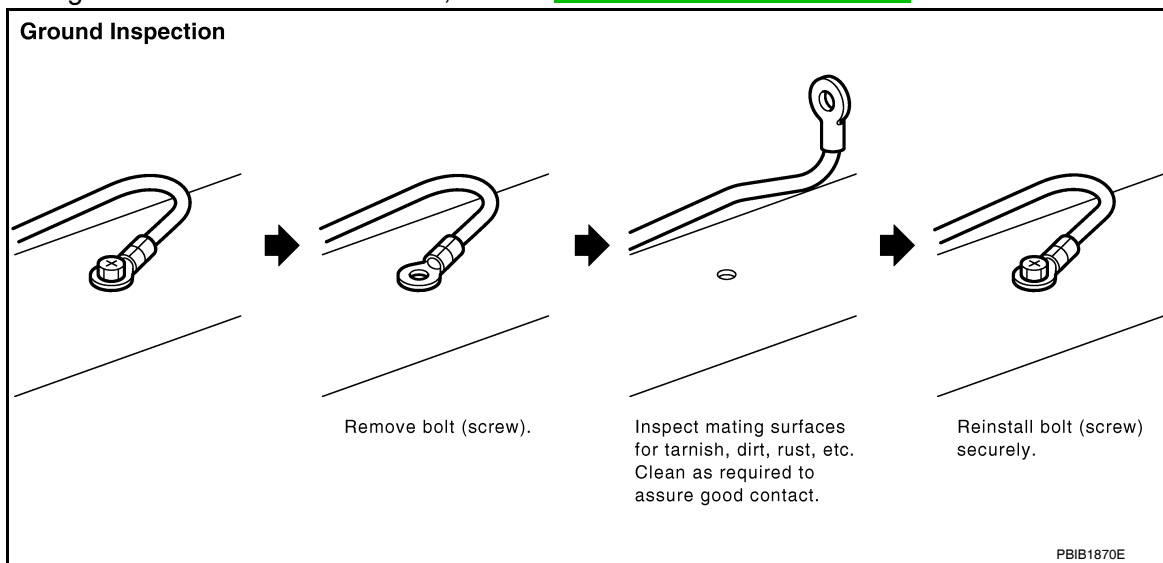
Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.

Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.

When inspecting a ground connection follow these rules:

- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.
- Clean as required to assure good contact.
- Reinstall bolt or screw securely.
- Inspect for "add-on" accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Check that all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet check that no ground wires have excess wire insulation.

For detailed ground distribution information, refer to [PG-30. "Ground Distribution"](#).



DTC U0101 CAN COMMUNICATION LINE

< SERVICE INFORMATION >

[QR25DE]

DTC U0101 CAN COMMUNICATION LINE

Description

INFOID:000000006150413

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.

On Board Diagnosis Logic

INFOID:000000006150414

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0101 0101	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 style="list-style-type: none">CAN communication line between TCM and ECM (CAN communication line is open or shorted.)

DTC Confirmation Procedure

INFOID:000000006150415

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-1246, "Diagnosis Procedure"](#).

DTC U0101 CAN COMMUNICATION LINE




[QR25DE]

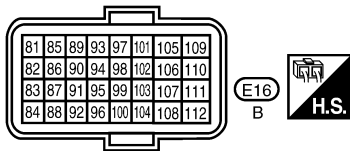
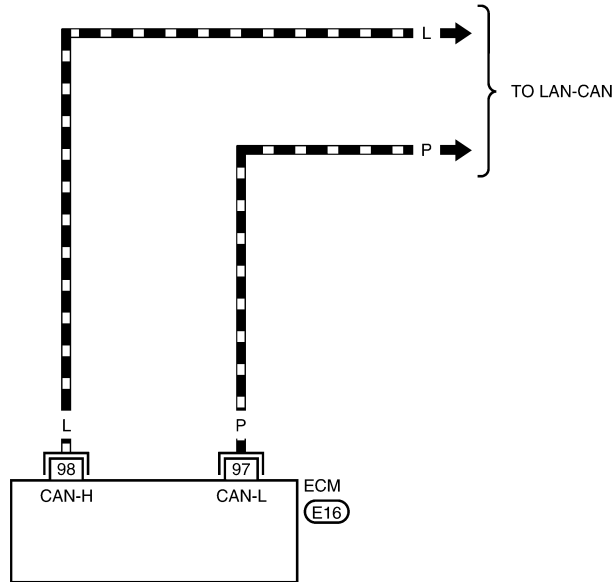
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006150416

EC-CAN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BBWA3021E

Diagnosis Procedure

INFOID:000000006150417

Go to [LAN-16, "Trouble Diagnosis Flow Chart"](#).

DTC U0140 CAN COMMUNICATION LINE

< SERVICE INFORMATION >

[QR25DE]

DTC U0140 CAN COMMUNICATION LINE

Description

INFOID:000000006150418

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.

On Board Diagnosis Logic

INFOID:000000006150419

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U0140 0140	Lost communication with BCM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission related diagnosis) with BCM for 2 seconds or more.	<ul style="list-style-type: none">• CAN communication line between BCM and ECM• CAN communication line open or shorted

DTC Confirmation Procedure

INFOID:000000006150420

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-1246, "Diagnosis Procedure"](#).

DTC U0140 CAN COMMUNICATION LINE




[QR25DE]

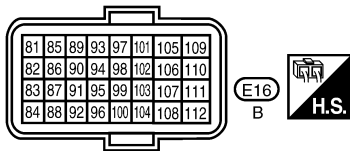
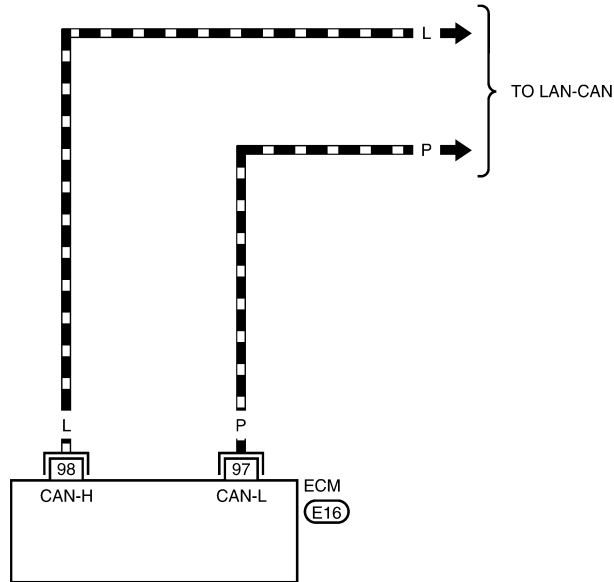
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006150421

EC-CAN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BBWA3021E

Diagnosis Procedure

INFOID:000000006150422

Go to [LAN-16, "Trouble Diagnosis Flow Chart"](#).

DTC U1001 CAN COMMUNICATION LINE

< SERVICE INFORMATION >

[QR25DE]

DTC U1001 CAN COMMUNICATION LINE

Description

INFOID:000000006150423

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.

On Board Diagnosis Logic

INFOID:000000006150424

The MIL will not illuminate for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1001 1001	CAN communication line	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission-related diagnosis) for 2 seconds or more.	<ul style="list-style-type: none">Harness or connectors (CAN communication line is open or shorted.)

DTC Confirmation Procedure

INFOID:000000006150425

1. Turn ignition switch ON and wait at least 3 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1248. "Diagnosis Procedure"](#).

DTC U1001 CAN COMMUNICATION LINE




[QR25DE]

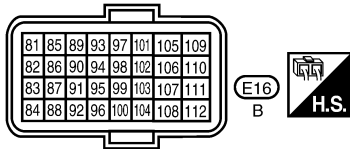
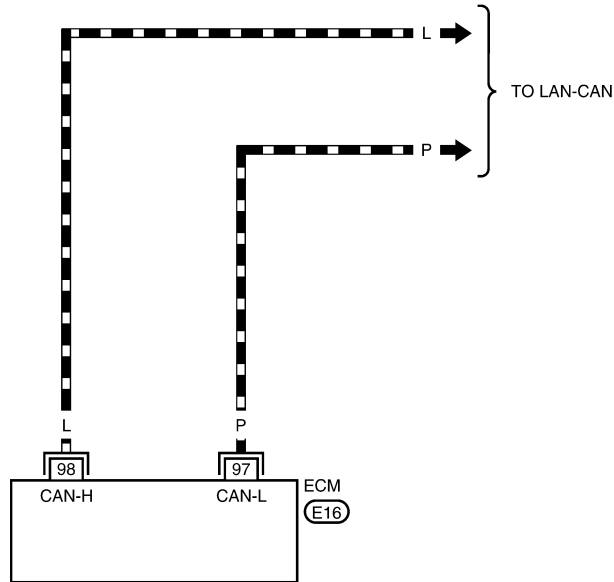
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006150426

EC-CAN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BBWA3021E

Diagnosis Procedure

INFOID:000000006150427

Go to [LAN-16, "Trouble Diagnosis Flow Chart"](#).

DTC P0011 IVT CONTROL

< SERVICE INFORMATION >

[QR25DE]

DTC P0011 IVT CONTROL

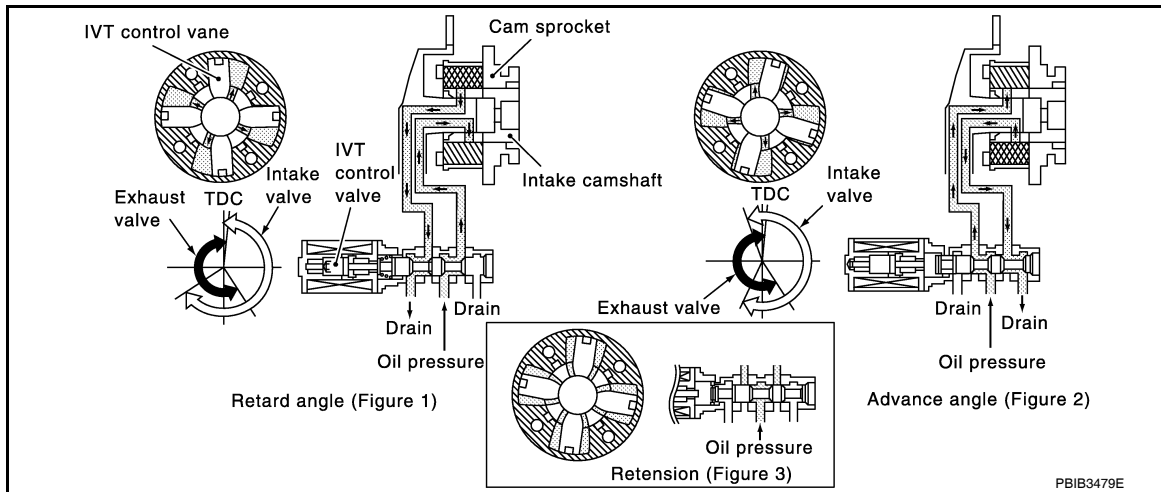
Description

INFOID:000000006150428

SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed and piston position	Intake valve timing control	Intake valve timing control solenoid valve
Engine coolant temperature sensor	Engine coolant temperature		
Combination meter	Vehicle speed*		

*: This signal is sent to the ECM through CAN communication line.



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 control solenoid 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.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150429

Specification data are reference values.

Monitor item	Condition	Specification
INT/V TIM (B1)	<ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load Idle	-5° - 5°CA
	2,000 rpm	Approx. 0° - 20°CA
INT/V SOL (B1)	<ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load Idle	0%
	2,000 rpm	Approx. 0% - 60%

DTC P0011 IVT CONTROL

< SERVICE INFORMATION >

[QR25DE]

On Board Diagnosis Logic

INFOID:000000006150430

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011 0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	<ul style="list-style-type: none"> • Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Intake valve timing control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control

FAIL-SAFE MODE

ECM enters in fail-safe mode when the malfunction is detected.

Detected items	Engine operating condition in fail-safe mode
Intake valve timing control	The signal is not energized to the solenoid valve and the valve control does not function

DTC Confirmation Procedure

INFOID:000000006150431

CAUTION:

Always drive at a safe speed.

NOTE:

- If DTC P0011 is displayed with DTC P0075, first perform trouble diagnosis for DTC P0075. See [EC-1268](#).
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10 V and 16 V at idle.

Ⓟ WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 6 consecutive seconds.
Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 3.5 msec
Selector lever	P or N position (CVT) Neutral position (M/T)

4. Let engine idle for 10 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-1251, "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to next step.
7. Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	1,200 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 65°C (149°F)
Selector lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

8. Check 1st trip DTC.

< SERVICE INFORMATION >

9. If 1st trip DTC is detected, go to [EC-1251, "Diagnosis Procedure"](#).

 WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

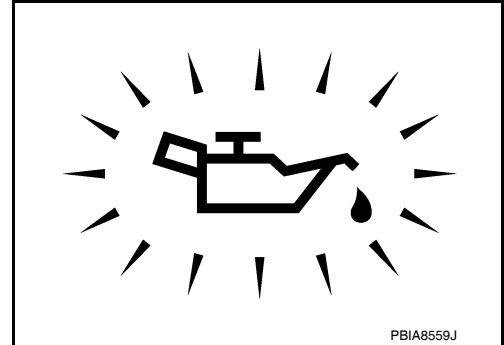
INFOID:000000006150432

1. CHECK OIL PRESSURE WARNING LAMP

1. Start engine.
2. Check oil pressure warning lamp and confirm it is not illuminated.

OK or NG

- OK >> GO TO 2.
- NG >> Go to [LU-18, "Inspection"](#).



2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-1252, "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace intake valve timing control solenoid valve. Refer to [EM-153, "Removal and Installation"](#).

3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-1420, "Component Inspection"](#).

OK or NG

- OK >> GO TO 4.
- NG >> Replace crankshaft position sensor (POS). Refer to [EM-189, "Disassembly and Assembly"](#).

4. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-1425, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace camshaft position sensor (PHASE). Refer to [EM-153, "Removal and Installation"](#).

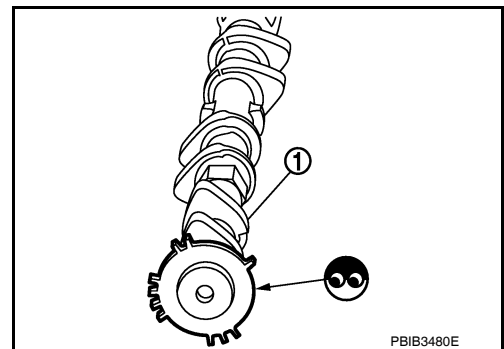
5. CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

OK or NG

- OK >> GO TO 6.
- NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to [EM-153, "Removal and Installation"](#).



6. CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misaligned.

Are there any service records that may cause timing chain misaligned?

Yes or No

- Yes >> Check timing chain installation. Refer to [EM-164](#).
- No >> GO TO 7.

7. CHECK LUBRICATION CIRCUIT

Refer to [EM-160. "Inspection After Installation"](#).

OK or NG

OK >> GO TO 8.

NG >> Clean lubrication line.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

For Wiring Diagram, refer to [EC-1416. "Wiring Diagram"](#) for CKP sensor (POS) and [EC-1422. "Wiring Diagram"](#) for CMP sensor (PHASE).

>> INSPECTION END

Component Inspection

INFOID:000000006150433

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve as follows.

Terminal	Resistance
1 and 2	6.7 - 7.7 Ω [at 20°C (68°F)]
1 or 2 and ground	∞Ω (Continuity should not exist.)

If NG, replace intake valve timing control solenoid valve. Refer to [EM-153. "Removal and Installation"](#).
If OK, go to next step.

3. Remove intake valve timing control solenoid valve. Refer to [EM-153. "Removal and Installation"](#).
4. Provide 12 V DC between intake valve timing control solenoid valve terminals and then interrupt it. Check that the plunger moves as shown in the figure.

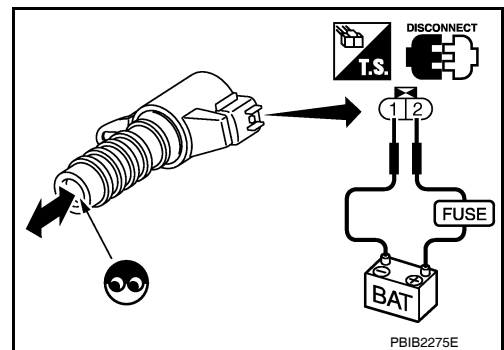
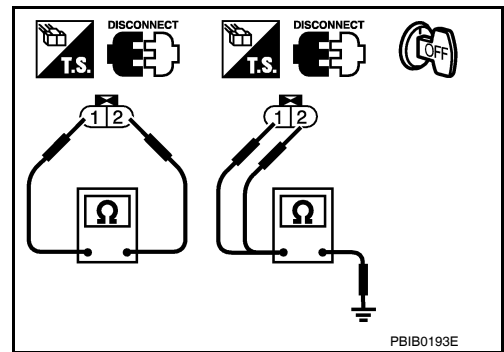
CAUTION:

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.

If NG, replace intake valve timing control solenoid valve. Refer to [EM-160. "Inspection After Installation"](#).

NOTE:

Always replace O-ring when intake valve timing control solenoid valve is removed.



DTC P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

< SERVICE INFORMATION >

[QR25DE]

DTC P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

Description

INFOID:000000006150435

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Air fuel ratio (A/F) sensor 1 heater control	Air fuel ratio (A/F) sensor 1 heater
Mass air flow sensor	Amount of intake air		

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 at the specified range.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150436

Specification data are reference values.

Monitor item	Condition	Specification
A/F S1 HTR (B1) A/F S1 HTR (B2)	• Engine: After warming up, idle the engine (More than 140 seconds after starting engine.)	4 - 100%

On Board Diagnosis Logic

INFOID:000000006150437

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031 0031 (Bank 1)	Air fuel ratio (A/F) sensor 1 heater control circuit low	The current amperage in the air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. [An excessively low voltage signal is sent to ECM through the air fuel ratio (A/F) sensor 1 heater.]	<ul style="list-style-type: none"> • Harness or connectors [Air fuel ratio (A/F) sensor 1 heater circuit is open or shorted.] • Air fuel ratio (A/F) sensor 1 heater
P0051 0051 (Bank 2)			
P0032 0032 (Bank 1)	Air fuel ratio (A/F) sensor 1 heater control circuit high	The current amperage in the air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. [An excessively high voltage signal is sent to ECM through the air fuel ratio (A/F) sensor 1 heater.]	<ul style="list-style-type: none"> • Harness or connectors [Air fuel ratio (A/F) sensor 1 heater circuit is shorted.] • Air fuel ratio (A/F) sensor 1 heater
P0052 0052 (Bank 2)			

DTC Confirmation Procedure

INFOID:000000006150438

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is 11 V at idle.

1. Start engine and run it for at least 10 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1257, "Diagnosis Procedure"](#).

DTC P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

< SERVICE INFORMATION >

[QR25DE]

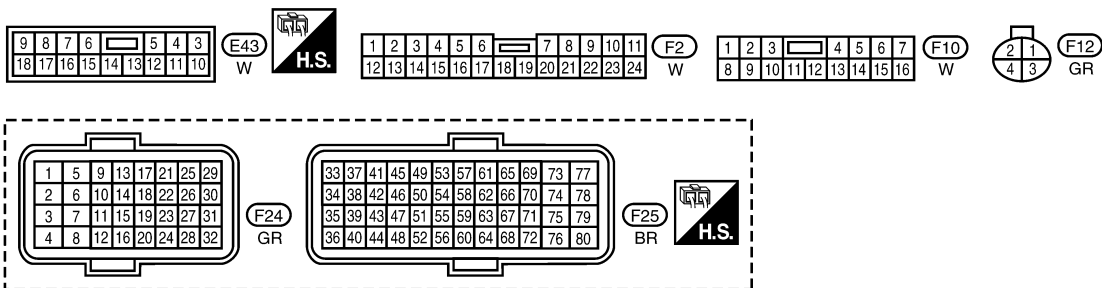
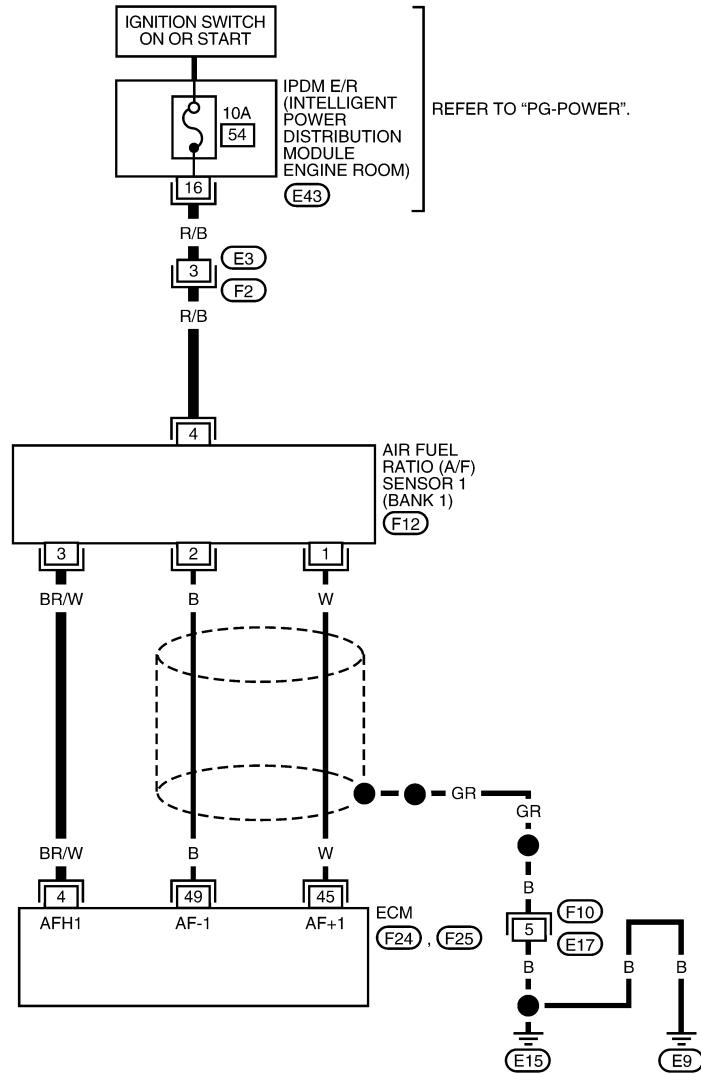
Wiring Diagram

INFOID:000000006150439

BANK 1

EC-AF1HB1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0172GB

Specification data are reference values and are measured between each terminal and ground.
 Pulse signal is measured by CONSULT-III.

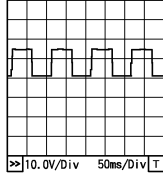
CAUTION:

DTC P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	BR/W	A/F sensor 1 heater (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed (More than 140 seconds after starting engine) 	Approximately 2.9 - 8.8 V★  <small>PBIA8148J</small>
45	W	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	Approximately 1.8 V Output voltage varies with air fuel ratio.
49	B	A/F sensor 1 (Bank 1)	[Ignition switch: ON]	Approximately 2.2 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

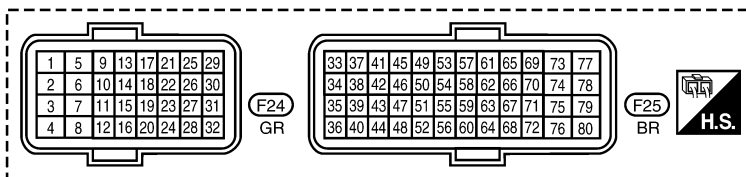
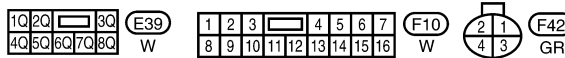
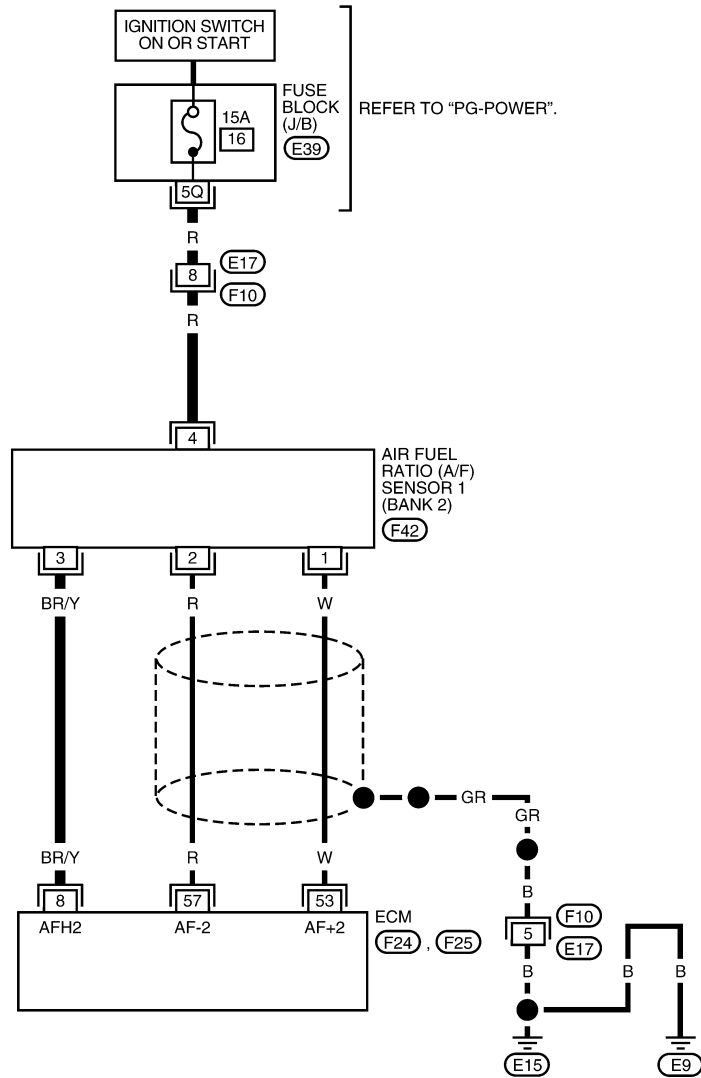
< SERVICE INFORMATION >

[QR25DE]

BANK 2

EC-AF1HB2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

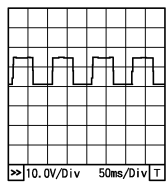
CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

< SERVICE INFORMATION >

[QR25DE]

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/Y	A/F sensor 1 heater (Bank 2)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ 
53	W	A/F sensor 1 (Bank 2)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
57	R	A/F sensor 1 (Bank 2)	[Ignition switch: ON]	Approximately 2.2 V

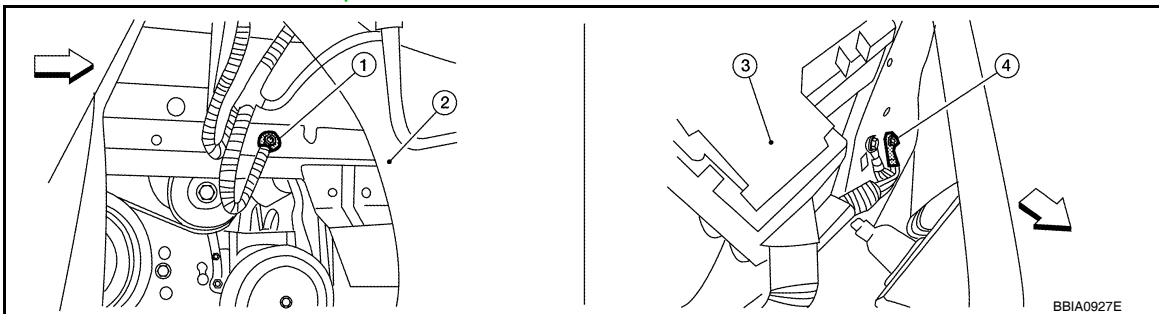
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150440

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
- Loosen and retighten ground screws on the body.
Refer to [EC-1242 "Ground Inspection"](#).



↔: Vehicle front

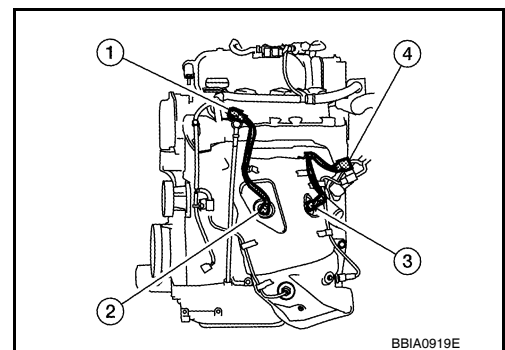
- Body ground E9 (view with front wheel RH and fender protector RH removed.)
- Washer tank
- Fuse and fusible link box
- Body ground E15

OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

2. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

- Disconnect air fuel ratio (A/F) sensor 1 harness connector.
 - Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector (1)
 - Air fuel ratio (A/F) sensor 1 (Bank 1) (2)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) (3)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector (4)
- Turn ignition switch ON.



B81A0919E

DTC P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

[QR25DE]

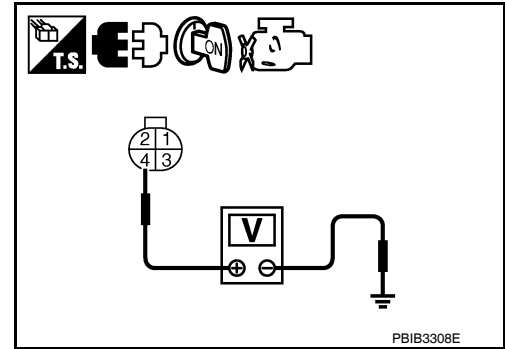
< SERVICE INFORMATION >

3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2 (Bank 1)
- Harness connectors E17, F10 (Bank 2)
- Fuse block (J/B) connector E43 (Bank 1)
- Fuse block (J/B) connector E39 (Bank 2)
- 10 A fuse (Bank 1)
- 15 A fuse (Bank 2)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 HEATER OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 4 (Bank 1) or 8 (Bank 2) and A/F sensor 1 terminal 3. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK A/F SENSOR 1 HEATER

Refer to [EC-1258. "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to [EM-140. "Removal and Installation"](#).

6. CHECK INTERMITTENT INCIDENT

Perform [EC-1236](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150441

AIR FUEL RATIO (A/F) SENSOR 1 HEATER

DTC P0031, P0032, P0051, P0052 A/F SENSOR 1 HEATER

[QR25DE]

< SERVICE INFORMATION >

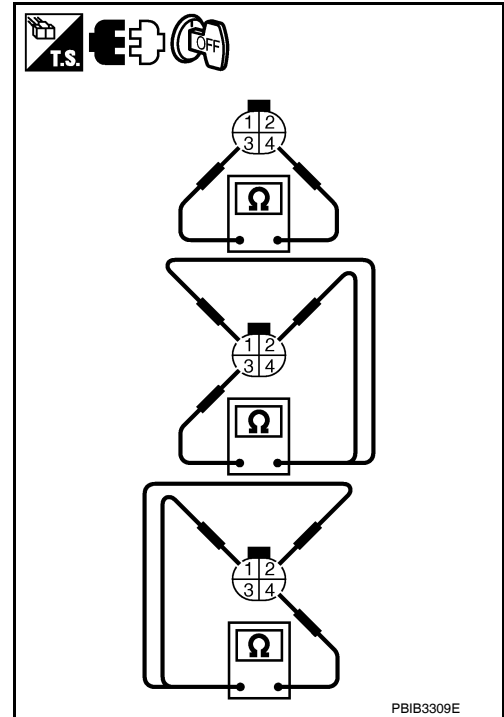
1. Check resistance between A/F sensor 1 terminals as follows.

Terminal No.	Resistance
3 and 4	1.8 - 2.44 Ω [at 25°C (77°F)]
3 and 1, 2	$\infty \Omega$
4 and 1, 2	(Continuity should not exist)

2. If NG, replace air fuel ratio (A/F) sensor 1. Refer to [EM-140](#). "[Removal and Installation](#)".

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 heated oxygen sensor thread cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).



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DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

< SERVICE INFORMATION >

[QR25DE]

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

Description

INFOID:000000006150443

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Crankshaft position sensor (POS)			
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

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.

OPERATION

Engine speed	Heated oxygen sensor 2 heater
Above 3,600 rpm	OFF
<ul style="list-style-type: none"> • Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	ON

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150444

Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 HTR (B1) HO2S2 HTR (B2)	<ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	ON
	<ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm 	OFF

On Board Diagnosis Logic

INFOID:000000006150445

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0037 0037 (Bank 1)	Heated oxygen sensor 2 heater 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 style="list-style-type: none"> • Harness or connectors (Heated oxygen sensor 2 heater circuit is open or shorted.) • Heated oxygen sensor 2 heater
P0057 0057 (Bank 2)			
P0038 0038 (Bank 1)	Heated oxygen sensor 2 heater 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 style="list-style-type: none"> • Harness or connectors (Heated oxygen sensor 2 heater circuit is shorted.) • Heated oxygen sensor 2 heater
P0058 0058 (Bank 2)			

DTC Confirmation Procedure

INFOID:000000006150446

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

< SERVICE INFORMATION >

[QR25DE]

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 11 V at idle.

④ WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-1265, "Diagnosis Procedure"](#).

④ WITH GST

Follow the procedure "WITH CONSULT-III" above.

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DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

< SERVICE INFORMATION >

[QR25DE]

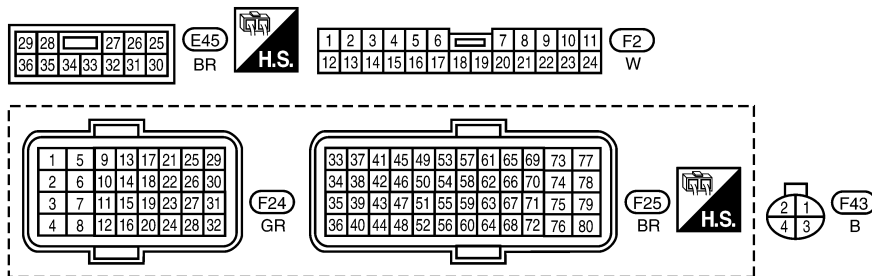
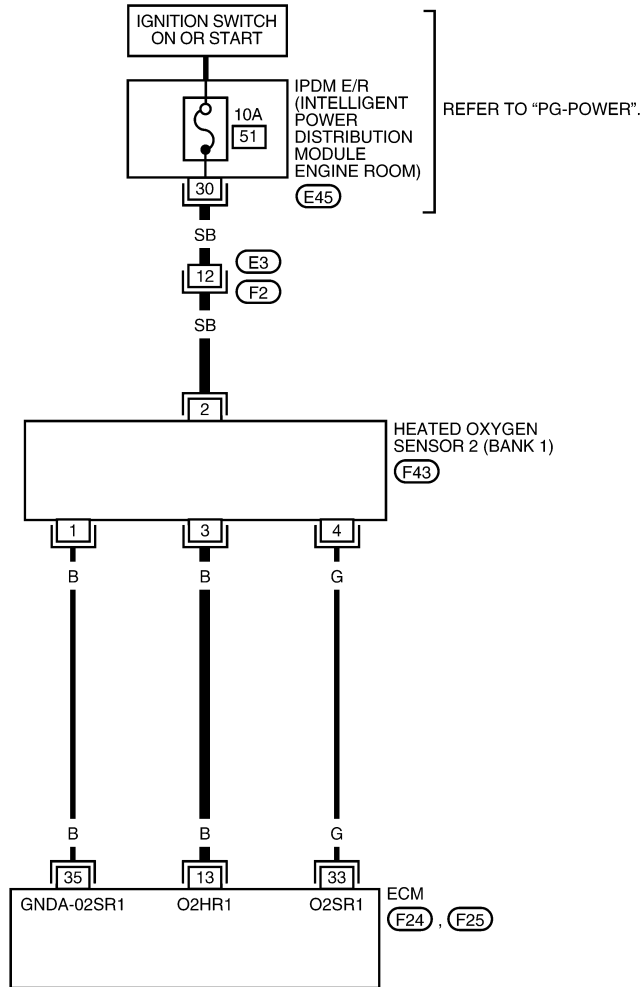
Wiring Diagram

INFOID:000000006150447

BANK 1

EC-O2H2B1-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



AABWA0256GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

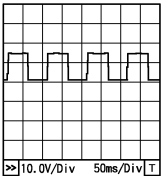
CAUTION:

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER- MI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	B	Heated oxygen sensor 2 heater (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★ 
			[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped [Engine is running] <ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
33	G	Heated oxygen sensor 2 (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
35	B	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

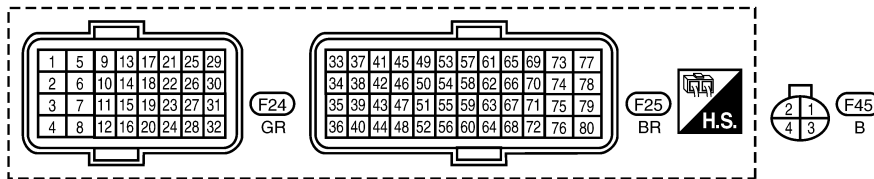
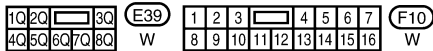
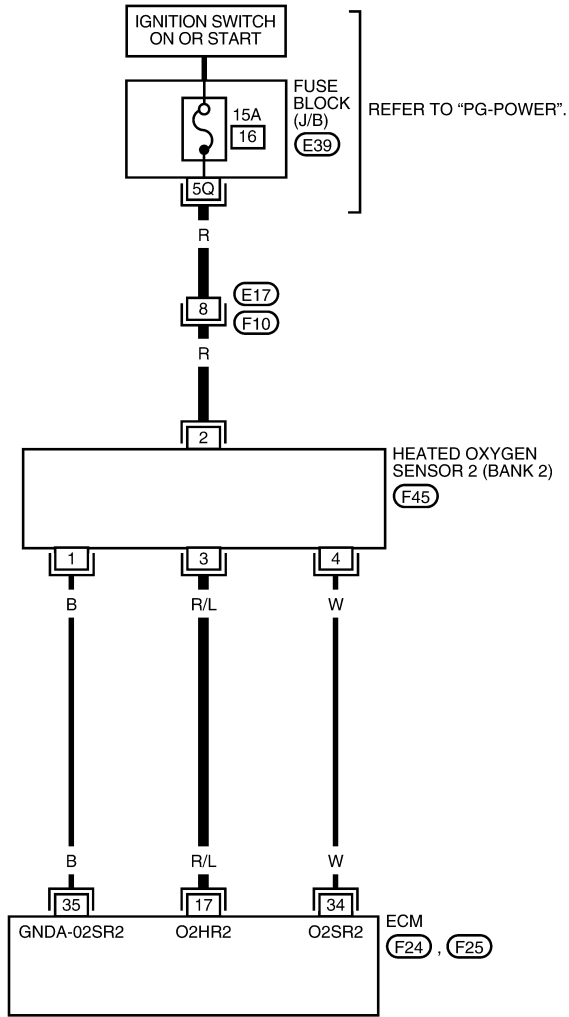
< SERVICE INFORMATION >

[QR25DE]

BANK 2

EC-O2H2B2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA3025E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

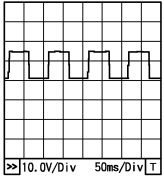
CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

< SERVICE INFORMATION >

[QR25DE]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
17	R/L	Heated oxygen sensor 2 heater (Bank 2)	[Engine is running] <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★ 
			[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped [Engine is running] <ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
34	W	Heated oxygen sensor 2 (Bank 2)	[Engine is running] <ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
35	B	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V

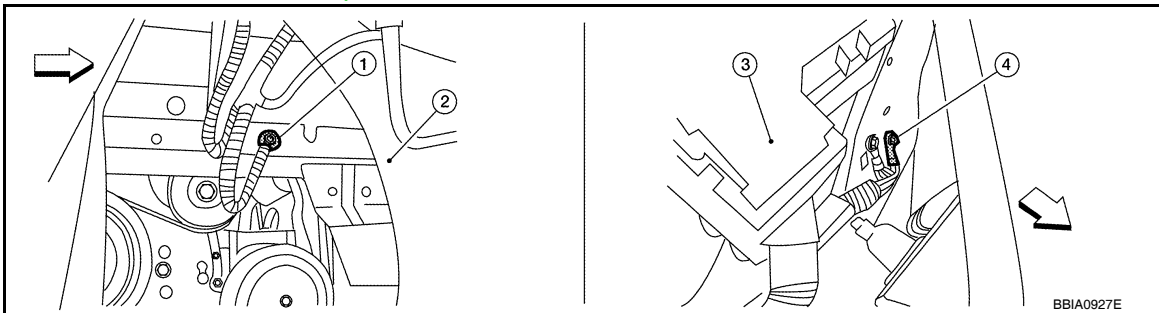
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150448

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
Refer to [EC-1242, "Ground Inspection"](#).



↔ Vehicle front

- | | | |
|---|----------------|------------------------------|
| 1. Body ground E9 (view with front wheel RH and fender protector RH removed.) | 2. Washer tank | 3. Fuse and fusible link box |
| 4. Body ground E15 | | |

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.

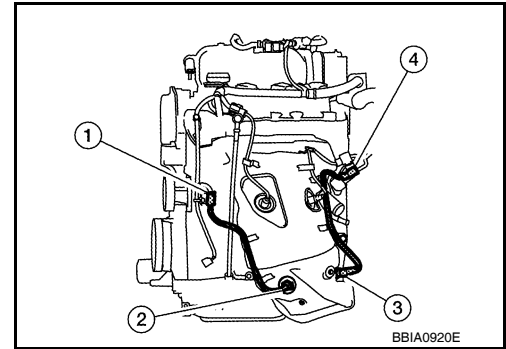
2. CHECK HO2S2 POWER SUPPLY CIRCUIT

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

[QR25DE]

< SERVICE INFORMATION >

1. Disconnect heated oxygen sensor 2 harness connector.
 - Heated oxygen sensor 2 (Bank 1) harness connector (1)
 - Heated oxygen sensor 2 (Bank 1) (2)
 - Heated oxygen sensor 2 (Bank 2) (3)
 - Heated oxygen sensor 2 (Bank 2) harness connector (4)
2. Turn ignition switch ON.

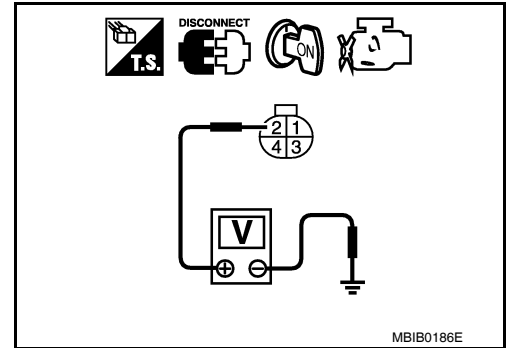


3. Check voltage between HO2S2 terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector E3, F2 (Bank 1)
- Harness connector E17, F10 (Bank 2)
- Fuse block (J/B) connector E45 (Bank 1)
- Fuse block (J/B) connector E39 (Bank 2)
- 10 A fuse (Bank 1)
- 15 A fuse (Bank 2)
- Harness for open or short between heated oxygen sensor 2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 13 (Bank 1) or 17 (Bank 2) and HO2S2 terminal 3. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to [EC-1267, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
NG >> Replace malfunctioning heated oxygen sensor 2. Refer to [EM-140, "Removal and Installation"](#).

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

DTC P0037, P0038, P0057, P0058 HO2S2 HEATER

< SERVICE INFORMATION >

[QR25DE]

>> INSPECTION END

Component Inspection

INFOID:000000006150449

HEATED OXYGEN SENSOR 2 HEATER

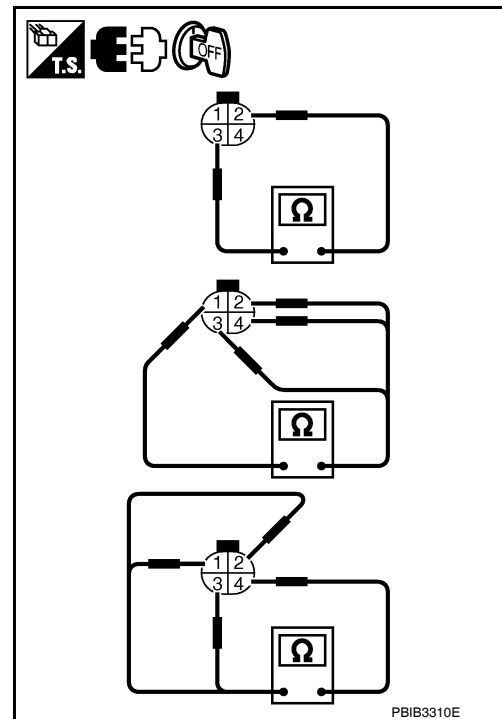
1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
2 and 3	3.4 - 4.4 Ω [at 25°C (77°F)]
1 and 2, 3, 4	$\infty \Omega$ (Continuity should not exist)
4 and 1, 2, 3	$\infty \Omega$ (Continuity should not exist)

2. If NG, replace heated oxygen sensor 2. Refer to [EM-140](#), "[Removal and Installation](#)".

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using oxygen sensor thread cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).



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DTC P0075 IVT CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[QR25DE]

DTC P0075 IVT CONTROL SOLENOID VALVE

Component Description

INFOID:000000006150451

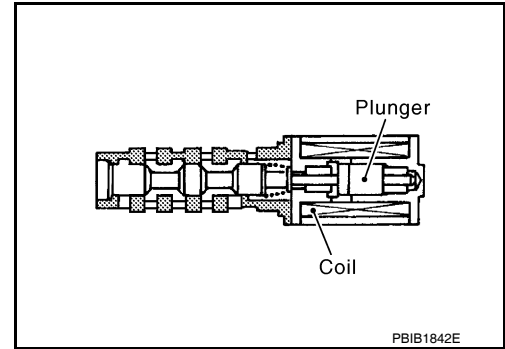
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150452

Specification data are reference values.

Monitor item	Condition	Specification	
INT/V SOL (B1)	• Engine: After warming up • Selector lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	0%
		2,000 rpm	Approx. 0% - 60%

On Board Diagnosis Logic

INFOID:000000006150453

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0075 0075	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	<ul style="list-style-type: none">• Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.)• Intake valve timing control solenoid valve

DTC Confirmation Procedure

INFOID:000000006150454

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Start engine and let it idle for 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1270, "Diagnosis Procedure"](#).

DTC P0075 IVT CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

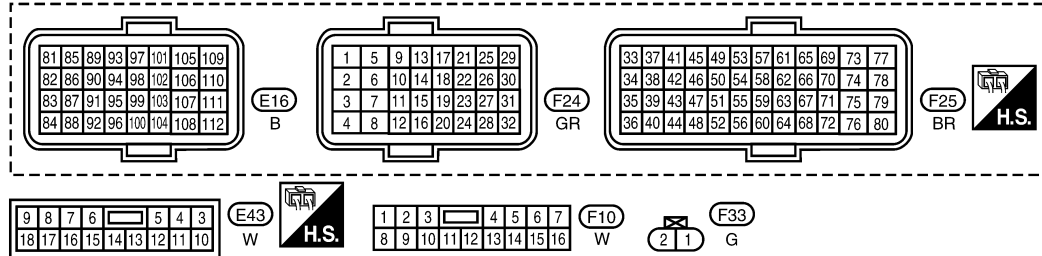
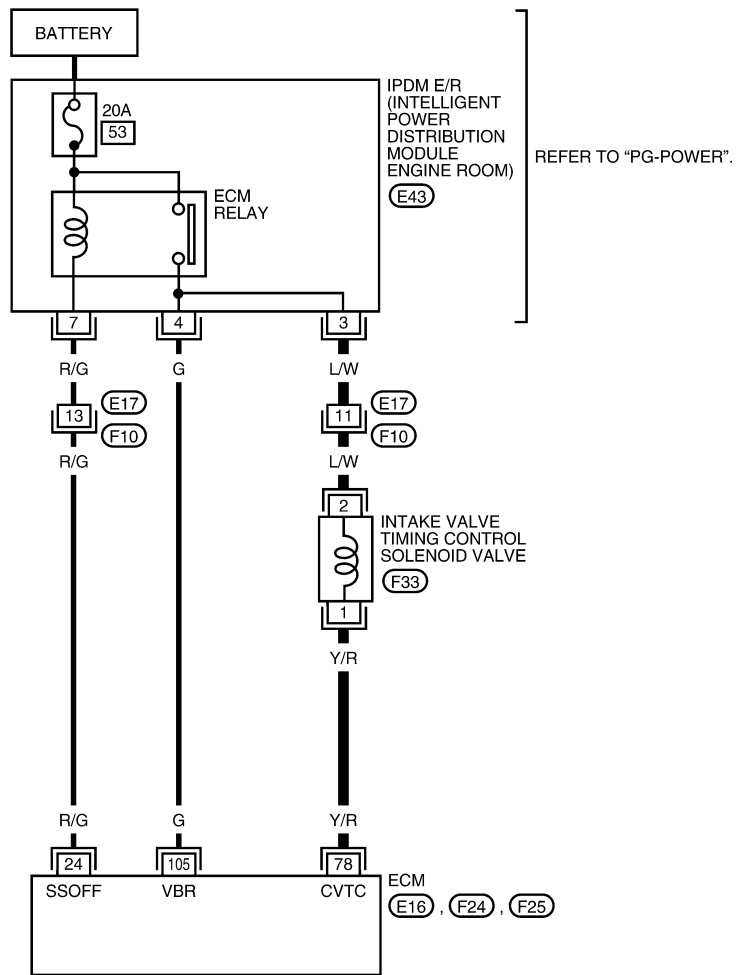
[QR25DE]

INFOID:000000006150455

Wiring Diagram

EC-IVC-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

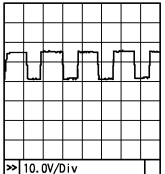
CAUTION:

DTC P0075 IVT CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
78	Y/R	Intake valve timing control solenoid valve	[Engine is running] • Warm-up condition • Idle speed	BATTERY VOLTAGE (11 - 14 V)
			[Engine is running] • Warm-up condition • When revving engine up to 2,000 rpm quickly	7 - 10 V★  PBI A4937J
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

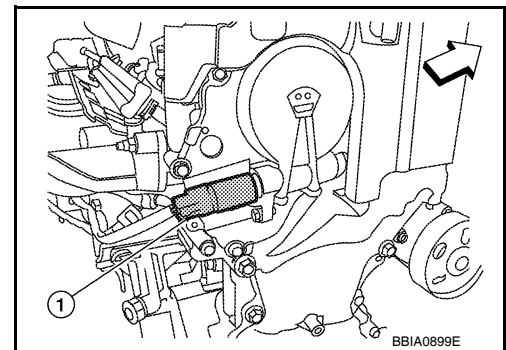
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150456

1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect intake valve timing control solenoid valve (1) harness connector.
↳: Vehicle front
- Turn ignition switch ON.

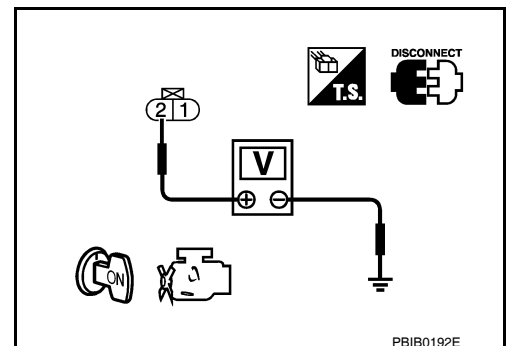


- Check voltage between intake valve timing control solenoid valve terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTION PART

Check the following.

DTC P0075 IVT CONTROL SOLENOID VALVE

[QR25DE]

< SERVICE INFORMATION >

- Harness connectors E17, F10
- Harness for open or short between intake valve timing control solenoid valve and IPDM E/R

>> Repair or replace harness or connectors.

3. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 78 and intake valve timing control solenoid valve terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-1271, "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace intake valve timing control solenoid valve. Refer to [EM-153, "Removal and Installation"](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150457

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

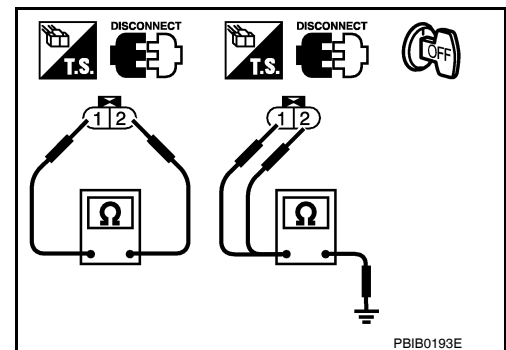
1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve as follows.

Terminal	Resistance
1 and 2	6.7 - 7.7 Ω [at 20°C (68°F)]
1 or 2 and ground	$\infty \Omega$ (Continuity should not exist.)

If NG, replace intake valve timing control solenoid valve. Refer to [EM-153, "Removal and Installation"](#).

If OK, go to next step.

3. Remove intake valve timing control solenoid valve. Refer to [EM-153, "Removal and Installation"](#).



DTC P0075 IVT CONTROL SOLENOID VALVE

[QR25DE]

< SERVICE INFORMATION >

4. Provide 12 V DC between intake valve timing control solenoid valve terminals and then interrupt it. Check that the plunger moves as shown in the figure.

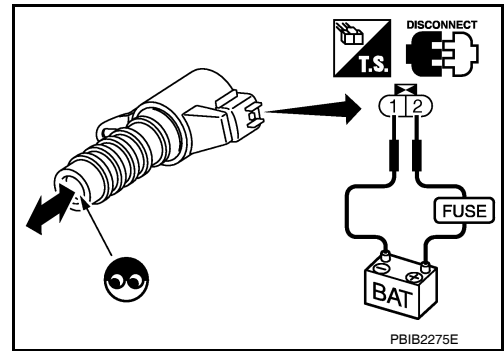
CAUTION:

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.

If NG, replace intake valve timing control solenoid valve. Refer to [EM-160. "Inspection After Installation"](#).

NOTE:

Always replace O-ring when intake valve timing control solenoid valve is removed.



DTC P0101 MAF SENSOR

< SERVICE INFORMATION >

[QR25DE]

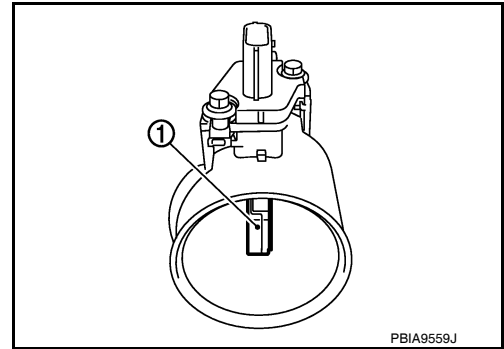
DTC P0101 MAF SENSOR

Component Description

INFOID:000000006150459

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 greater air flow, 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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150460

Specification data are reference values.

Monitor item	Condition	Specification
MAS A/F SE-B1	See EC-1228 .	
CAL/LD VALUE	• Engine: After warming up • Selector lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle 2,500 rpm
		10% - 35% 10% - 35%
MASS AIRFLOW	• Engine: After warming up • Selector lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle 2,500 rpm
		1.0 - 4.0 g/s 4.0 - 10.0 g/s

On Board Diagnosis Logic

INFOID:000000006150461

NOTE:

If DTC P0101 is displayed with other DTC, first perform the trouble diagnosis for other DTC.

DTC No.	Trouble diagnosis (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0101	MAF SEN/CIRCUIT-B1 [Mass air flow (MAF) sensor circuit range/performance]	<ul style="list-style-type: none"> A high voltage from the sensor is sent to ECM under light load driving condition. A low voltage from the sensor is sent to ECM under heavy load driving condition. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Intake air leaks MAF sensor EVAP control system pressure sensor Intake air temperature sensor

DTC Confirmation Procedure

INFOID:000000006150462

1. 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.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Start engine and warm it up to normal operating temperature.
- Drive the vehicle for at least 5 seconds under the following conditions:

CAUTION:

Always drive vehicle at safe speed.

DTC P0101 MAF SENSOR

< SERVICE INFORMATION >

[QR25DE]

Selector lever	Suitable position
Vehicle speed	40 km/h (25 MPH) or more

NOTE:

- The gear must be fixed while driving the vehicle.
- Keep the accelerator pedal as steady as possible during cruising.

3. Check 1st trip DTC.

Is 1st trip DTC detected?

- YES >> Proceed to [EC-1276, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

DTC P0101 MAF SENSOR

< SERVICE INFORMATION >

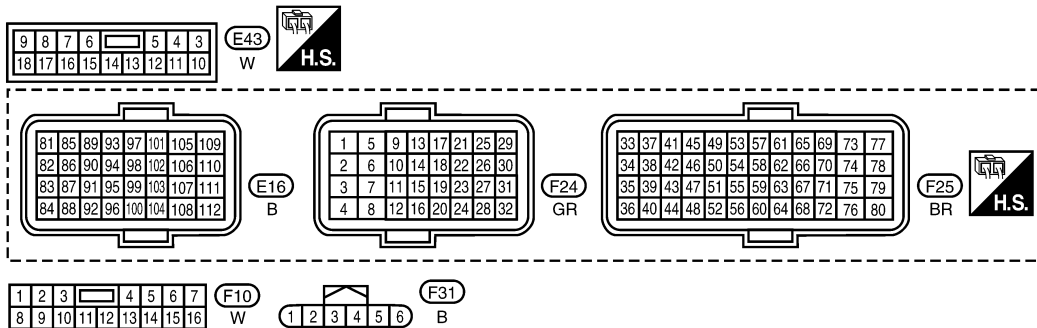
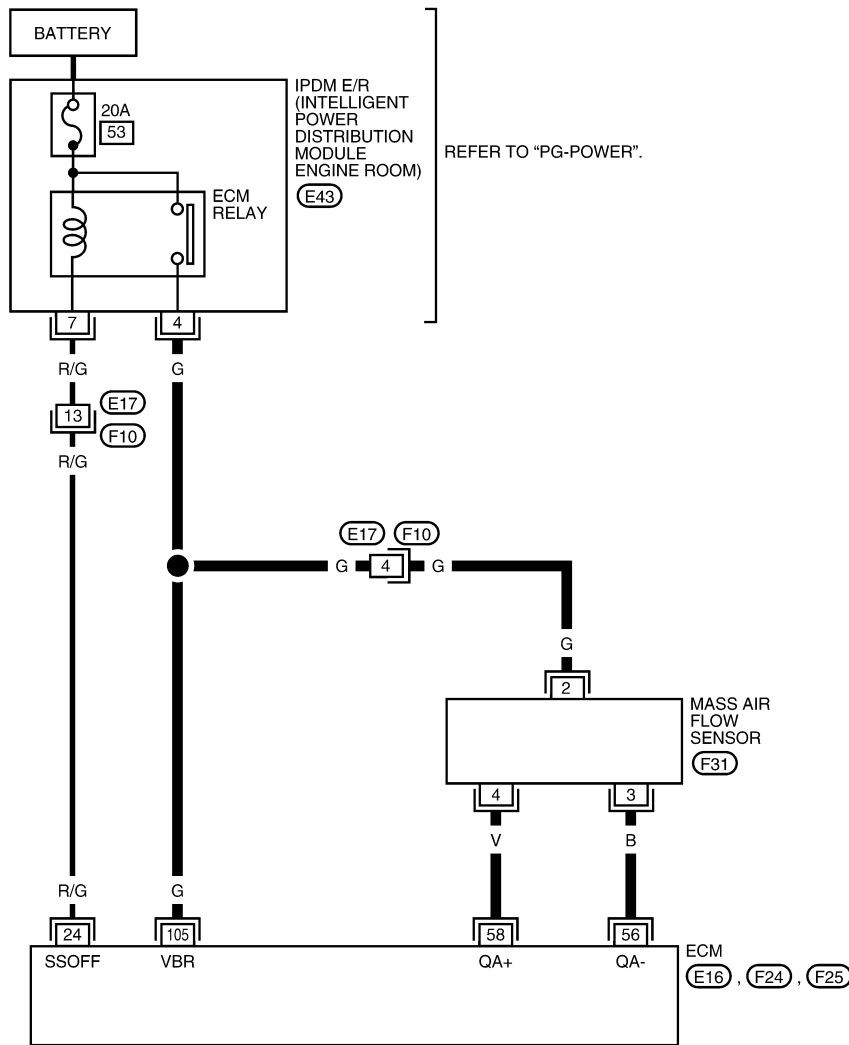
[QR25DE]

Wiring Diagram

INFOID:000000006150464

EC-MAFS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0258GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0101 MAF SENSOR

< SERVICE INFORMATION >

[QR25DE]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
56	B	Sensor ground	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
58	V	Mass air flow sensor	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.1 V
			[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	1.4 - 1.7 V
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006150465

1. CHECK INTAKE AIR LEAK

Check the following for connections.

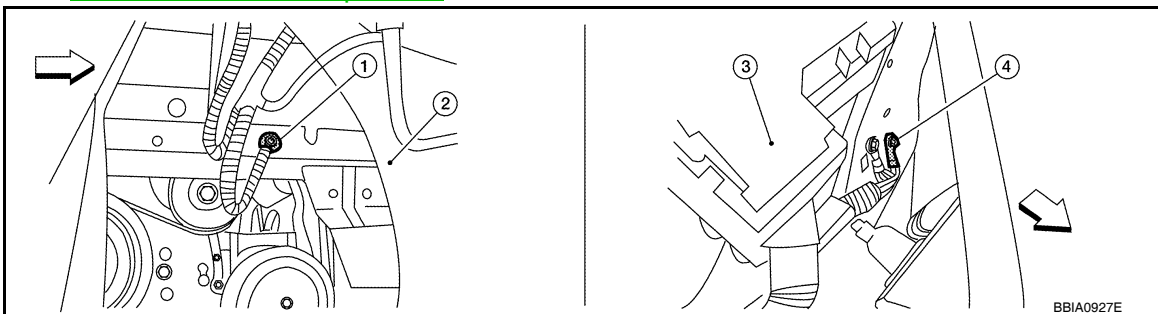
- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

OK or NG

- OK >> GO TO 2.
NG >> Reconnect the parts.

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 3.
NG >> Repair or replace ground connections.

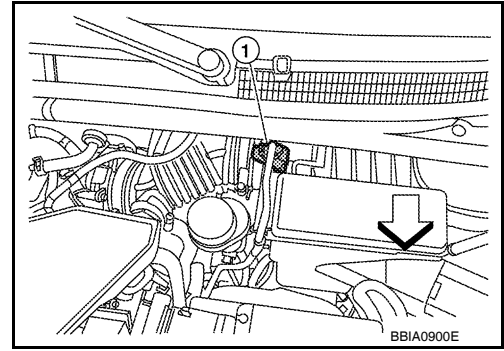
DTC P0101 MAF SENSOR

< SERVICE INFORMATION >

[QR25DE]

3. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor (1) harness connector.
 - ⇐: Vehicle front
2. Turn ignition switch ON.

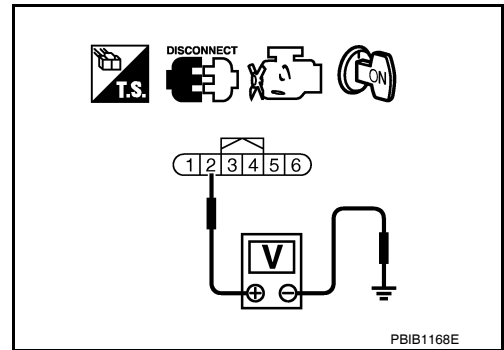


3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between mass air flow sensor and IPDM E/R
- Harness for open or short between mass air flow sensor and ECM

>> 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 harness continuity between MAF sensor terminal 3 and ECM terminal 56. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 58. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> Repair open circuit or short to ground or short or short to power in harness or connectors.

7. CHECK INTAKE AIR TEMPERATURE SENSOR

DTC P0101 MAF SENSOR

[QR25DE]

< SERVICE INFORMATION >

Refer to [EC-1308, "Component Inspection"](#).

OK or NG

OK >> GO TO 8.

NG >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-133, "Removal and Installation"](#).

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1471, "Component Inspection"](#).

OK or NG

OK >> GO TO 9.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

9. CHECK MASS AIR FLOW SENSOR

Refer to [EC-1278, "Component Inspection"](#).

OK or NG

OK >> GO TO 10.

NG >> Replace mass air flow sensor. Refer to [EM-133, "Removal and Installation"](#).

10. CHECK INTERMITTENT INCIDENT

Perform [EC-1236](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150466

MASS AIR FLOW SENSOR

Ⓟ With CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Connect CONSULT-III and select "DATA MONITOR" mode.
4. Select "MAS A/F SE-B1" and check indication under the following conditions.

Condition	MAS A/F SE-B1 (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.4 - 1.7
Idle to approx. 4,000 rpm	0.9 - 1.1 to 2.4*

*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

5. If the voltage is out of specification, proceed the following.
 - a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
 - b. If NG, repair or replace malfunctioning part and perform step 2 to 4 again.
If OK, go to next step.
6. Turn ignition switch OFF.
7. Disconnect mass air flow sensor harness connector and reconnect it again.
8. Perform step 2 to 4 again.
9. If NG, clean or replace mass air flow sensor. Refer to [EM-133, "Removal and Installation"](#).

ⓧ Without CONSULT-III

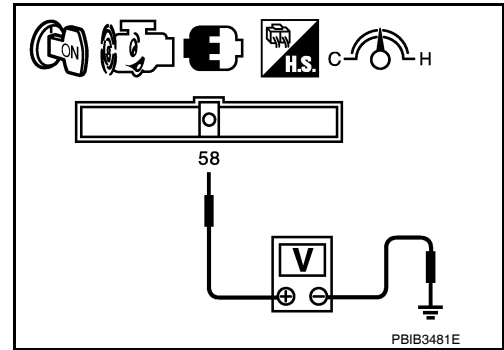
DTC P0101 MAF SENSOR

[QR25DE]

< SERVICE INFORMATION >

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 58 (Mass air flow sensor signal) and ground.

Condition	Voltage (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.4 - 1.7
Idle to approx. 4,000 rpm	0.9 - 1.1 to 2.4*



*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
 - a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
 - b. If NG, repair or replace malfunctioning part and perform step 2 and 3 again. If OK, go to next step.
5. Turn ignition switch OFF.
6. Disconnect mass air flow sensor harness connector and reconnect it again.
7. Perform step 2 and 3 again.
8. If NG, clean or replace mass air flow sensor. Refer to [EM-133, "Removal and Installation"](#).

DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

[QR25DE]

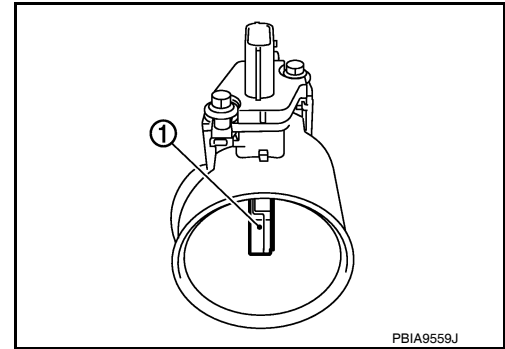
DTC P0102, P0103 MAF SENSOR

Component Description

INFOID:000000006150468

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150469

Specification data are reference values.

Monitor item	Condition	Specification
MAS A/F SE-B1	See EC-1228 .	
CAL/LD VALUE	Idle	10% - 35%
	2,500 rpm	10% - 35%
MASS AIRFLOW	Idle	1.0 - 4.0 g/s
	2,500 rpm	4.0 - 10.0 g/s

On Board Diagnosis Logic

INFOID:000000006150470

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102 0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (Mass air flow sensor circuit is open or shorted.) Intake air leaks Mass air flow sensor
P0103 0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (Mass air flow sensor circuit is open or shorted.) Mass air flow sensor

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL illuminates.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

DTC Confirmation Procedure

INFOID:000000006150471

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR DTC P0102

DTC P0102, P0103 MAF SENSOR

[QR25DE]

< SERVICE INFORMATION >

1. Start engine and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-1283. "Diagnosis Procedure"](#).

A

PROCEDURE FOR DTC P0103

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-1283. "Diagnosis Procedure"](#).
If DTC is not detected, go to next step.
4. Start engine and wait at least 5 seconds
5. Check DTC.
6. If DTC is detected, go to [EC-1283. "Diagnosis Procedure"](#).

EC

C

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DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

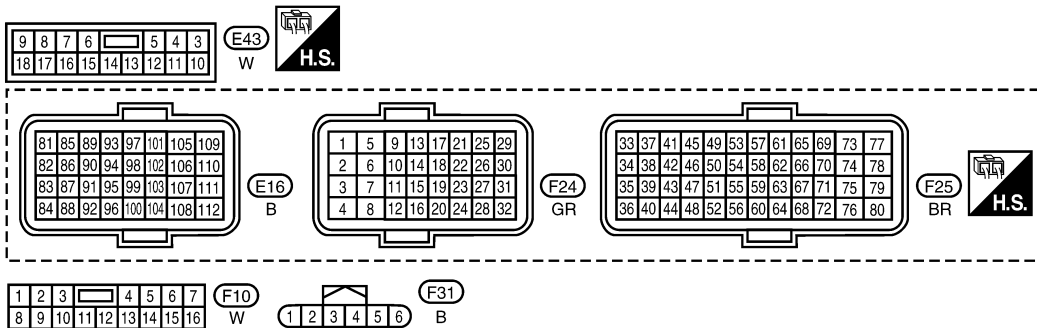
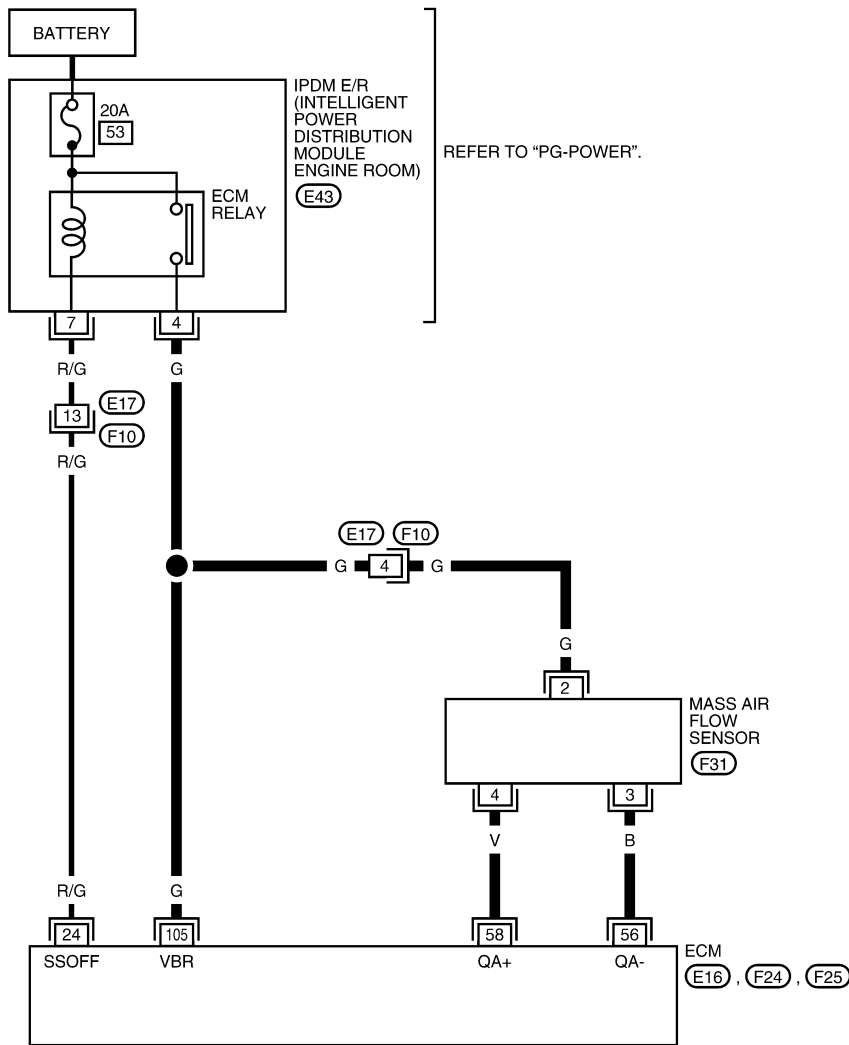
[QR25DE]

INFOID:000000006150472

Wiring Diagram

EC-MAFS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0258GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0102, P0103 MAF SENSOR

< SERVICE INFORMATION >

[QR25DE]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
56	B	Sensor ground (Mass air flow sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
58	V	Mass air flow sensor	[Engine is running] • Warm-up condition • Idle speed	0.9 - 1.1 V
			[Engine is running] • Warm-up condition • Engine speed: 2,500 rpm	1.4 - 1.7 V
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006150473

1. INSPECTION START

Which malfunction (P0102 or P0103) is duplicated?

P0102 or P0103

P0102 >> GO TO 2.

P0103 >> GO TO 3.

2. CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

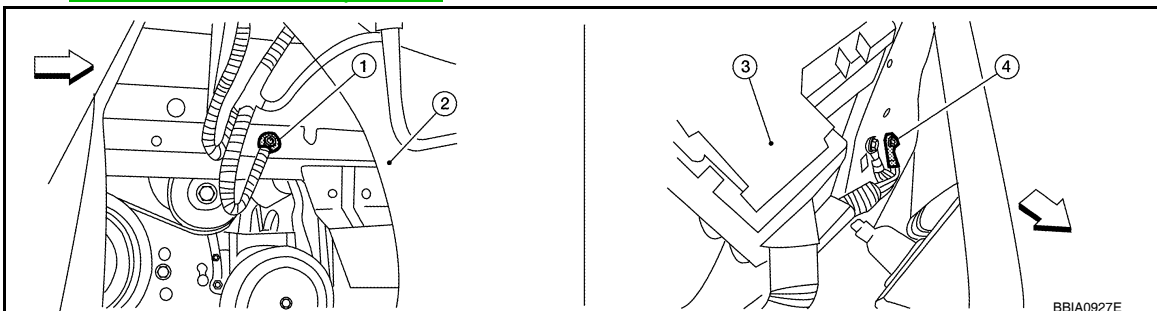
OK or NG

OK >> GO TO 3.

NG >> Reconnect the parts.

3. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



BBI A0927E

DTC P0102, P0103 MAF SENSOR

[QR25DE]

< SERVICE INFORMATION >

↶: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

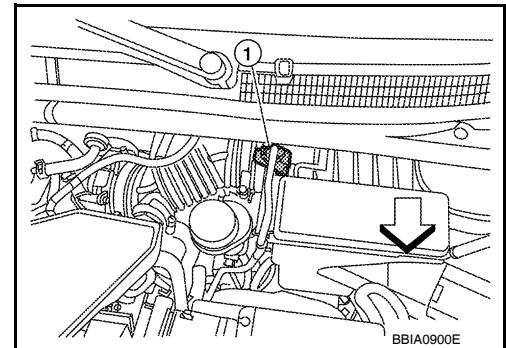
OK or NG

OK >> GO TO 4.

NG >> Repair or replace ground connections.

4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor (1) harness connector.
- ↶: Vehicle front
2. Turn ignition switch ON.



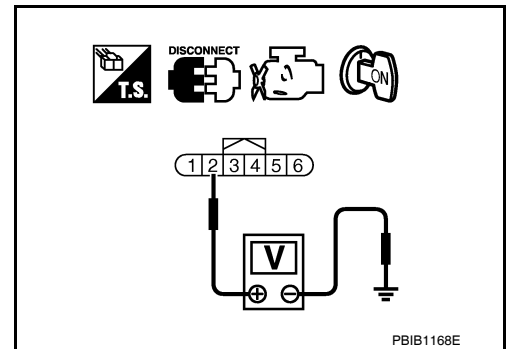
3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- 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.

6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 56.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 58.

DTC P0102, P0103 MAF SENSOR

[QR25DE]

< SERVICE INFORMATION >

Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to [EC-1285, "Component Inspection"](#).

OK or NG

OK >> GO TO 9.

NG >> Replace mass air flow sensor. Refer to [EM-133, "Removal and Installation"](#).

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

Component Inspection

INFOID:000000006150474

MASS AIR FLOW SENSOR

 With CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Connect CONSULT-III and select "DATA MONITOR" mode.
4. Select "MAS A/F SE-B1" and check indication under the following conditions.

Condition	MAS A/F SE-B1 (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.4 - 1.7
Idle to approx. 4,000 rpm	0.9 - 1.1 to 2.4*

*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

5. If the voltage is out of specification, proceed the following.
 - a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
 - b. If NG, repair or replace malfunctioning part and perform step 2 to 4 again. If OK, go to next step.
6. Turn ignition switch OFF.
7. Disconnect mass air flow sensor harness connector and reconnect it again.
8. Perform step 2 to 4 again.
9. If NG, clean or replace mass air flow sensor. Refer to [EM-133, "Removal and Installation"](#).

 Without CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.

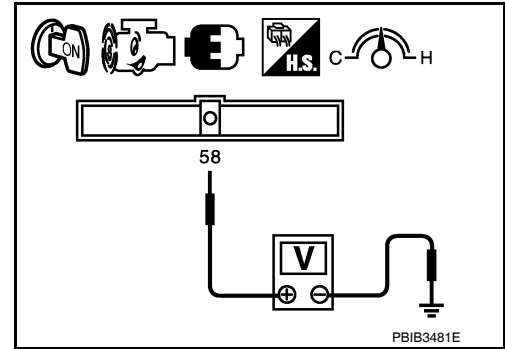
DTC P0102, P0103 MAF SENSOR

[QR25DE]

< SERVICE INFORMATION >

3. Check voltage between ECM terminal 58 (Mass air flow sensor signal) and ground.

Condition	Voltage (V)
Ignition switch ON (Engine stopped.)	Approx 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.4 - 1.7
Idle to approx. 4,000 rpm	0.9 - 1.1 to 2.4*



*: Check for linear voltage rise in response to engine being increased to approximately 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
- Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Improper specification of intake air system parts
 - If NG, repair or replace malfunctioning part and perform step 2 and 3 again. If OK, go to next step.
 - Turn ignition switch OFF.
 - Disconnect mass air flow sensor harness connector and reconnect it again.
 - Perform step 2 and 3 again.
 - If NG, clean or replace mass air flow sensor. Refer to [EM-133, "Removal and Installation"](#).

DTC P0112, P0113 IAT SENSOR

< SERVICE INFORMATION >

[QR25DE]

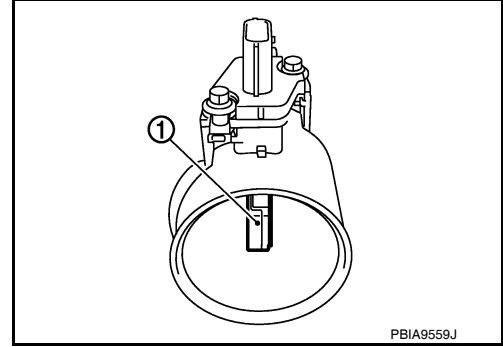
DTC P0112, P0113 IAT SENSOR

Component Description

INFOID:000000006150476

The intake air temperature sensor is built-into the mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.

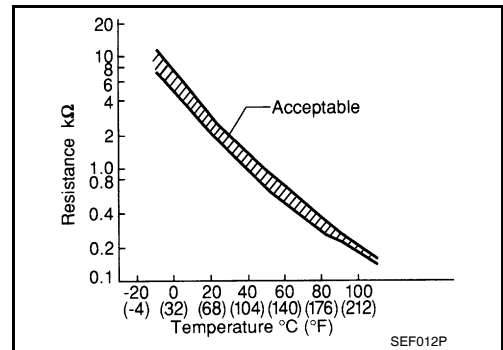
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the rise in temperature.



<Reference data>

Intake air temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: This data is reference value and is measured between ECM terminal 50 (Intake air temperature sensor) and ground.



On Board Diagnosis Logic

INFOID:000000006150477

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Intake air temperature sensor circuit is open or shorted.) • Intake air temperature sensor
P0113 0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006150478

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1288, "Diagnosis Procedure"](#).

DTC P0112, P0113 IAT SENSOR

< SERVICE INFORMATION >

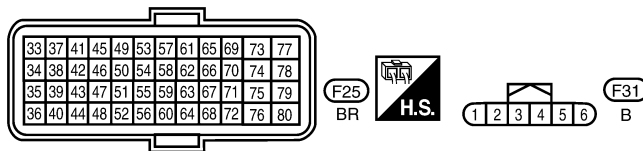
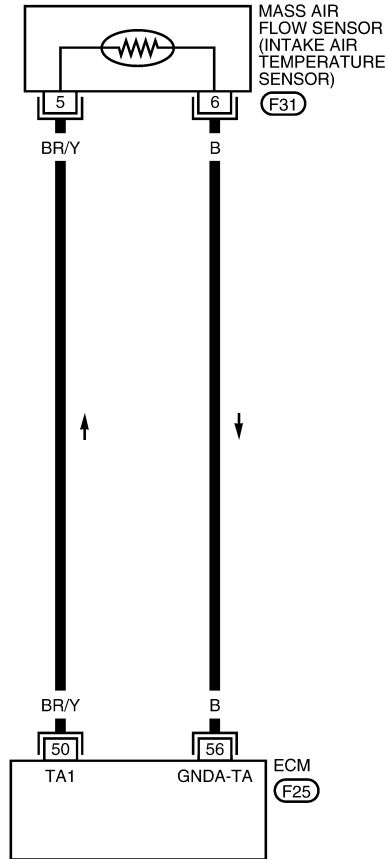
[QR25DE]

Wiring Diagram

INFOID:000000006150479

EC-IATS-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA3028E

Diagnosis Procedure

INFOID:000000006150480

1. CHECK GROUND CONNECTIONS

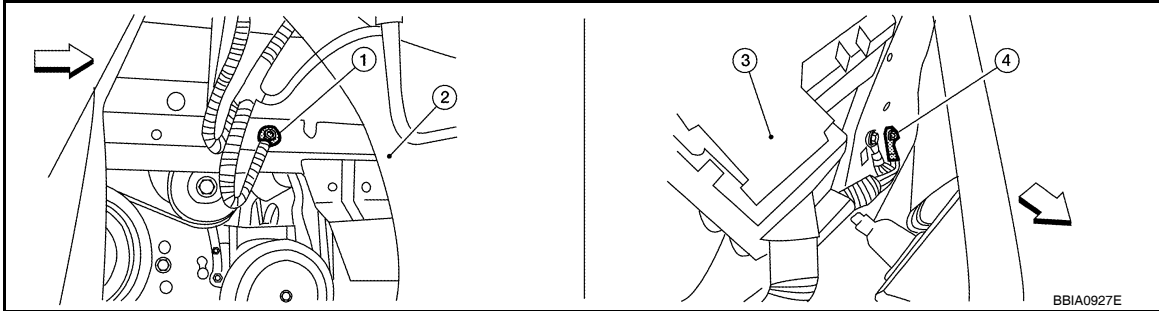
1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.

DTC P0112, P0113 IAT SENSOR

[QR25DE]

< SERVICE INFORMATION >

Refer to [EC-1242, "Ground Inspection"](#).



⇐: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

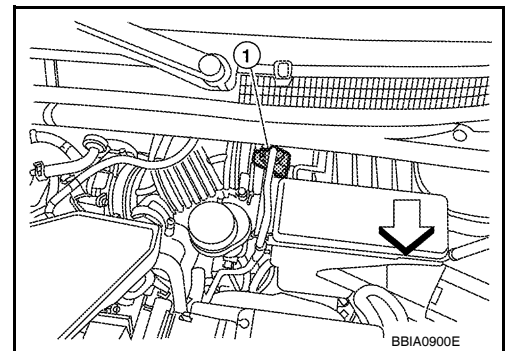
OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow sensor (with intake air temperature sensor) (1) harness connector.
 - ⇐: Vehicle front
2. Turn ignition switch ON.



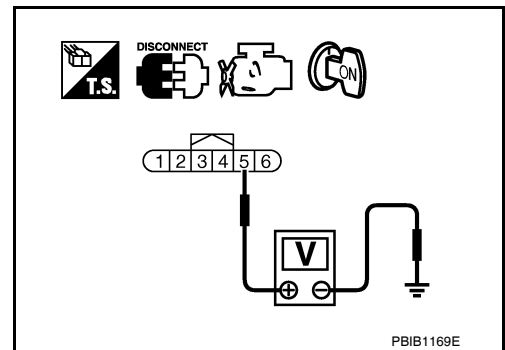
3. Check voltage between mass air flow sensor terminal 5 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between mass air flow sensor terminal 6 and ECM terminal 56. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0112, P0113 IAT SENSOR

[QR25DE]

< SERVICE INFORMATION >

4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-1290, "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-133, "Removal and Installation"](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

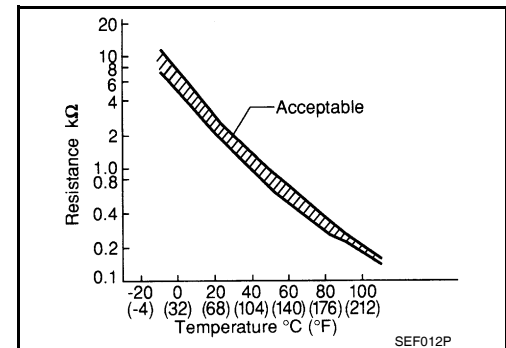
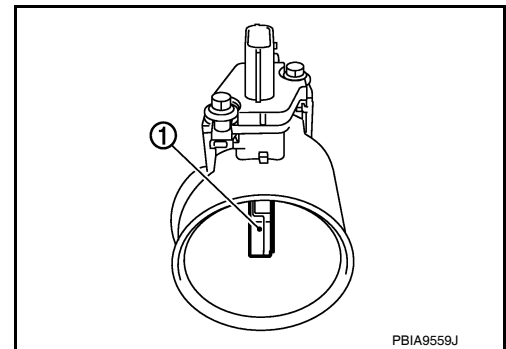
INFOID:000000006150481

INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between mass air flow sensor (1) terminals 5 and 6 under the following conditions.

Intake air temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200

2. If NG, replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-133, "Removal and Installation"](#).



DTC P0116 ECT SENSOR

< SERVICE INFORMATION >

[QR25DE]

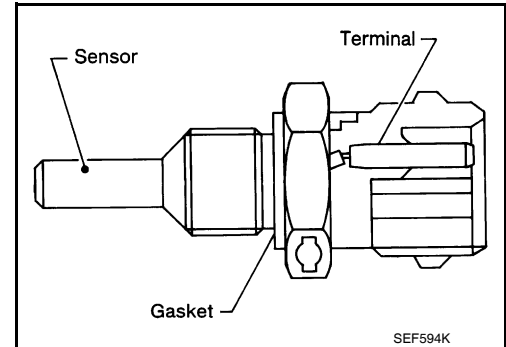
DTC P0116 ECT SENSOR

Description

INFOID:000000006150483

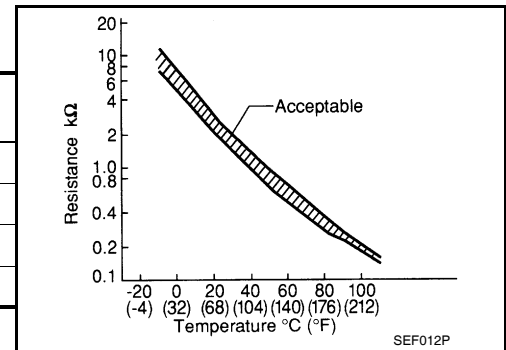
Component Description

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)]	Voltage* (V)	Resistance (kΩ)
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260



*: This data is reference values and is measured between ECM terminal 46 (Engine coolant temperature sensor) and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

INFOID:000000006150484

NOTE:

- If DTC P0116 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-1294, "Component Description"](#).
- This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0116 0116	Engine coolant temperature sensor circuit range/performance	Engine coolant temperature signal from engine coolant temperature sensor does not fluctuate, even when some time has passed after starting the engine with pre-warming up condition.	<ul style="list-style-type: none"> • Harness or connectors (High or low resistance in the circuit) • Engine coolant temperature sensor

DTC Confirmation Procedure

INFOID:000000006150485

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, do not add fuel.

1. Start engine and warm it up to normal operating temperature.
2. Rev engine up to 2,000 rpm for more than 10 minutes.
3. Move the vehicle to a cool place, then stop engine.
4. Check resistance between "fuel level sensor and fuel pump" terminals 4 and 5.

DTC P0116 ECT SENSOR

[QR25DE]

< SERVICE INFORMATION >

- Soak the vehicle until the resistance between “fuel level sensor and fuel pump” terminals 4 and 5 becomes 0.5 kΩ higher than the value measured before soaking.

CAUTION:

Never turn ignition switch ON during soaking time.

NOTE:

Soak time changes depending on ambient air temperature. It may take several hours.

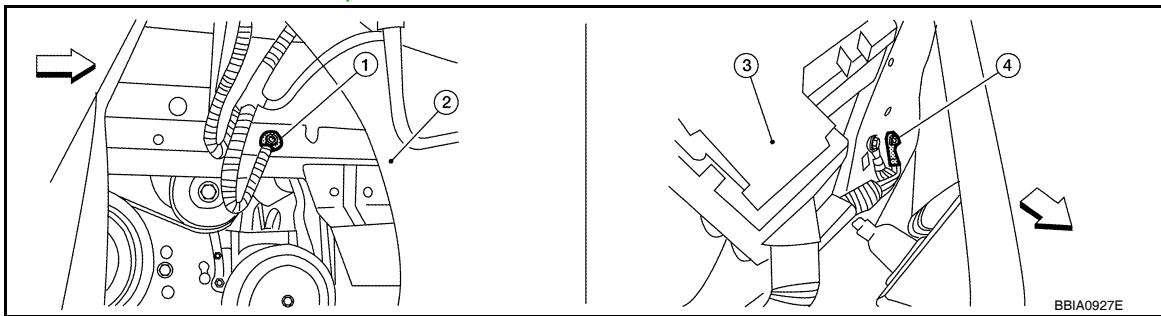
- Start engine and let it idle for 20 minutes.
- Check DTC.
- If DTC is detected, go to [EC-1292, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150486

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
- Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

- Body ground E9 (view with front wheel RH and fender protector RH removed.)
- Washer tank
- Fuse and fusible link box
- Body ground E15

OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

2. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-1292, "Component Inspection"](#).

OK or NG

OK >> GO TO 3.

NG >> Replace engine coolant temperature sensor. Refer to [CO-50, "Component"](#).

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236, "Diagnosis Procedure"](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150487

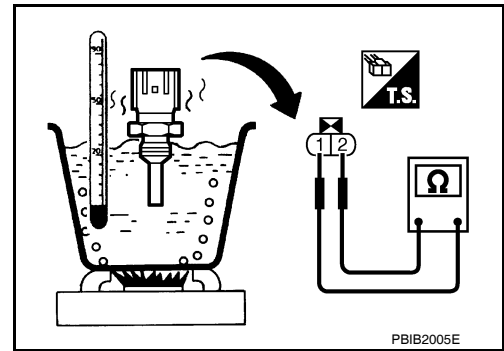
ENGINE COOLANT TEMPERATURE SENSOR

DTC P0116 ECT SENSOR

[QR25DE]

< SERVICE INFORMATION >

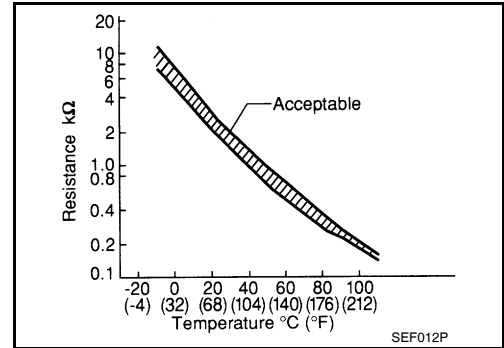
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure. Refer to [CO-50, "Component"](#).



<Reference data>

Engine coolant temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine coolant temperature sensor. Refer to [CO-50, "Component"](#).



A
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DTC P0117, P0118 ECT SENSOR

< SERVICE INFORMATION >

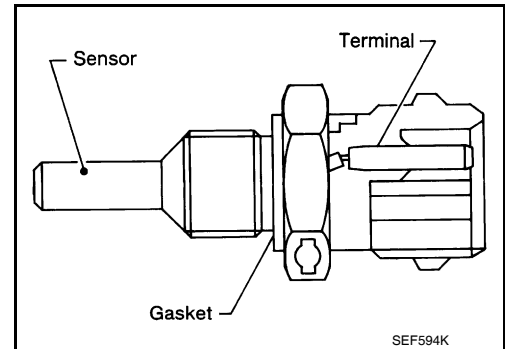
[QR25DE]

DTC P0117, P0118 ECT SENSOR

Component Description

INFOID:000000006150489

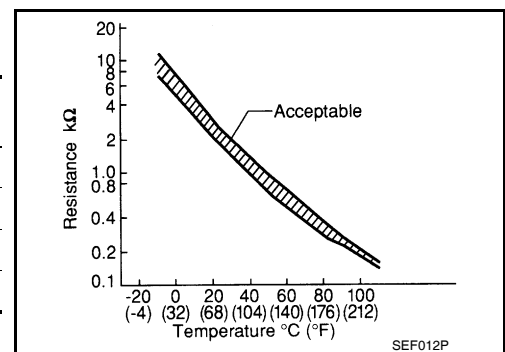
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: This data is reference value and is measured between ECM terminal 46 (Engine coolant temperature sensor) and ground.



CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

INFOID:000000006150490

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Engine coolant temperature sensor circuit is open or shorted.) • Engine coolant temperature sensor
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL illuminates.

DTC P0117, P0118 ECT SENSOR

< SERVICE INFORMATION >

[QR25DE]

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the following condition CONSULT-III displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-III display)
	Just as ignition switch is turned ON or START	40°C (104°F)
	Approx. 4 minutes or more after engine 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.		

DTC Confirmation Procedure

INFOID:000000006150491

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check DTC.
3. If DTC is detected, go to [EC-1296, "Diagnosis Procedure"](#).

DTC P0117, P0118 ECT SENSOR

< SERVICE INFORMATION >

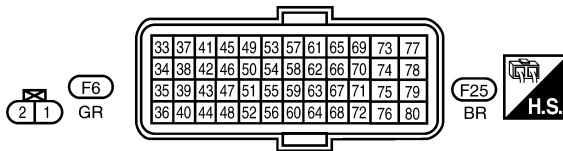
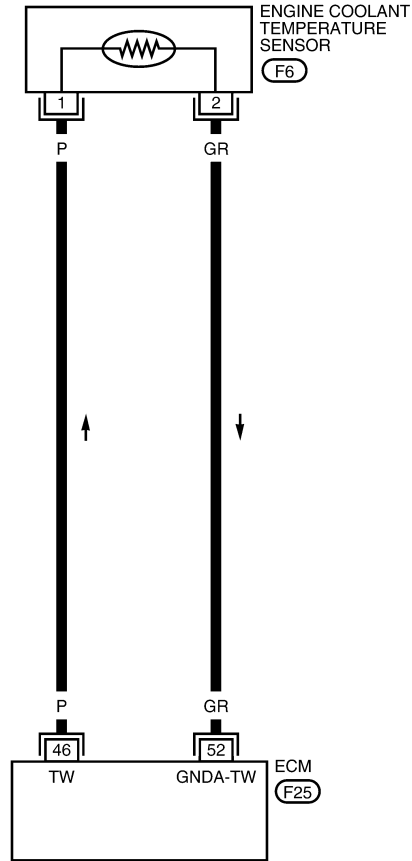
[QR25DE]

Wiring Diagram

INFOID:000000006150492

EC-ECTS-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



BBWA3029E

Diagnosis Procedure

INFOID:000000006150493

1. CHECK GROUND CONNECTIONS

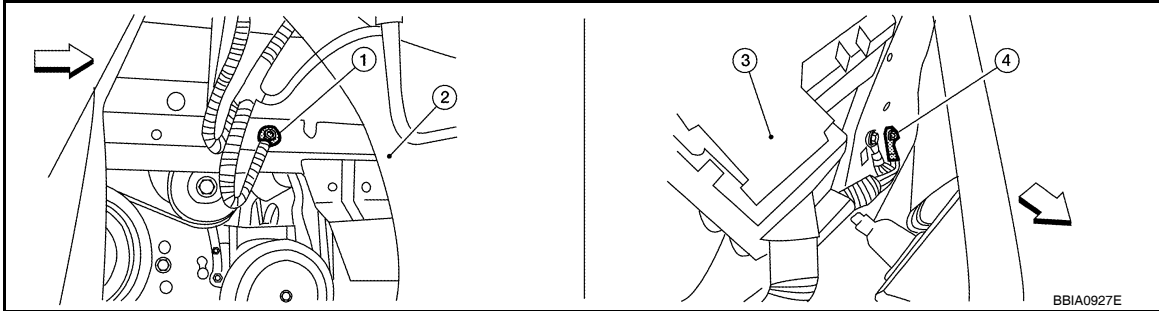
1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.

DTC P0117, P0118 ECT SENSOR

< SERVICE INFORMATION >

[QR25DE]

Refer to [EC-1242, "Ground Inspection"](#).



⇐: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

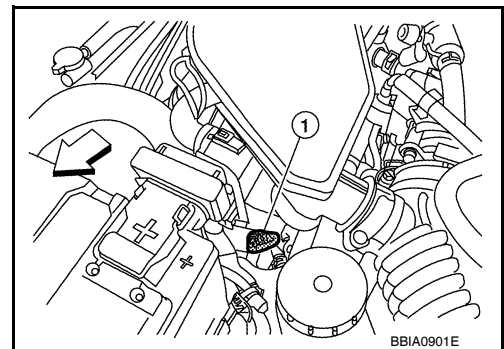
OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature (ECT) sensor (1) harness connector.
 - ⇐: Vehicle front
2. Turn ignition switch ON.



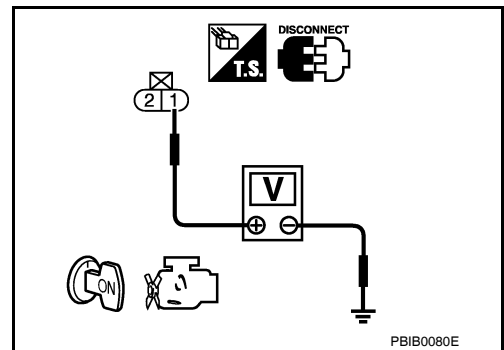
3. Check voltage between ECT sensor terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 52 and ECT sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0117, P0118 ECT SENSOR

[QR25DE]

< SERVICE INFORMATION >

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-1298. "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace engine coolant temperature sensor. Refer to [CO-50. "Component"](#).

5. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

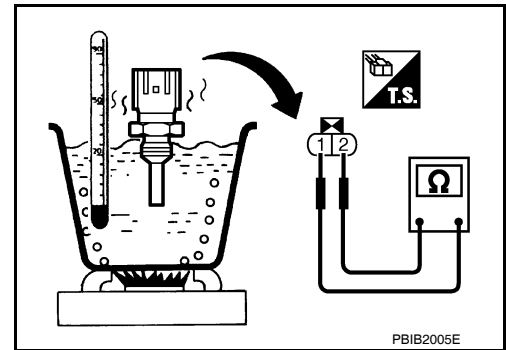
>> INSPECTION END

Component Inspection

INFOID:000000006150494

ENGINE COOLANT TEMPERATURE SENSOR

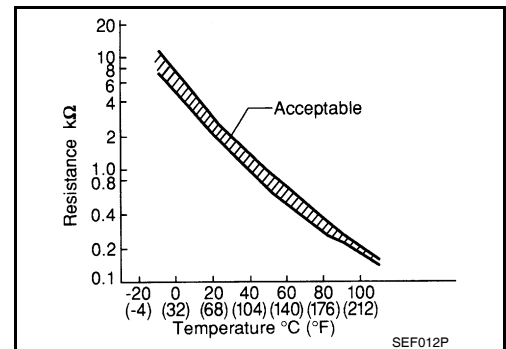
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine coolant temperature sensor. Refer to [CO-50. "Component"](#).



DTC P0122, P0123 TP SENSOR

< SERVICE INFORMATION >

[QR25DE]

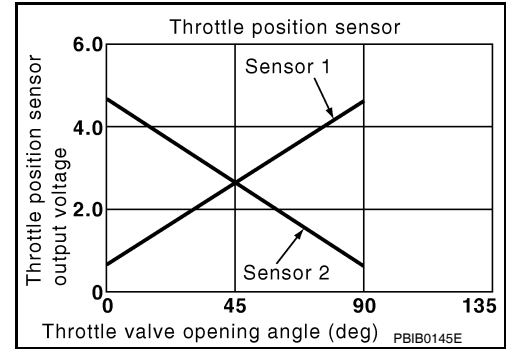
DTC P0122, P0123 TP SENSOR

Component Description

INFOID:000000006150496

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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. The ECM judges the current opening angle of the throttle valve from these signals and controls the throttle valve opening signal in response to driving conditions via the throttle control motor.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150497

Specification data are reference values.

Monitor item	Condition	Specification
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	More than 0.36 V
	• Selector lever: D (CVT), 1st (M/T) Accelerator pedal: Fully depressed	Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:000000006150498

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P0122 or P0123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1520](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (TP sensor 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 2)
P0123 0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL illuminates.

Engine operation condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006150499

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1301. "Diagnosis Procedure"](#).

DTC P0122, P0123 TP SENSOR

< SERVICE INFORMATION >

[QR25DE]

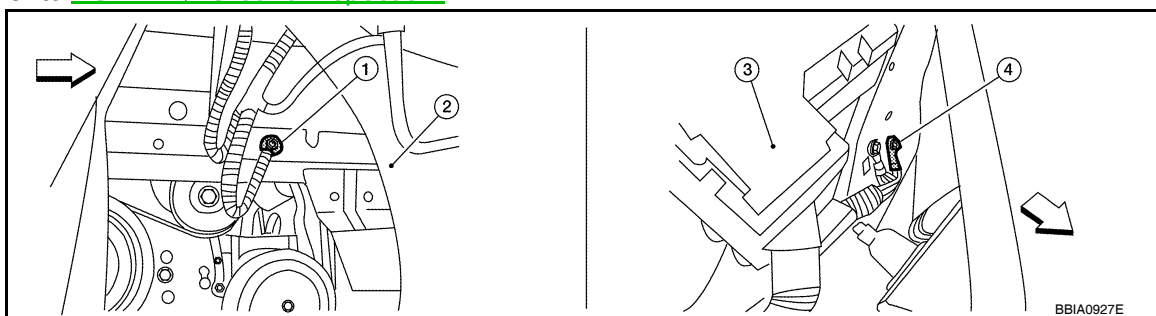
TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
36	B	Sensor ground (Throttle position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
37	R	Throttle position sensor 1	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
38	W	Throttle position sensor 2	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
47	G	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

INFOID:000000006150501

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242 "Ground Inspection"](#).



↙: Vehicle front

- | | | |
|---|----------------|------------------------------|
| 1. Body ground E9 (view with front wheel RH and fender protector RH removed.) | 2. Washer tank | 3. Fuse and fusible link box |
| 4. Body ground E15 | | |

OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

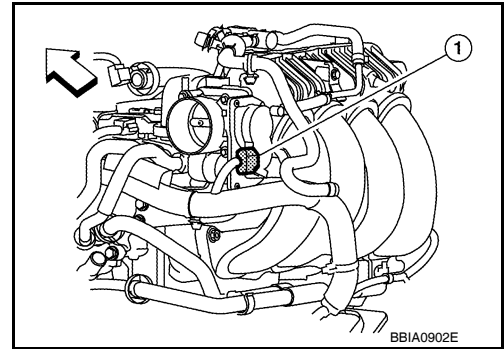
2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

DTC P0122, P0123 TP SENSOR

[QR25DE]

< SERVICE INFORMATION >

1. Disconnect electric throttle control actuator harness connector (1).
 - ⇐: Vehicle front
2. Turn ignition switch ON.

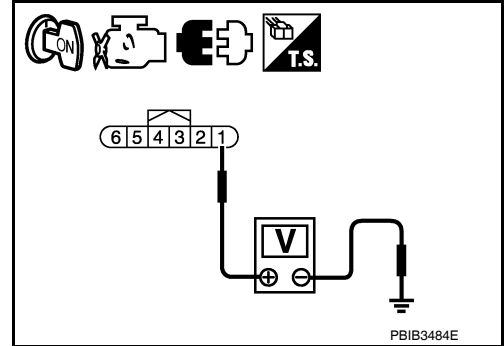


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 4 and ECM terminal 36. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 38 and electric throttle control actuator terminal 3. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-1303, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-135, "Removal and Installation"](#).

>> **INSPECTION END**

DTC P0122, P0123 TP SENSOR

< SERVICE INFORMATION >

[QR25DE]

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

Component Inspection

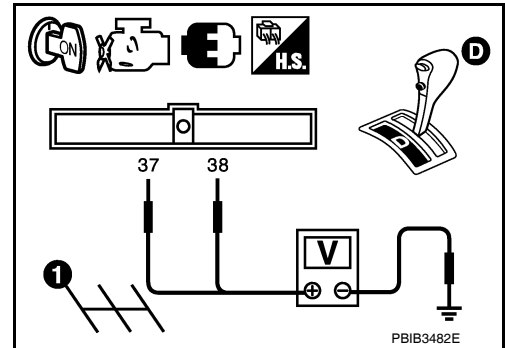
INFOID:000000006150502

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform [EC-1183](#). "Throttle Valve Closed Position Learning".
3. Turn ignition switch ON.
4. Set selector lever to D position (CVT) or 1st position (M/T).
5. Check voltage between ECM terminals 37 (TP sensor 1 signal), 38 (TP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
37 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
38 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V

6. If NG, replace electric throttle control actuator. Refer to [EM-135](#). "Removal and Installation".



DTC P0125 ECT SENSOR

< SERVICE INFORMATION >

[QR25DE]

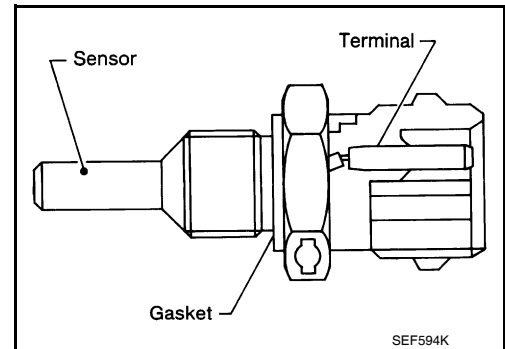
DTC P0125 ECT SENSOR

Description

INFOID:000000006150504

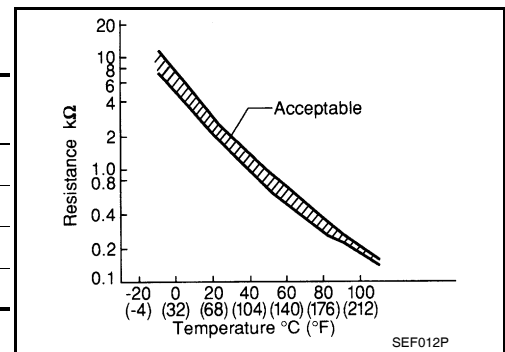
COMPONENT DESCRIPTION

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)]	Voltage* (V)	Resistance (kΩ)
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260



*: This data is reference values and is measured between ECM terminal 46 (Engine coolant temperature sensor) and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

INFOID:000000006150505

NOTE:

- If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-1294, "On Board Diagnosis Logic"](#).
- If DTC P0125 is displayed with P0116, first perform the trouble diagnosis for DTC P0116. Refer to [EC-1291, "On Board Diagnosis Logic"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0125 0125	Insufficient engine coolant temperature for closed loop fuel control	<ul style="list-style-type: none"> • Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. • Engine coolant temperature is insufficient for closed loop fuel control. 	<ul style="list-style-type: none"> • Harness or connectors (High resistance in the circuit) • Engine coolant temperature sensor • Thermostat

DTC Confirmation Procedure

INFOID:000000006150506

CAUTION:

Be careful not to overheat engine.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.

DTC P0125 ECT SENSOR

[QR25DE]

< SERVICE INFORMATION >

3. Check that "COOLAN TEMP/S" is above 20°C (68°F).
If it is above 20°C (68°F), the test result will be OK.
If it is below 20°C (68°F), go to following step.
4. Start engine and run it for 65 minutes at idle speed.
If "COOLAN TEMP/S" increases to more than 20°C (68°F) within 65 minutes, stop engine because the test result will be OK.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-1305, "Diagnosis Procedure"](#).

WITH GST

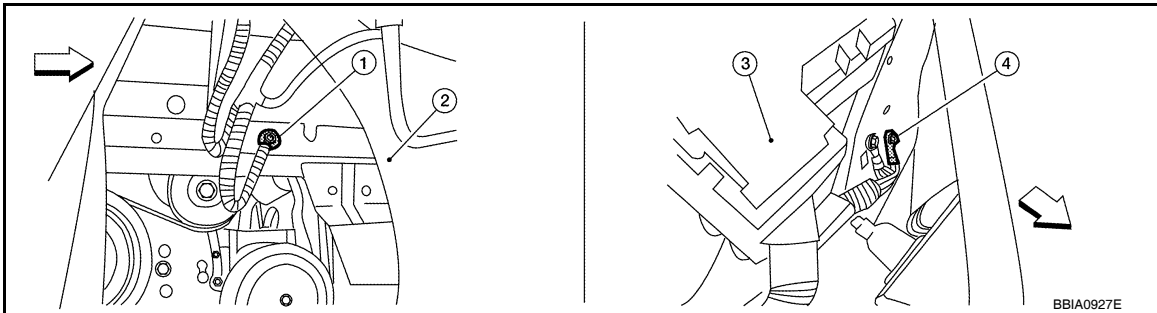
Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

INFOID:000000006150507

1.CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



 Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-1306, "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
NG >> Replace engine coolant temperature sensor. Refer to [CO-50, "Component"](#).

3.CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace thermostat. Refer to [CO-51](#).

4.CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

Refer to [EC-1296, "Wiring Diagram"](#).

>> INSPECTION END

DTC P0125 ECT SENSOR

< SERVICE INFORMATION >

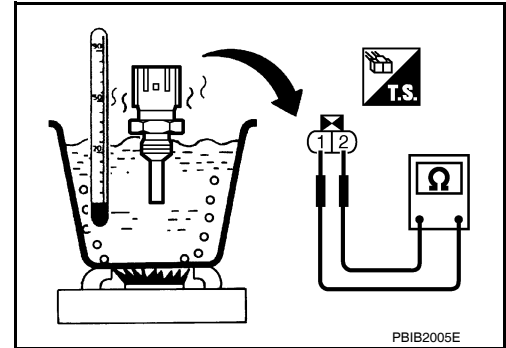
[QR25DE]

Component Inspection

INFOID:000000006150508

ENGINE COOLANT TEMPERATURE SENSOR

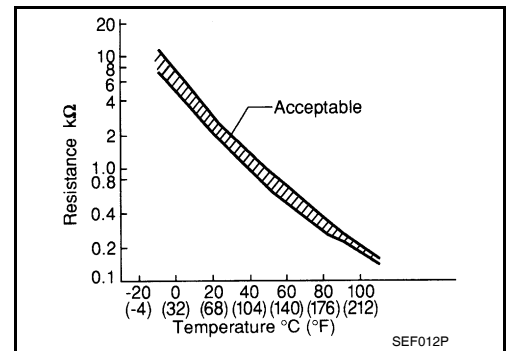
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Engine coolant temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine coolant temperature sensor. Refer to [CO-50. "Component"](#).



DTC P0127 IAT SENSOR

< SERVICE INFORMATION >

[QR25DE]

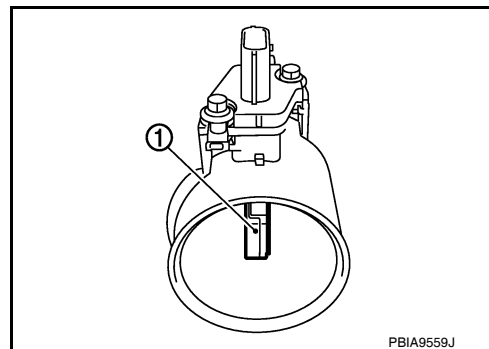
DTC P0127 IAT SENSOR

Component Description

INFOID:000000006150510

The intake air temperature sensor is built into mass air flow sensor (1). The sensor detects intake air temperature and transmits a signal to the ECM.

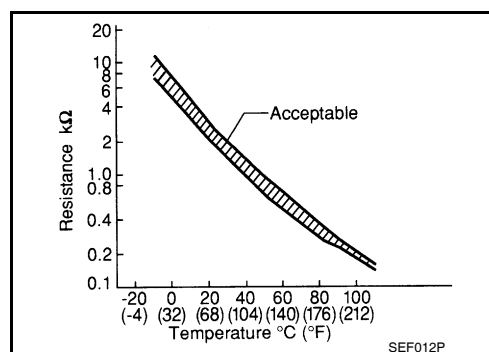
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

Intake air temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
25 (77)	3.3	1.800 - 2.200
80 (176)	1.2	0.283 - 0.359

*: This data is reference value and is measured between ECM terminal 50 (Intake air temperature sensor) and ground.



On Board Diagnosis Logic

INFOID:000000006150511

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0127 0127	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 style="list-style-type: none"> Harness or connectors (Intake temperature sensor circuit is open or shorted) Intake air temperature sensor

DTC Confirmation Procedure

INFOID:000000006150512

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT-III

1. Wait until engine coolant temperature is less than 90°C (194°F)
 - a. Turn ignition switch ON.
 - b. Select "DATA MONITOR" mode with CONSULT-III.
 - c. Check the engine coolant temperature.
 - d. If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch OFF and cool down engine.
 - Perform the following steps before engine coolant temperature is above 90°C (194°F).
2. Turn ignition switch ON.
3. Select "DATA MONITOR" mode with CONSULT-III.

DTC P0127 IAT SENSOR

[QR25DE]

< SERVICE INFORMATION >

4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-1308. "Diagnosis Procedure"](#).

WITH GST

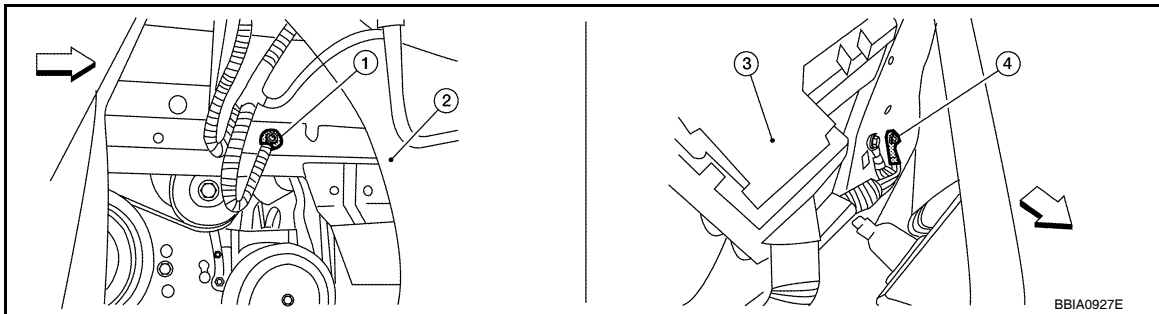
Follow the procedure "WITH CONSULT-III" above.


Diagnosis Procedure

INFOID:000000006150513

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242. "Ground Inspection"](#).



 Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-1308. "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
NG >> Replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-133. "Removal and Installation"](#).

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

Refer to [EC-1288. "Wiring Diagram"](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150514

INTAKE AIR TEMPERATURE SENSOR

DTC P0127 IAT SENSOR

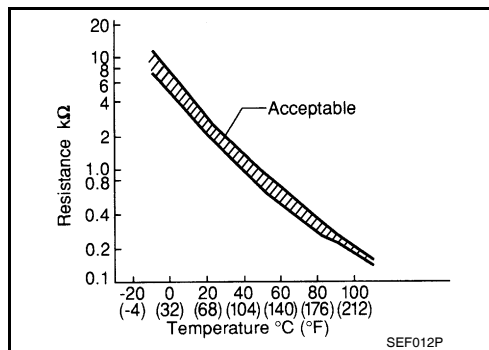
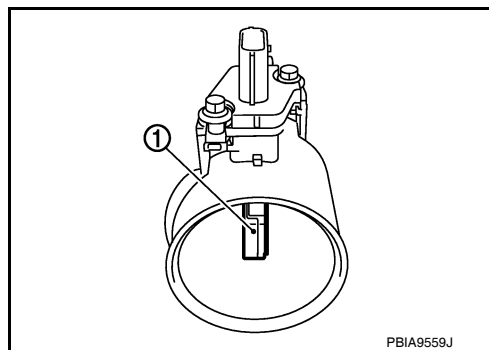
[QR25DE]

< SERVICE INFORMATION >

1. Check resistance between intake air temperature sensor (1) terminals 5 and 6 under the following conditions.

Intake air temperature [°C (°F)]	Resistance (kΩ)
25 (77)	1.800 - 2.200

2. If NG, replace mass air flow sensor (with intake air temperature sensor). Refer to [EM-133, "Removal and Installation"](#).



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DTC P0128 THERMOSTAT FUNCTION

< SERVICE INFORMATION >

[QR25DE]

DTC P0128 THERMOSTAT FUNCTION

On Board Diagnosis Logic

INFOID:000000006150516

NOTE:

If DTC P0128 is displayed with DTC P0300, P0301, P0302, P0303 or P0304, first perform the trouble diagnosis for DTC P0300, P0301, P0302, P0303, P0304. Refer to [EC-1405, "DTC Confirmation Procedure"](#).

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 stuck open.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0128 0128	Thermostat function	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	<ul style="list-style-type: none">• Thermostat• Leakage from sealing portion of thermostat• Engine coolant temperature sensor

DTC Confirmation Procedure

INFOID:000000006150517

WITH CONSULT-III

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- For best results, perform at ambient temperature of -10°C (14°F) or higher.
- For best results, perform at engine coolant temperature of -10°C (14°F) to 56°C (133°F).
- Before performing the following procedure, do not add fuel.

1. Turn A/C switch OFF.
2. Turn blower fan switch OFF.
3. Turn ignition switch ON.
4. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-III.
5. Check the indication of "COOLAN TEMP/S".
If it is below 75°C (167°F), go to next step.
If it is above 75°C (167°F), cool down the engine to less than 75°C (167°F). Then go to next steps.
6. Start engine.
7. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	More than 56 km/h (35 MPH)
---------------	----------------------------

If "COOLAN TEMP/S" increases to more than 75°C (167°F) within 10 minutes, turn ignition switch OFF because the test result will be OK.

8. Check 1st trip DTC.
9. If 1st trip DTC is detected, go to [EC-1310, "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "With CONSULT-III" above.

Diagnosis Procedure

INFOID:000000006150518

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-1311, "Component Inspection"](#).

OK or NG

OK >> GO TO 2.

NG >> Replace engine coolant temperature sensor. Refer to [CO-50, "Component"](#).

2. CHECK THERMOSTAT

DTC P0128 THERMOSTAT FUNCTION

[QR25DE]

< SERVICE INFORMATION >

Refer to [CO-51, "Removal and Installation"](#).

OK or NG

OK >> INSPECTION END

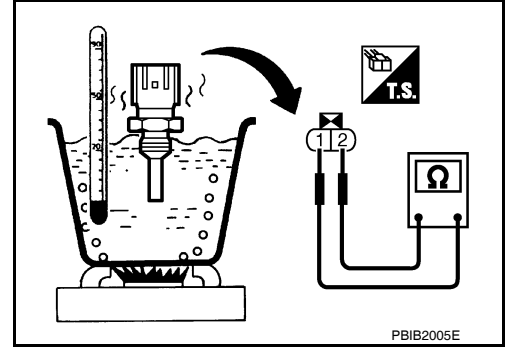
NG >> Replace thermostat. Refer to [CO-51, "Removal and Installation"](#).

Component Inspection

INFOID:000000006150519

ENGINE COOLANT TEMPERATURE SENSOR

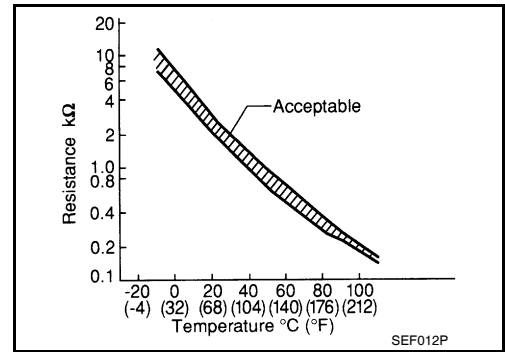
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure. Refer to [CO-50, "Component"](#).



<Reference data>

Engine coolant temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine coolant temperature sensor. Refer to [CO-50, "Component"](#).



DTC P0130, P0150 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

DTC P0130, P0150 A/F SENSOR 1

Component Description

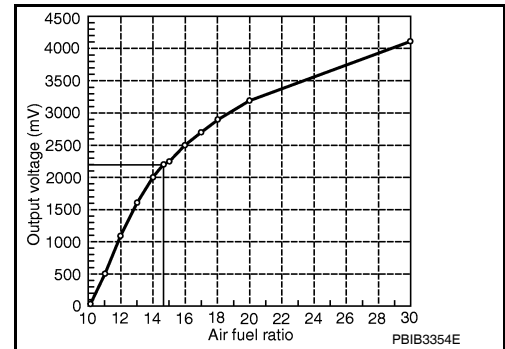
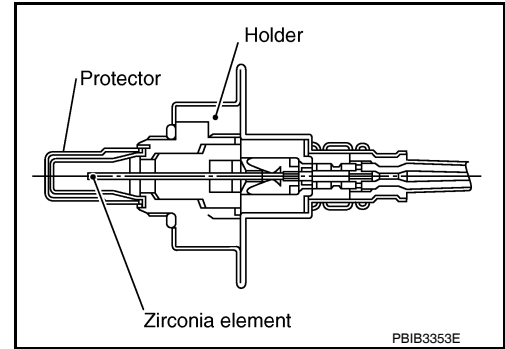
INFOID:000000006150521

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 λ 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).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150522

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1) A/F SEN1 (B2)	• Engine: After warming up Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006150523

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal fluctuates according to fuel feedback control.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0130 0130 (Bank 1)	Air fuel ratio (A/F) sensor 1 circuit	A) The A/F signal computed by ECM from the A/F sensor 1 signal is constantly in the range other than approx. 2.2 V.	<ul style="list-style-type: none"> • Harness or connectors [Air fuel ratio (A/F) sensor 1 circuit is open or shorted.] • Air fuel ratio (A/F) sensor 1
P0150 0150 (Bank 2)		B) The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 2.2 V.	

DTC Confirmation Procedure

INFOID:000000006150524

Perform PROCEDURE FOR MALFUNCTION A first.

If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

PROCEDURE FOR MALFUNCTION A

DTC P0130, P0150 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

④ With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Let engine idle for 2 minutes.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-1317, "Diagnosis Procedure"](#).

④ With GST

Follow the procedure "With CONSULT-III" above.

PROCEDURE FOR MALFUNCTION B

CAUTION:

Always drive vehicle at a safe speed.

④ With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "A/F SEN1 (B1)" or "A/F SEN 1 (B2)" in "DATA MONITOR" mode with CONSULT-III.
3. Check "A/F SEN1 (B1)" or "A/F SEN 1 (B2)" indication.
If the indication is constantly approx. 2.2 V and does not fluctuates, go to [EC-1317, "Diagnosis Procedure"](#).
If the indication fluctuates around 2.2 V, go to next step.
4. Select "A/F SEN1 (B1) P1276" (for P0130) or "A/F SEN 1 (B2) P1286" (for DTC P0150) of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. Touch "START".
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-III screen.

ENG SPEED	1,000 - 3,200 rpm
VHCL SPEED SE	More than 64 km/h (40 MPH)
B/FUEL SCHDL	1.0 - 11.5 msec
Selector lever	D position (CVT) 5th position (M/T)

If "TESTING" is not displayed after 20 seconds, retry from step 2.

7. Release accelerator pedal fully.

NOTE:

Never apply brake during releasing the accelerator pedal.

8. Check that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", retry from step 6.
9. Check that "OK" is displayed after touching "SELF-DIAG RESULTS".
If "NG" is displayed, go to [EC-1317, "Diagnosis Procedure"](#).

Overall Function Check

INFOID:000000006150525

PROCEDURE MALFUNCTION B

Use this procedure to check the overall function of the A/F sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

④ With GST

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in the suitable gear position.
3. Set selector lever to D position (CVT) or 5th position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (31 MPH).
NOTE:
Never apply brake during releasing the accelerator pedal.
4. Repeat steps 2 and 3 for five times.
5. Stop the vehicle and turn ignition switch OFF.
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 and 3 for 5 times.
8. Stop the vehicle and connect GST to the vehicle.
9. Check that no 1st trip DTC is displayed.

DTC P0130, P0150 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

If 1st trip DTC is displayed, go to [EC-1317, "Diagnosis Procedure"](#).

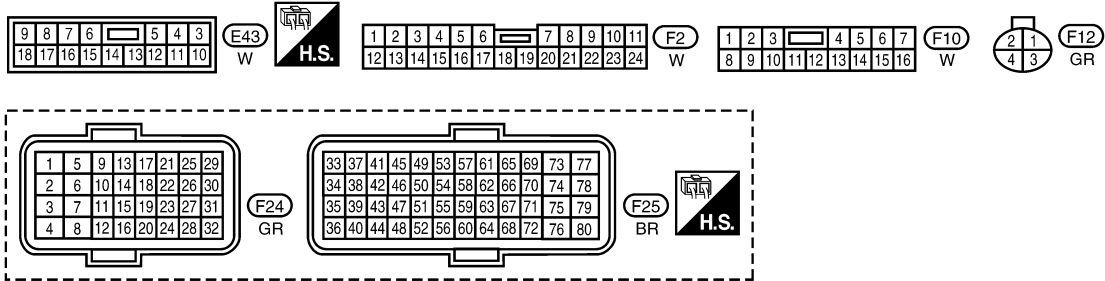
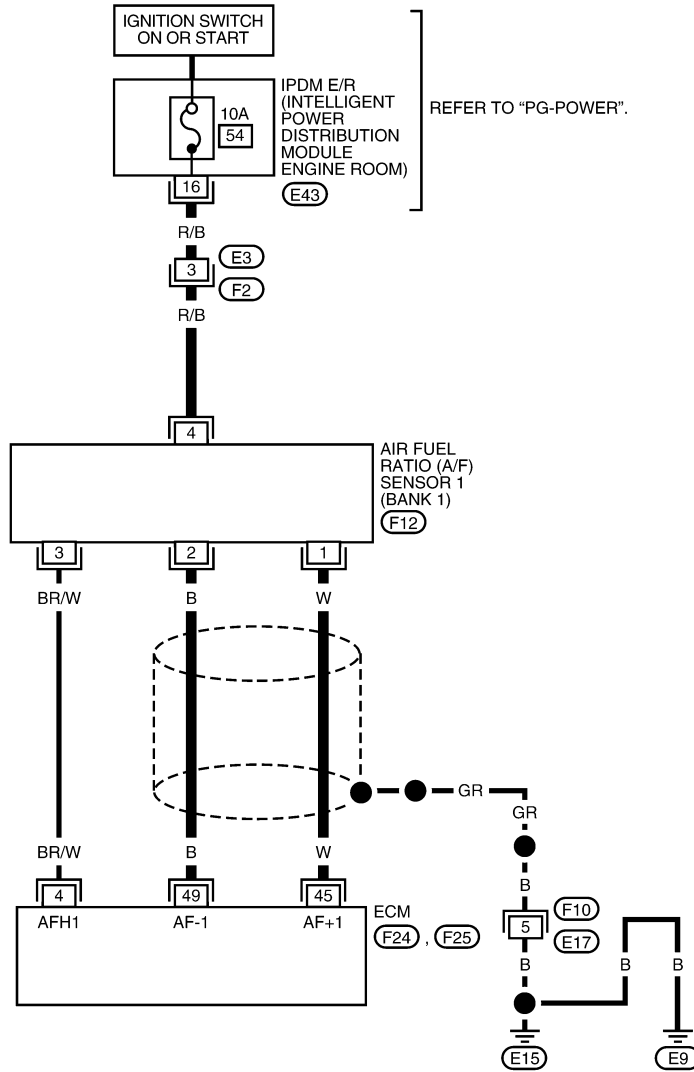
Wiring Diagram

INFOID:000000006150526

BANK 1

EC-AF1B1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0175GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

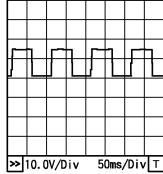
CAUTION:

DTC P0130, P0150 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	BR/W	A/F sensor 1 heater (Bank 1)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ 
45	W	A/F sensor 1 (Bank 1)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
49	B	A/F sensor 1 (Bank 1)	[Ignition switch: ON]	Approximately 2.2 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P0130, P0150 A/F SENSOR 1

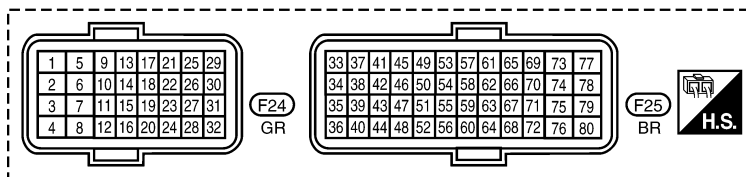
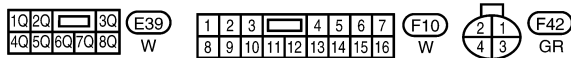
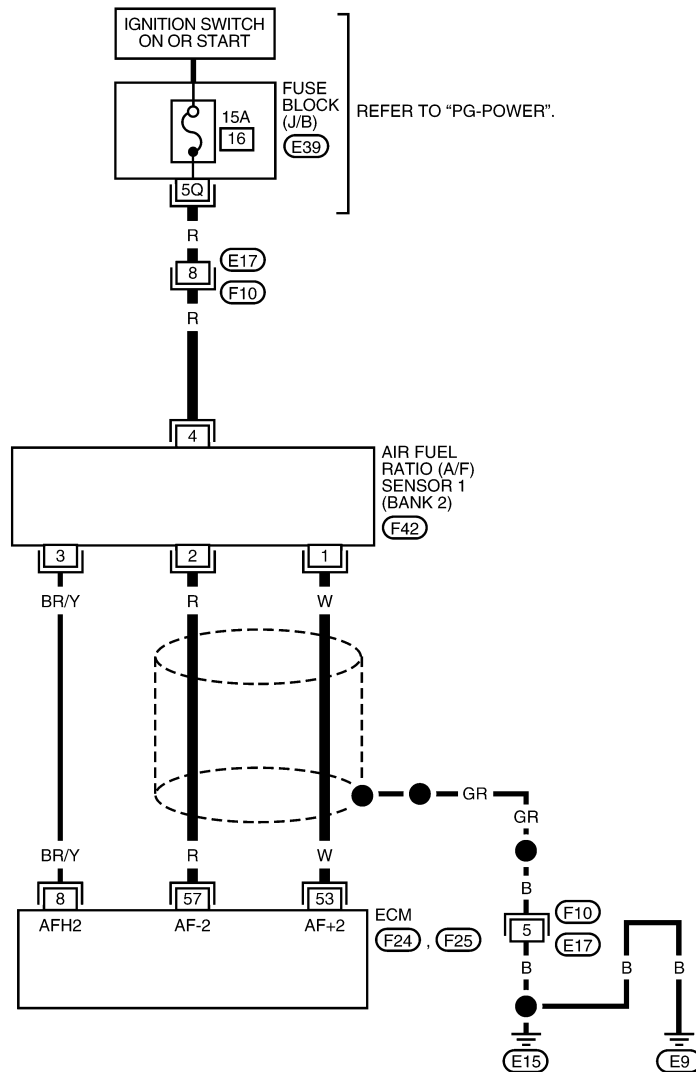
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< SERVICE INFORMATION >

BANK 2

EC-AF1B2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0176GB

Specification data are reference values and are measured between each terminal and ground.
 Pulse signal is measured by CONSULT-III.

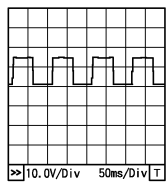
CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0130, P0150 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/Y	A/F sensor 1 heater (Bank 2)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  P8148J
53	W	A/F sensor 1 (Bank 2)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
57	R	A/F sensor 1 (Bank 2)	[Ignition switch: ON]	Approximately 2.2 V

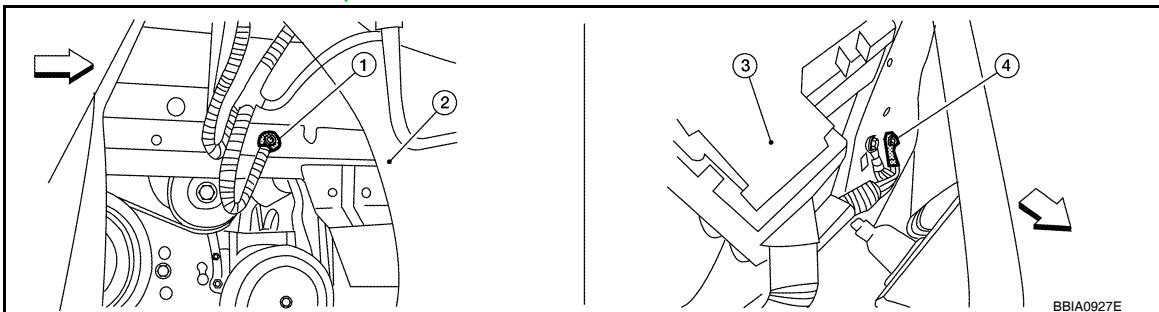
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150527

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
- Loosen and retighten ground screws on the body.
Refer to [EC-1242 "Ground Inspection"](#).



↔: Vehicle front

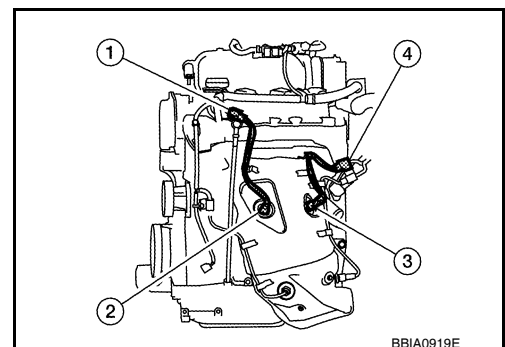
- Body ground E9 (view with front wheel RH and fender protector RH removed.)
- Washer tank
- Fuse and fusible link box
- Body ground E15

OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

2. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

- Disconnect air fuel ratio (A/F) sensor 1 harness connector.
 - Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector (1)
 - Air fuel ratio (A/F) sensor 1 (Bank 1) (2)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) (3)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector (4)
- Turn ignition switch ON.



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DTC P0130, P0150 A/F SENSOR 1

[QR25DE]

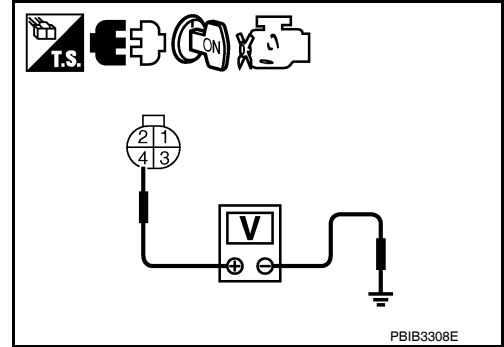
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3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2 (Bank 1)
- Harness connectors E17, F10 (Bank 2)
- Fuse block (J/B) connector E43 (Bank 1)
- Fuse block (J/B) connector E39 (Bank 2)
- 10 A fuse (Bank 1)
- 15 A fuse (Bank 2)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Bank	A/F sensor 1 terminal	ECM terminal
1	1	45
	2	49
2	1	53
	2	57

Continuity should exist.

4. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor terminal	ECM terminal	A/F sensor terminal	ECM terminal
1	45	1	53
2	49	2	57

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-1236](#).

OK or NG

DTC P0130, P0150 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

- OK >> GO TO 6.
- NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to [EM-140. "Removal and Installation"](#).

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).

>> INSPECTION END

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DTC P0131, P0151 A/F SENSOR 1

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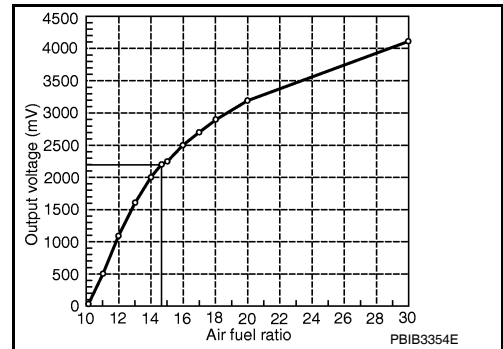
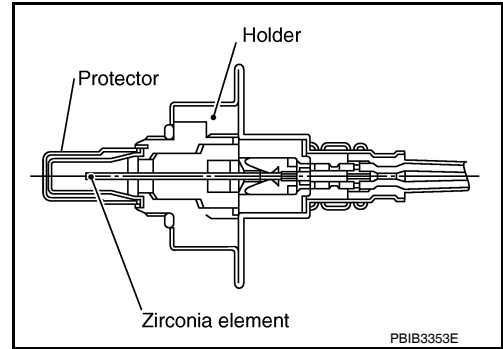
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DTC P0131, P0151 A/F SENSOR 1

Component Description

INFOID:000000006150529

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 λ 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).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150530

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1) A/F SEN1 (B2)	<ul style="list-style-type: none"> Engine: After warming up Maintaining engine speed at 2,000 rpm 	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006150531

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately low.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0131 0131 (Bank 1)	Air fuel ratio (A/F) sensor 1 circuit low voltage	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 0 V.	<ul style="list-style-type: none"> Harness or connectors [Air fuel ratio (A/F) sensor circuit is open or shorted.] Air fuel ratio (A/F) sensor 1
P0151 0151 (Bank 2)			

DTC Confirmation Procedure

INFOID:000000006150532

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

Ⓜ WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.

DTC P0131, P0151 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

2. Select "A/F SEN1 (B1)" or "A/F SEN 1 (B2)" in "DATA MONITOR" mode with CONSULT-III.
3. Check "A/F SEN1 (B1)" or "A/F SEN 1 (B2)" indication.
If the indication is constantly approx. 0 V, go to [EC-1325. "Diagnosis Procedure"](#).
If the indication is not constantly approx. 0 V, go to next step.
4. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
5. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.
6. 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 the cruising.
 - If this procedure is not completed within 1 minute after restarting engine at step 4, return to step 4.
7. Check 1st trip DTC.
 8. If 1st trip DTC is displayed, go to [EC-1325. "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "WITH CONSULT-III" above.

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DTC P0131, P0151 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

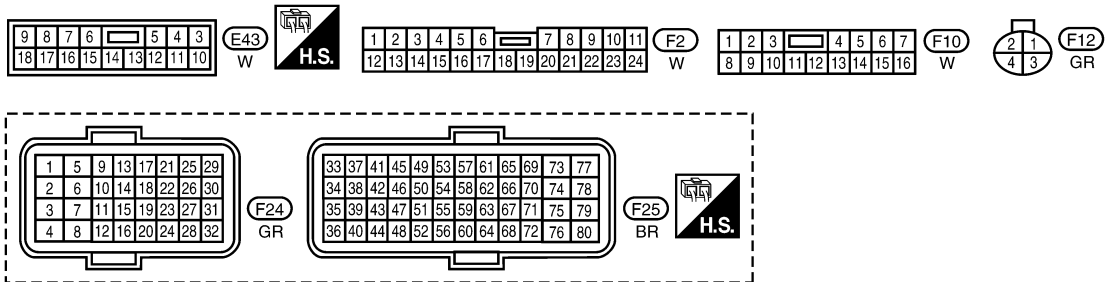
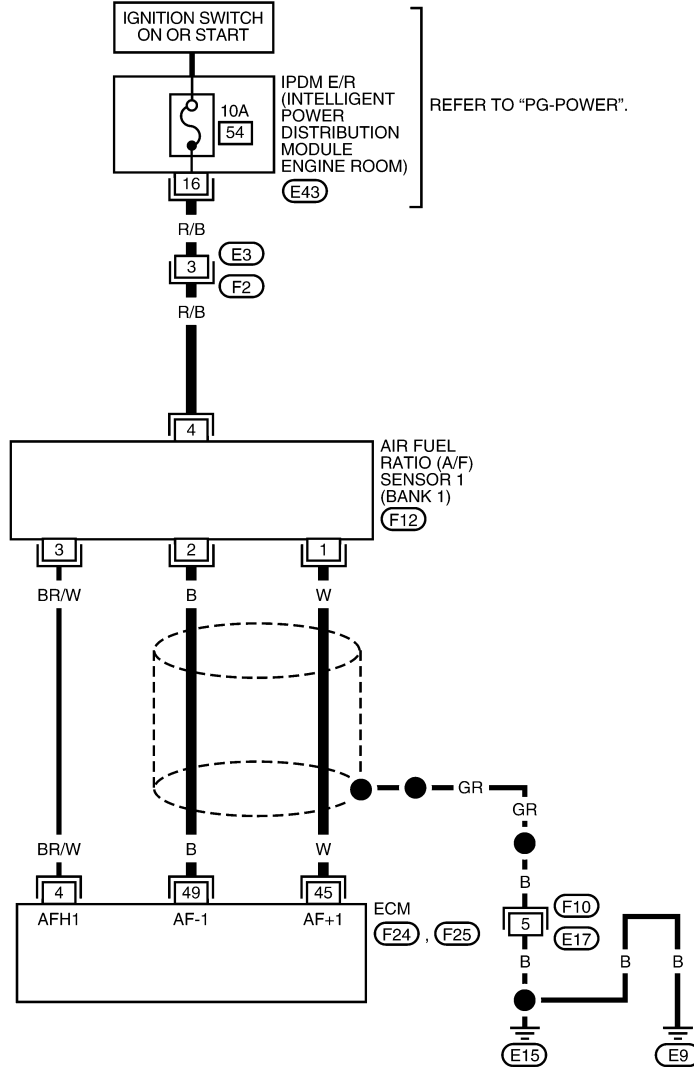
Wiring Diagram

INFOID:000000006150533

BANK 1

EC-AF1B1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0175GB

Specification data are reference values and are measured between each terminal and ground.
 Pulse signal is measured by CONSULT-III.

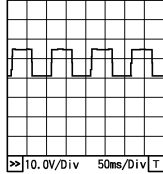
CAUTION:

DTC P0131, P0151 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	BR/W	A/F sensor 1 heater (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed (More than 140 seconds after starting engine) 	Approximately 2.9 - 8.8 V★  <small>PBIA8148J</small>
45	B	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	Approximately 1.8 V Output voltage varies with air fuel ratio.
49	W	A/F sensor 1 (Bank 1)	[Ignition switch: ON]	Approximately 2.2 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P0131, P0151 A/F SENSOR 1

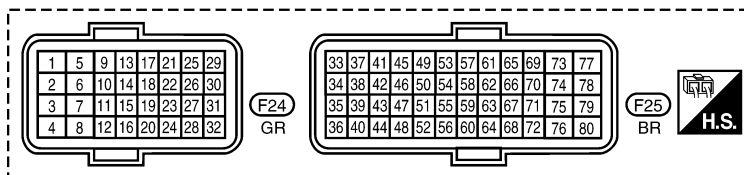
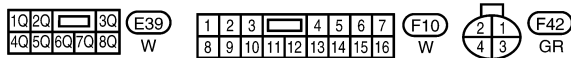
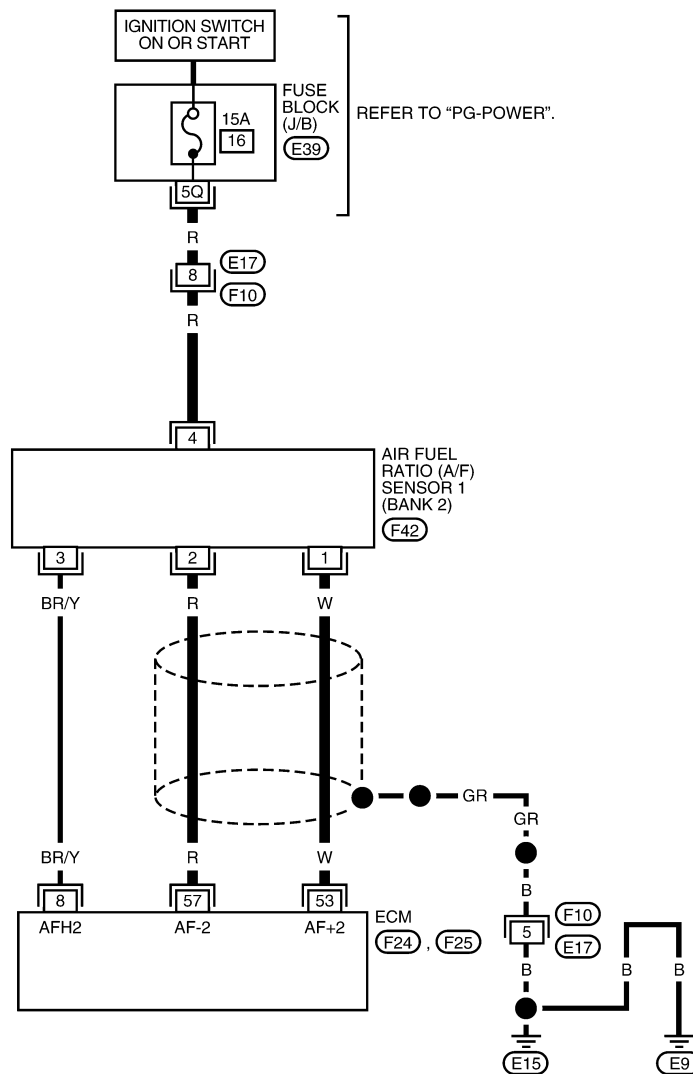
[QR25DE]

< SERVICE INFORMATION >

BANK 2

EC-AF1B2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0176GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

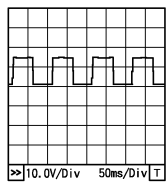
CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0131, P0151 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/Y	A/F sensor 1 heater (Bank 2)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  P8148J
53	W	A/F sensor 1 (Bank 2)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
57	R	A/F sensor 1 (Bank 2)	[Ignition switch: ON]	Approximately 2.2 V

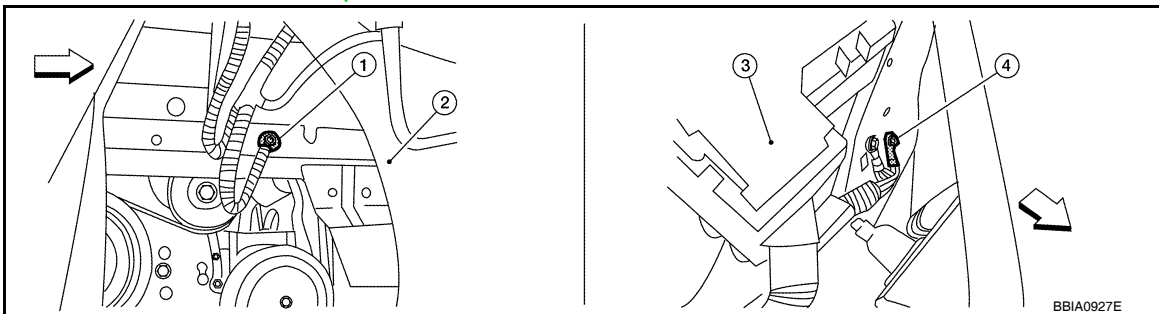
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150534

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
- Loosen and retighten ground screws on the body.
Refer to [EC-1242 "Ground Inspection"](#).



↔: Vehicle front

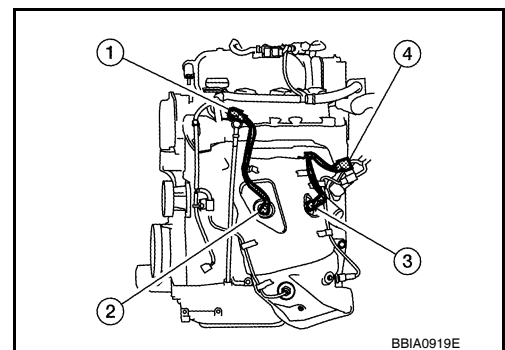
- Body ground E9 (view with front wheel RH and fender protector RH removed.)
- Washer tank
- Fuse and fusible link box
- Body ground E15

OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

2. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

- Disconnect air fuel ratio (A/F) sensor 1 harness connector.
 - Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector (1)
 - Air fuel ratio (A/F) sensor 1 (Bank 1) (2)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) (3)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector (4)
- Turn ignition switch ON.



DTC P0131, P0151 A/F SENSOR 1

[QR25DE]

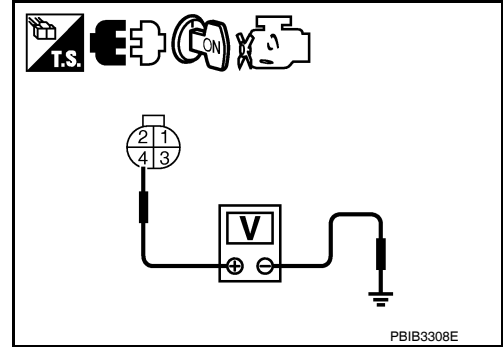
< SERVICE INFORMATION >

3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2 (Bank 1)
- Harness connectors E17, F10 (Bank 2)
- Fuse block (J/B) connector E43 (Bank 1)
- Fuse block (J/B) connector E39 (Bank 2)
- 10 A fuse (Bank 1)
- 15 A fuse (Bank 2)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Bank	A/F sensor 1 terminal	ECM terminal
1	1	45
	2	49
2	1	53
	2	57

Continuity should exist.

4. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor terminal	ECM terminal	A/F sensor terminal	ECM terminal
1	45	1	53
2	49	2	57

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-1236](#).

OK or NG

DTC P0131, P0151 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

- OK >> GO TO 6.
- NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to [EM-140. "Removal and Installation"](#).

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).

>> INSPECTION END

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DTC P0132, P0152 A/F SENSOR 1

< SERVICE INFORMATION >

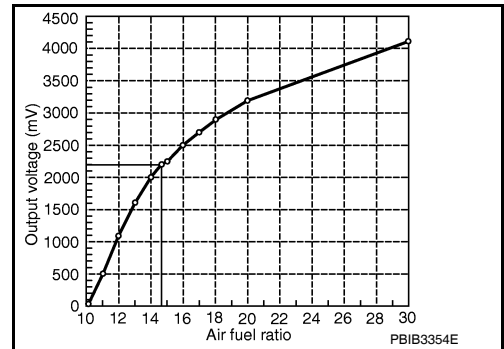
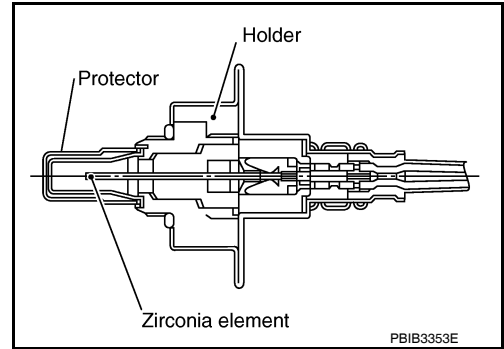
[QR25DE]

DTC P0132, P0152 A/F SENSOR 1

Component Description

INFOID:000000006150536

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 λ 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).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150537

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1) A/F SEN1 (B2)	<ul style="list-style-type: none"> Engine: After warming up Maintaining engine speed at 2,000 rpm 	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006150538

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately high.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0132 0132 (Bank 1)	Air fuel ratio (A/F) sensor 1 circuit high voltage	The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 5 V.	<ul style="list-style-type: none"> Harness or connectors [Air fuel ratio (A/F) sensor circuit is open or shorted.] Air fuel ratio (A/F) sensor 1
P0152 0152 (Bank 2)			

DTC Confirmation Procedure

INFOID:000000006150539

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.

DTC P0132, P0152 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

2. Select "A/F SEN1 (B1)" or "A/F SEN 1 (B2)" in "DATA MONITOR" mode with CONSULT-III.
3. Check "A/F SEN1 (B1)" or "A/F SEN 1 (B2)" indication.
If the indication is constantly approx. 5 V, go to [EC-1333. "Diagnosis Procedure"](#).
If the indication is not constantly approx. 5 V, go to next step.
4. Turn ignition switch OFF, wait at least 10 seconds and then restart engine.
5. Drive and accelerate vehicle to more than 40 km/h (25 MPH) within 20 seconds after restarting engine.
6. 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 the cruising.
 - If this procedure is not completed within 1 minute after restarting engine at step 4, return to step 4.
7. Check 1st trip DTC.
 8. If 1st trip DTC is displayed, go to [EC-1333. "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "WITH CONSULT-III" above.

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DTC P0132, P0152 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

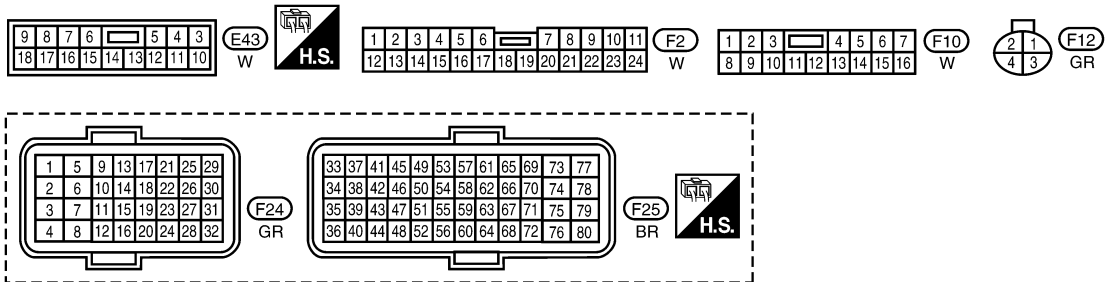
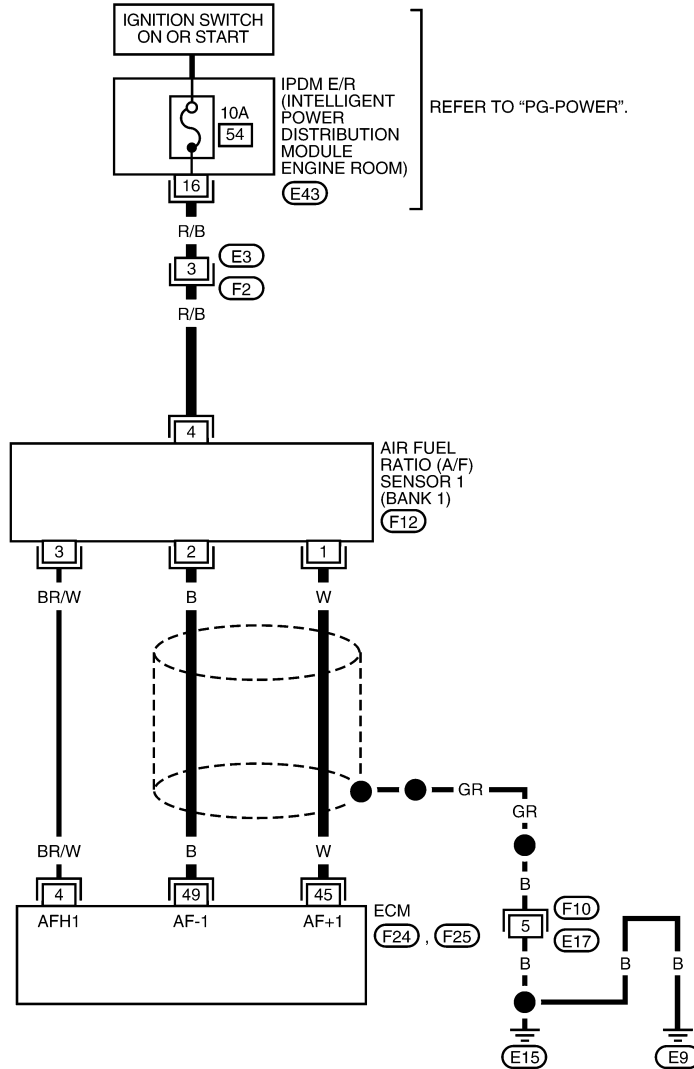
Wiring Diagram

INFOID:000000006150540

BANK 1

EC-AF1B1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground.
 Pulse signal is measured by CONSULT-III.

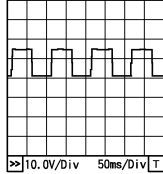
CAUTION:

DTC P0132, P0152 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	BR/W	A/F sensor 1 heater (Bank 1)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ 
45	W	A/F sensor 1 (Bank 1)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
49	B	A/F sensor 1 (Bank 1)	[Ignition switch: ON]	Approximately 2.2 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P0132, P0152 A/F SENSOR 1

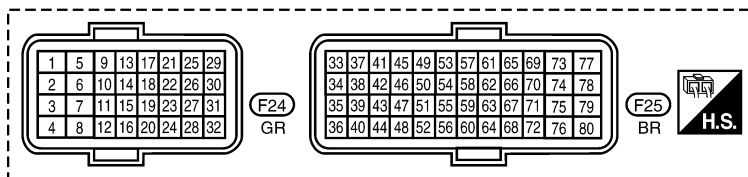
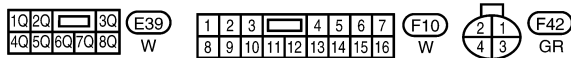
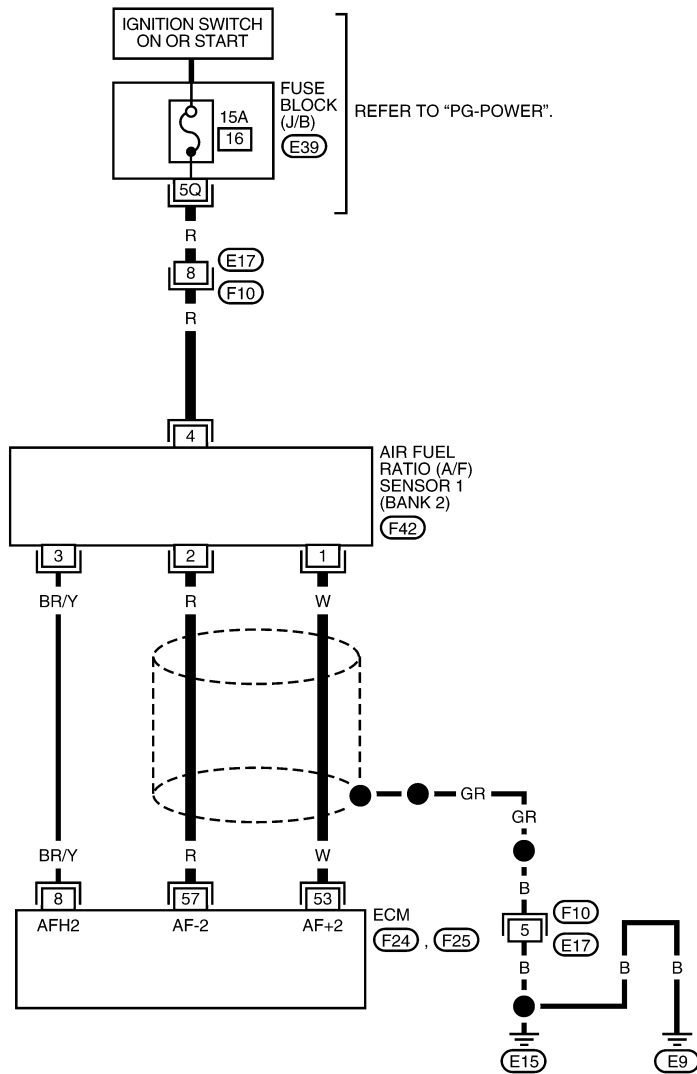
[QR25DE]

< SERVICE INFORMATION >

BANK 2

EC-AF1B2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0176GB

Specification data are reference values and are measured between each terminal and ground.
 Pulse signal is measured by CONSULT-III.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0132, P0152 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/Y	A/F sensor 1 heater (Bank 2)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ P81A8148J
53	W	A/F sensor 1 (Bank 2)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
57	R	A/F sensor 1 (Bank 2)	[Ignition switch: ON]	Approximately 2.2 V

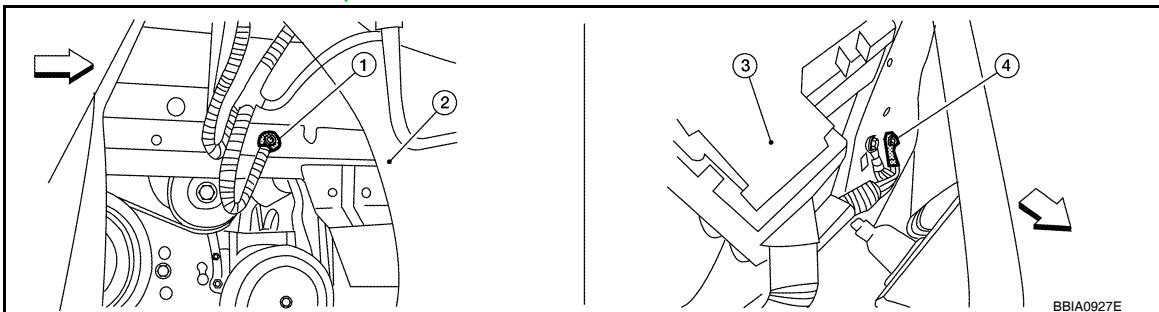
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150541

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
- Loosen and retighten three ground screws on the body.
Refer to [EC-1242 "Ground Inspection"](#).



↔: Vehicle front

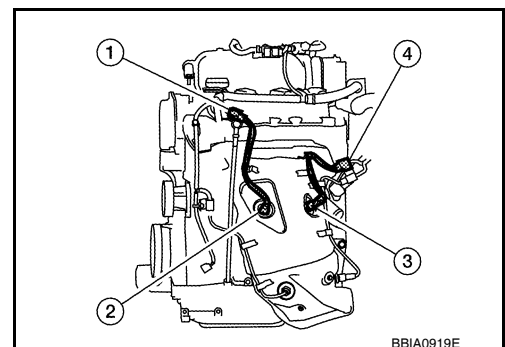
- Body ground E9 (view with front wheel RH and fender protector RH removed.)
- Washer tank
- Fuse and fusible link box
- Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

- Disconnect air fuel ratio (A/F) sensor 1 harness connector.
 - Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector (1)
 - Air fuel ratio (A/F) sensor 1 (Bank 1) (2)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) (3)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector (4)
- Turn ignition switch ON.



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DTC P0132, P0152 A/F SENSOR 1

[QR25DE]

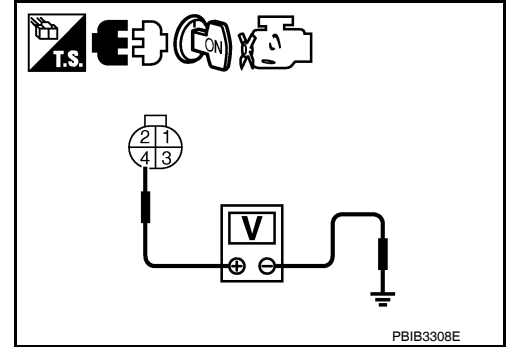
< SERVICE INFORMATION >

3. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2 (Bank 1)
- Harness connectors E17, F10 (Bank 2)
- Fuse block (J/B) connector E43 (Bank 1)
- Fuse block (J/B) connector E39 (Bank 2)
- 10 A fuse (Bank 1)
- 15 A fuse (Bank 2)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Bank	A/F sensor 1 terminal	ECM terminal
1	1	45
	2	49
2	1	53
	2	57

Continuity should exist.

4. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor terminal	ECM terminal	A/F sensor terminal	ECM terminal
1	45	1	53
2	49	2	57

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Perform [EC-1236](#).

OK or NG

DTC P0132, P0152 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

- OK >> GO TO 6.
- NG >> Repair or replace.

6. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to [EM-140. "Removal and Installation"](#).

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).

>> INSPECTION END

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DTC P0133, P0153 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

DTC P0133, P0153 A/F SENSOR 1

Component Description

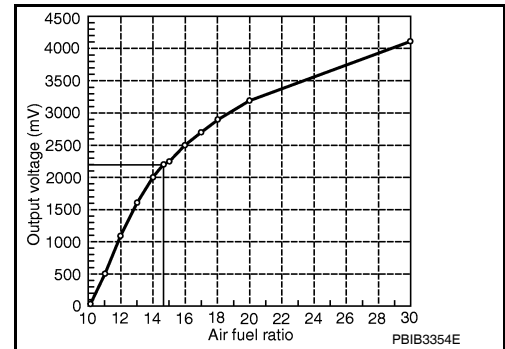
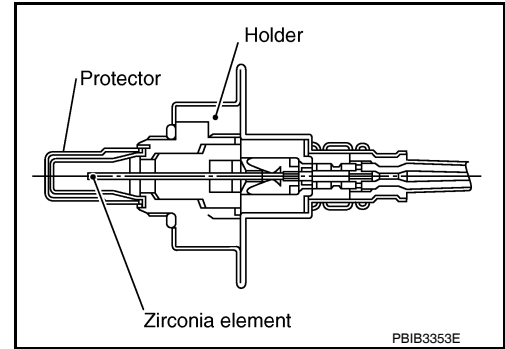
INFOID:000000006150543

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 λ 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).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150544

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1) A/F SEN1 (B2)	• Engine: After warming up Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006150545

To judge the malfunction of air fuel ratio (A/F) sensor 1, this diagnosis measures response time of the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and the air fuel ratio (A/F) sensor 1 temperature index. Judgment is based on whether the compensated time (the A/F sensor 1 signal cycling time index) is inordinately long or not.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0133 0133 (Bank 1)	Air fuel ratio (A/F) sensor 1 circuit slow response	The response of the A/F signal computed by ECM from A/F sensor 1 signal takes more than the specified time.	<ul style="list-style-type: none"> • Harness or connectors [Air fuel ratio (A/F) sensor circuit is open or shorted.] • Air fuel ratio (A/F) sensor 1 • Air fuel ratio (A/F) sensor heater 1 • Fuel pressure • Fuel injector • Intake air leaks • Exhaust gas leaks • PCV valve • Mass air flow sensor
P0153 0153 (Bank 2)			

DTC Confirmation Procedure

INFOID:000000006150546

NOTE:

DTC P0133, P0153 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and 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. Select "A/F SEN1 (B1) P1278/P1279" (for DTC P0133) or "A/F SEN1 (B2) P1288/P1289" (for DTC P0153) of "A/F SEN1" in "DTC WORK SUPPORT" mode with CONSULT-III.
6. Touch "START".
If "COMPLETED" appears on CONSULT-III screen, go to step 10.
If "COMPLETED" does not appear on CONSULT-III screen, go to the following step.
7. After perform the following procedure, "TESTING" will be displayed on the CONSULT-III screen.
 - a. Increase the engine speed up to between 4,000 to 5,000 rpm and maintain that speed for 10 seconds.
 - b. Fully release accelerator pedal and then let engine idle for approximately 10 seconds.
If "TESTING" is not displayed after 10 seconds, refer to [EC-1228](#).
8. Wait for approximately 20 seconds at idle under the condition that "TESTING" is displayed on the CONSULT-III screen.
9. Check that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", refer to [EC-1228](#).
10. Check that "OK" is displayed after touching "SELF-DIAG RESULTS".
If "NG" is displayed, go to [EC-1341, "Diagnosis Procedure"](#).

WITH GST

1. 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.
Check that the total percentage should be within $\pm 15\%$.
If OK, go to the following step.
If NG, check the following.
 - Intake air leaks
 - Exhaust gas leaks
 - Incorrect fuel pressure
 - Lack of fuel
 - Fuel injector
 - Incorrect PCV hose connection
 - PCV valve
 - Mass air flow sensor
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. Increase the engine speed up to between 4,000 to 5,000 rpm and maintain that speed for 10 seconds.
8. Fully release accelerator pedal and then let engine idle for approximately 1 minute.
9. Select Service \$07 with GST.
If 1st trip DTC is detected, go to [EC-1341, "Diagnosis Procedure"](#).

DTC P0133, P0153 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

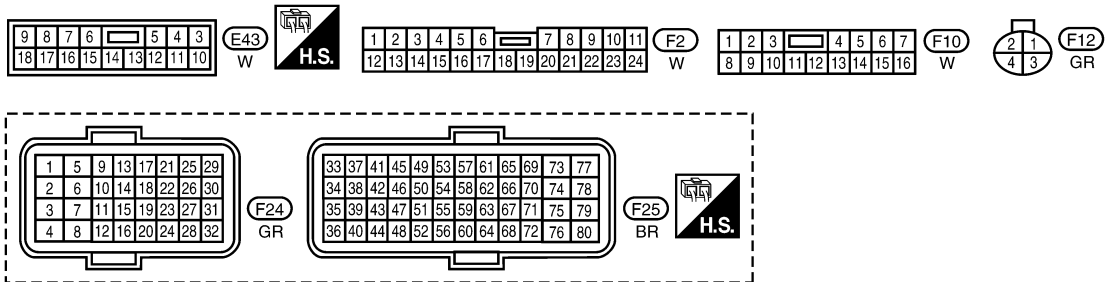
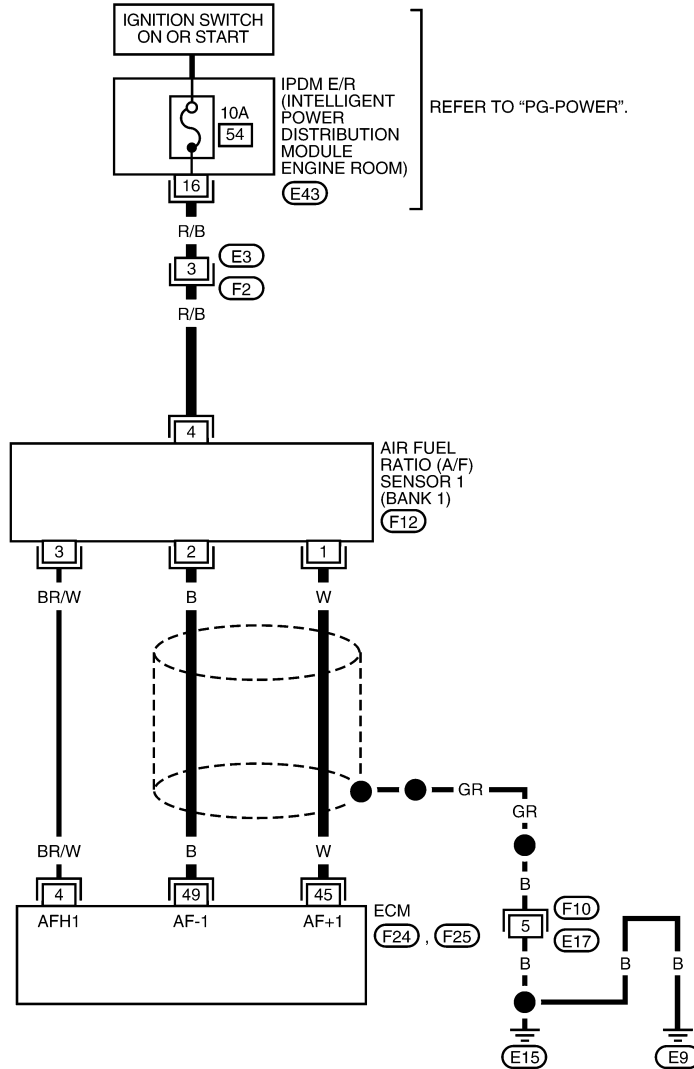
INFOID:000000006150547

Wiring Diagram

BANK 1

EC-AF1B1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0175GB

Specification data are reference values and are measured between each terminal and ground.
 Pulse signal is measured by CONSULT-III.

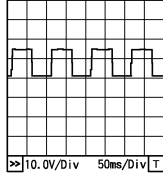
CAUTION:

DTC P0133, P0153 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

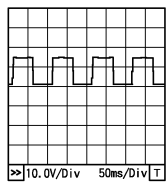
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	BR/W	A/F sensor 1 heater (Bank 1)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ 
45	W	A/F sensor 1 (Bank 1)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
49	B	A/F sensor 1 (Bank 1)	[Ignition switch: ON]	Approximately 2.2 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P0133, P0153 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/Y	A/F sensor 1 heater (Bank 2)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ 
53	W	A/F sensor 1 (Bank 2)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
57	R	A/F sensor 1 (Bank 2)	[Ignition switch: ON]	Approximately 2.2 V

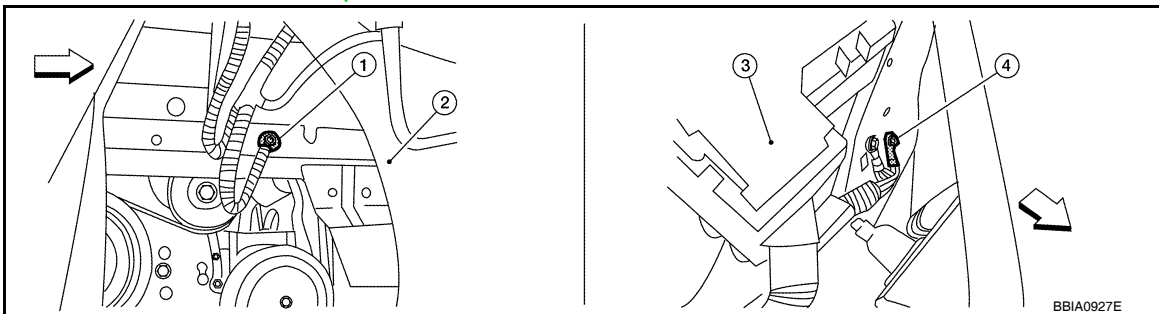
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150548

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine screws on the body.
Refer to [EC-1242](#), "Ground Inspection".



↔: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

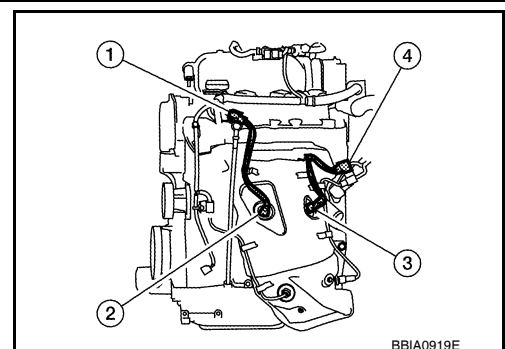
- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

2. RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1

Loosen and retighten the air fuel ratio (A/F) sensor 1. Refer to [EM-140](#), "Removal and Installation".

- Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector (1)
- Air fuel ratio (A/F) sensor 1 (Bank 1) (2)
- Air fuel ratio (A/F) sensor 1 (Bank 2) (3)
- Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector (4)

>> GO TO 3.



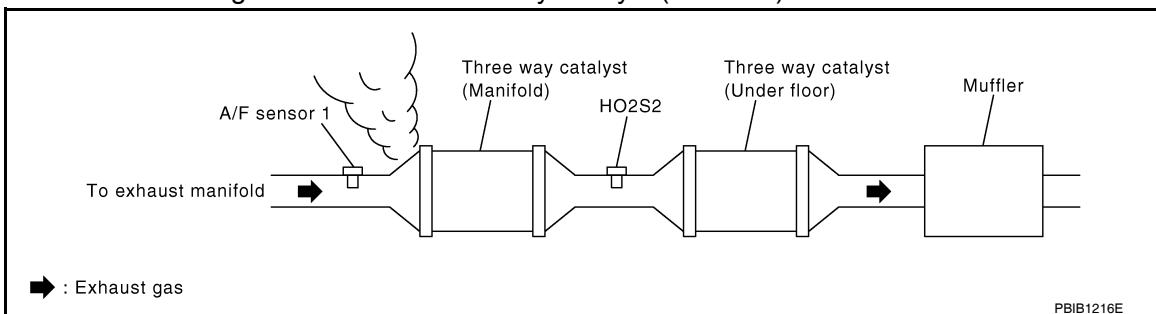
DTC P0133, P0153 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

3. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace.

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace.

5. CLEAR THE SELF-LEARNING DATA

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear the self-learning control coefficient by touching "CLEAR" or "START".
4. 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?

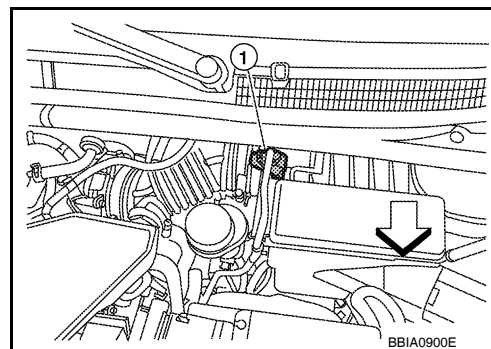
Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.

- ←: Vehicle front

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Check that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-1144, "Emission-related Diagnostic Information"](#).
7. Check that DTC P0000 is displayed.
8. 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 or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to [EC-1375](#) or [EC-1384](#).
- No >> GO TO 6.

6. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

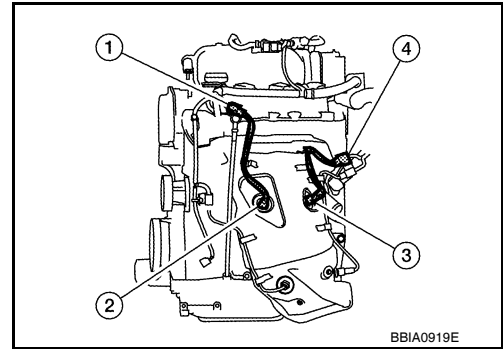
1. Turn ignition switch OFF.

DTC P0133, P0153 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

2. Disconnect air fuel ratio (A/F) sensor 1 harness connector.
 - Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector (1)
 - Air fuel ratio (A/F) sensor 1 (Bank 1) (2)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) (3)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector (4)
3. Turn ignition switch ON.

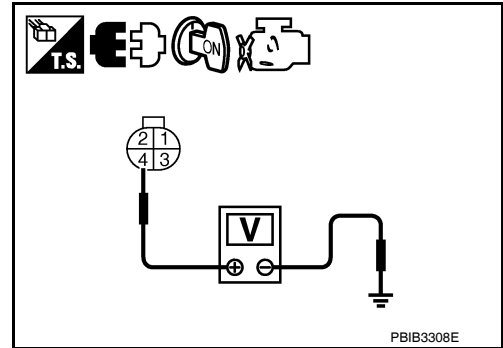


4. Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.



7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2 (Bank 1)
- Harness connectors E17, F10 (Bank 2)
- Fuse block (J/B) connector E43 (Bank 1)
- Fuse block (J/B) connector E39 (Bank 2)
- 10 A fuse (Bank 1)
- 15 A fuse (Bank 2)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Bank	A/F sensor 1 terminal	ECM terminal
1	1	45
	2	49
2	1	53
	2	57

Continuity should exist.

4. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor terminal	ECM terminal	A/F sensor terminal	ECM terminal
1	45	1	53
2	49	2	57

DTC P0133, P0153 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

Continuity should not exist.

5. Also check harness for short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to [EC-1258, "Component Inspection"](#).

OK or NG

OK >> GO TO 10.

NG >> GO TO 13.

10. CHECK MASS AIR FLOW SENSOR

Refer to [EC-1278, "Component Inspection"](#).

OK or NG

OK >> GO TO 11.

NG >> Replace mass air flow sensor. Refer to [EM-133, "Removal and Installation"](#).

11. CHECK PCV VALVE

Refer to [EC-1138, "Component Inspection"](#).

OK or NG

OK >> GO TO 12.

NG >> Repair or replace PCV valve. Refer to [EM-151, "Removal and Installation"](#).

12. CHECK INTERMITTENT INCIDENT

Perform [EC-1236](#).

OK or NG

OK >> GO TO 13.

NG >> Repair or replace.

13. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to [EM-140, "Removal and Installation"](#).

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).

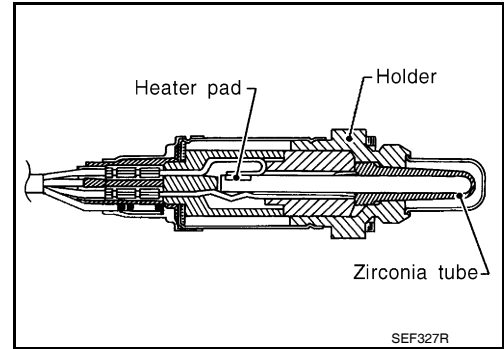
>> INSPECTION END

DTC P0137, P0157 HO2S2

Component Description

INFOID:000000006150550

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank. 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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150551

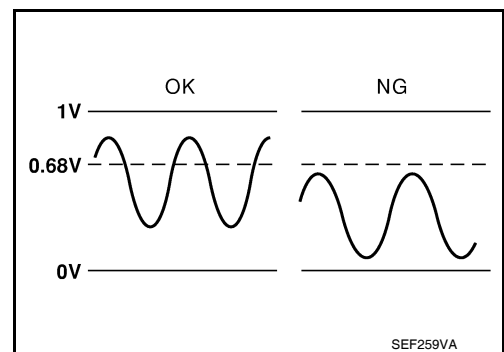
Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 (B1) HO2S2 (B2)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	LEAN ↔ RICH

On Board Diagnosis Logic

INFOID:000000006150552

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 before 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 the various driving condition such as fuel cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0137 0137 (Bank 1)	Heated oxygen sensor 2 circuit low voltage	The maximum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> • Harness or connectors (Heated oxygen sensor 2 circuit open or shorted.) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks
P0157 0157 (Bank 2)			

DTC Confirmation Procedure

INFOID:000000006150553

NOTE:

DTC P0137, P0157 HO2S2

< SERVICE INFORMATION >

[QR25DE]

If DTC confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

④ WITH CONSULT-III

TESTING CONDITION:

For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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. 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 to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1147" (for DTC P0137) "HO2S2 (B2) or P1167" (for DTC P0157) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
9. Follow the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

10. Check that "OK" is displayed after touching "SELF-DIAG RESULTS".
If "NG" is displayed, refer to [EC-1350, "Diagnosis Procedure"](#).
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
 - b. Return to step 1.

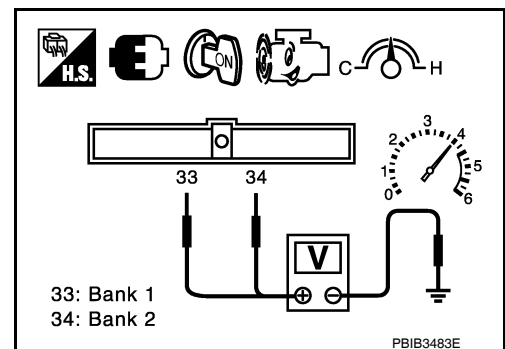
Overall Function Check

INFOID:000000006150554

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

④ WITH GST

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 1 minute.
5. Set voltmeter probes between ECM terminal 33 [HO2S2 (B1) signal] or 34 [HO2S2 (B2) signal] and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68 V at least once during this procedure.
If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be above 0.68 V at least once during this procedure.
8. If NG, go to [EC-1350, "Diagnosis Procedure"](#).



DTC P0137, P0157 HO2S2

[QR25DE]

< SERVICE INFORMATION >

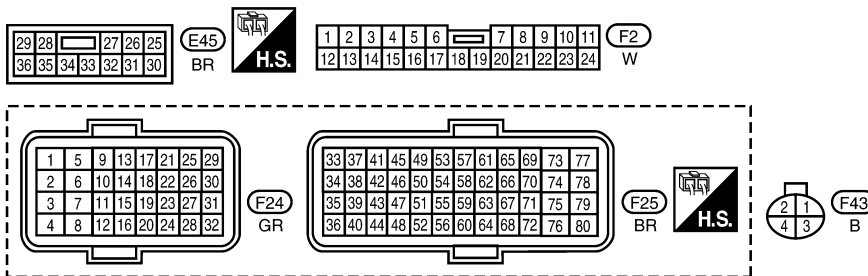
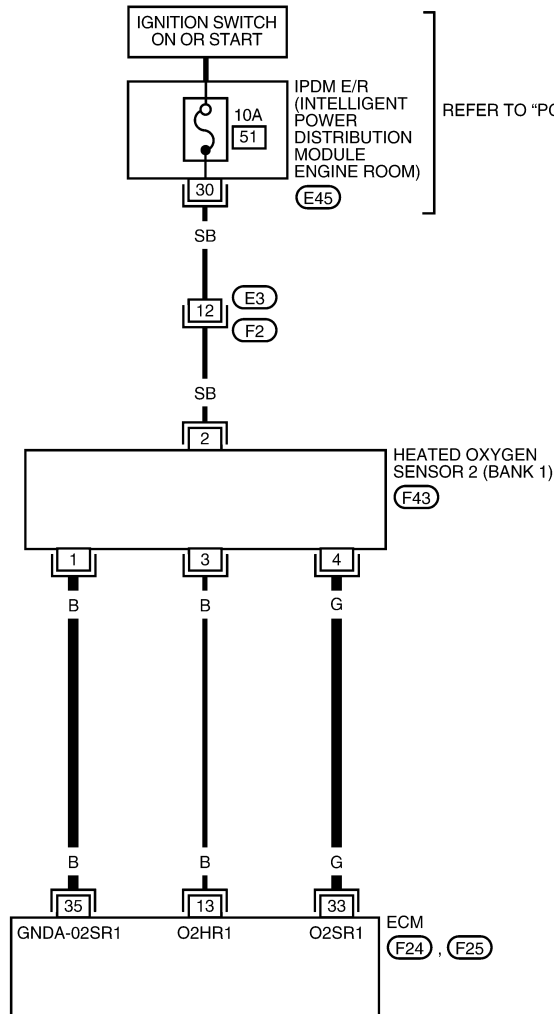
Wiring Diagram

INFOID:000000006150555

BANK 1

EC-O2S2B1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0262GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

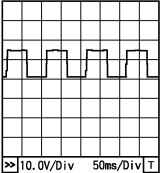
CAUTION:

DTC P0137, P0157 HO2S2

< SERVICE INFORMATION >

[QR25DE]

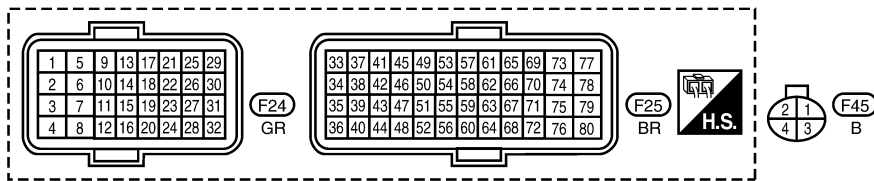
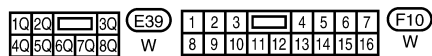
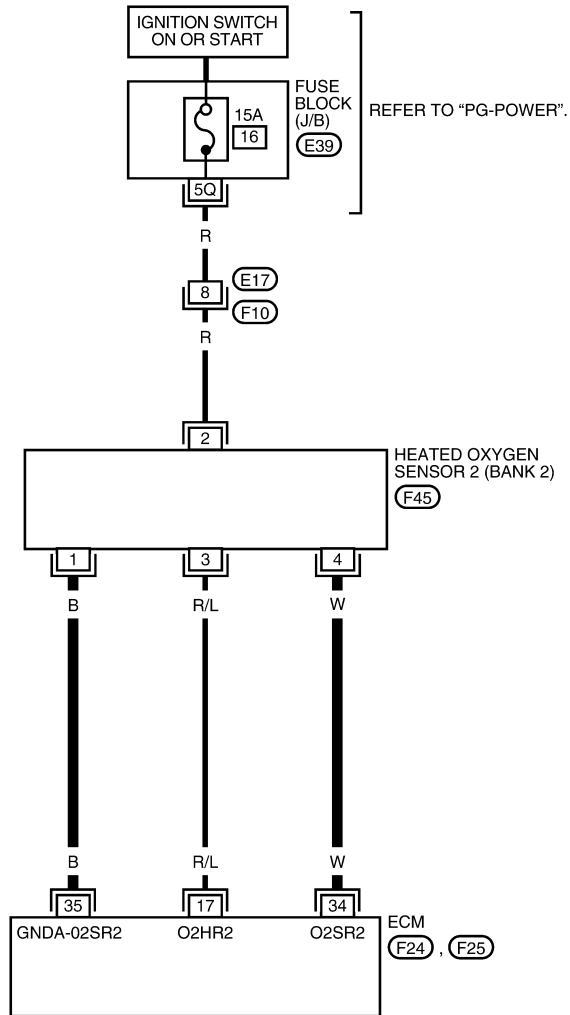
Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	B	Heated oxygen sensor 2 heater (Bank 1)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	<p>Approximately 10 V★</p>  <p style="text-align: right; font-size: small;">PBI A8148J</p>
			<p>[Ignition switch: ON]</p> <ul style="list-style-type: none"> • Engine stopped <p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm. 	<p>BATTERY VOLTAGE (11 - 14 V)</p>
33	G	Heated oxygen sensor 2 (Bank 1)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	<p>0 - Approximately 1.0 V</p>
35	B	Sensor ground (Heated oxygen sensor 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	<p>Approximately 0 V</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

EC-O2S2B2-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



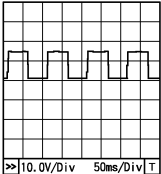
BBWA3034E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

A
EC
C
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P

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
17	R/L	Heated oxygen sensor 2 heater (Bank 2)	[Engine is running] <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★  PBI A8148J
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
34	W	Heated oxygen sensor 2 (Bank 2)	[Engine is running] <ul style="list-style-type: none"> Reving engine from idle to 3,000 rpm quickly after the following conditions are met. Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
35	B	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed 	Approximately 0 V

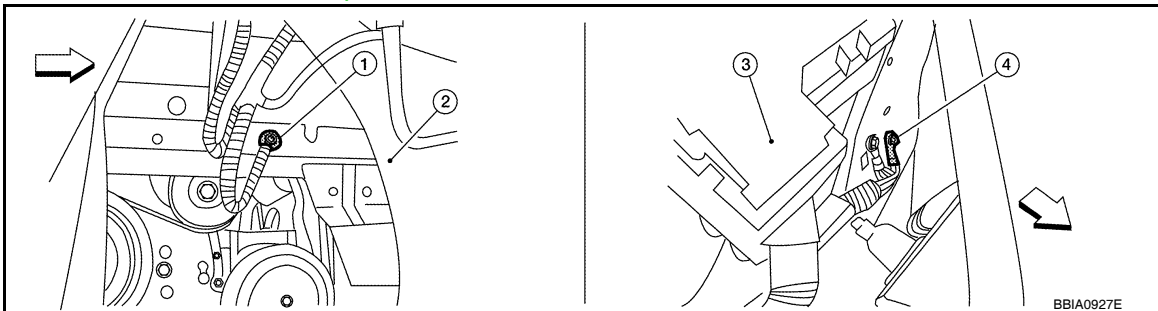
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150556

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
- Loosen and retighten ground screw on the body.
Refer to [EC-1242. "Ground Inspection"](#).



↔: Vehicle front

- | | | |
|---|----------------|------------------------------|
| 1. Body ground E9 (view with front wheel RH and fender protector RH removed.) | 2. Washer tank | 3. Fuse and fusible link box |
| 4. Body ground E15 | | |

OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

2. CLEAR THE SELF-LEARNING DATA

Ⓜ With CONSULT-III

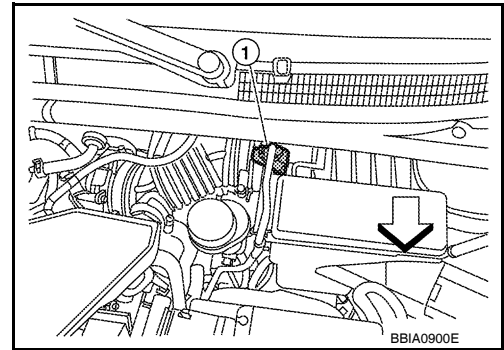
- Start engine and warm it up to normal operating temperature.

< SERVICE INFORMATION >

2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171, P0174 detected?
Is it difficult to start engine?

⊗ Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
 - ⇐: Vehicle front
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Check that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-1144](#). "Emission-related Diagnostic Information".
7. Check that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171, P0174 detected?
Is it difficult to start engine?



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0174. Refer to [EC-1375](#).
 No >> GO TO 3.

3.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
 - Heated oxygen sensor 2 (Bank 1) harness connector (1)
 - Heated oxygen sensor 2 (Bank 1) (2)
 - Heated oxygen sensor 2 (Bank 2) (3)
 - Heated oxygen sensor 2 (Bank 2) harness connector (4)
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 35 and HO2S2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminals and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminal		Bank
	ECM	Sensor	
P0137	33	4	1
P0157	34	4	2

Continuity should exist.

2. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

A
EC
C
D
E
F
G
H
I
J
K
L
M
N
O
P

DTC	Terminal		Bank
	ECM	Sensor	
P0137	33	4	1
P0157	34	4	2

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-1352, "Component Inspection"](#).

OK or NG

OK >> GO TO 6.

NG >> Replace malfunctioning heated oxygen sensor 2. Refer to [EM-140, "Removal and Installation"](#).

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

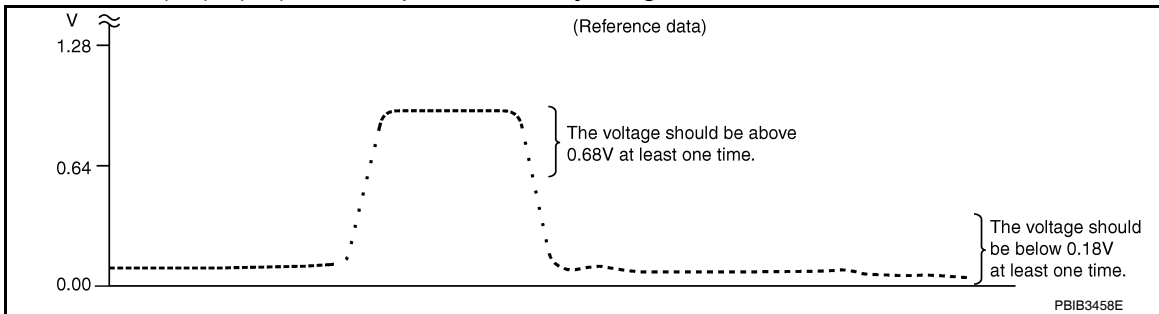
Component Inspection

INFOID:000000006150557

HEATED OXYGEN SENSOR 2

Ⓟ With CONSULT-III

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. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1) / (B2)" as the monitor item with CONSULT-III.
6. Check "HO2S2 (B1) / (B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"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%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using oxygen sensor thread cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

ⓧ Without CONSULT-III

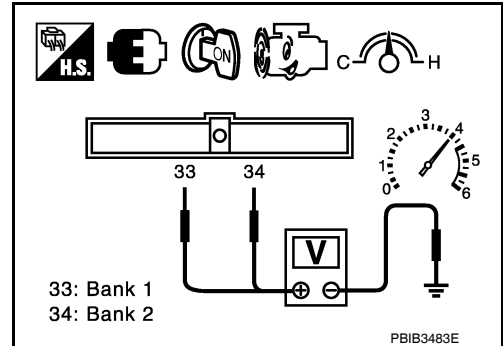
1. Start engine and warm it up to the normal operating temperature.

DTC P0137, P0157 HO2S2

[QR25DE]

< SERVICE INFORMATION >

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. Set voltmeter probes between ECM terminal 33 [HO2S2 (B1) signal] or 34 [HO2S2 (B2) signal] and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
If the voltage can be confirmed at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2. Refer to [EM-140, "Removal and Installation"](#).
CAUTION:
 - Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
 - Before installing new oxygen sensor, clean exhaust system threads using oxygen sensor thread cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

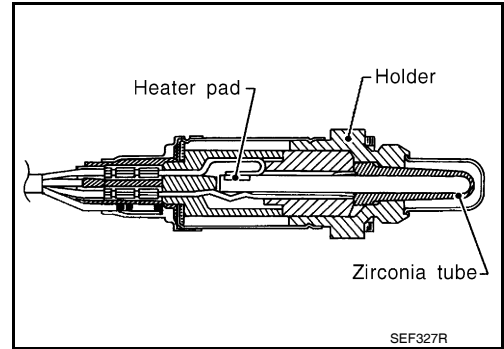


DTC P0138, P0158 HO2S2

Component Description

INFOID:000000006150559

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank. 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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150560

Specification data are reference values.

Monitor item	Condition	Specification
HO2S2 (B1) HO2S2 (B2)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	LEAN ↔ RICH

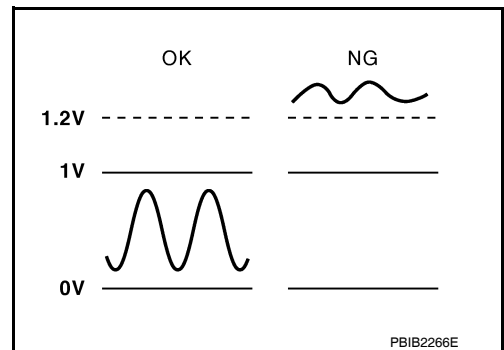
On Board Diagnosis Logic

INFOID:000000006150561

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 before the three way catalyst (manifold) causes the longer switching time.

MALFUNCTION A

To judge the malfunctions of rear heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel cut.



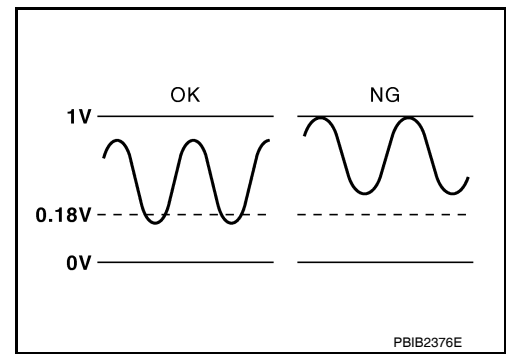
MALFUNCTION B

DTC P0138, P0158 HO2S2

< SERVICE INFORMATION >

[QR25DE]

To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during the various driving condition such as fuel cut.



DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0138 0138 (Bank 1)	Heated oxygen sensor 2 circuit high voltage	A)	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Heated oxygen sensor 2 circuit is open or shorted.) • Heated oxygen sensor 2
P0158 0158 (Bank 2)		B)	The minimum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> • Harness or connectors (Heated oxygen sensor circuit is open or shorted.) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector

DTC Confirmation Procedure

INFOID:000000006150562

Perform PROCEDURE FOR MALFUNCTION A first.
If DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

Ⓟ With CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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 2 minutes.
6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-1360, "Diagnosis Procedure"](#).

Ⓢ With GST

Follow the procedure "With CONSULT-III" above.

PROCEDURE FOR MALFUNCTION B

Ⓟ With CONSULT-III

TESTING CONDITION:

For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III
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. Check that "COOLAN TEMP/S" indicates more than 70°C (158°F).

DTC P0138, P0158 HO2S2

[QR25DE]

< SERVICE INFORMATION >

If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches to 70°C (158°F).

- Open engine hood.
- Select "HO2S2 (B1) P1146" (for DTC P0138) or "HO2S2 (B2) P1166" (for DTC P0158) of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
- Follow the instruction of CONSULT-III.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

- Check that "OK" is displayed after touching "SELF-DIAG RESULTS".
If "NG" is displayed, refer to [EC-1360, "Diagnosis Procedure"](#).
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
 - Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
 - Return to step 1.

Overall Function Check

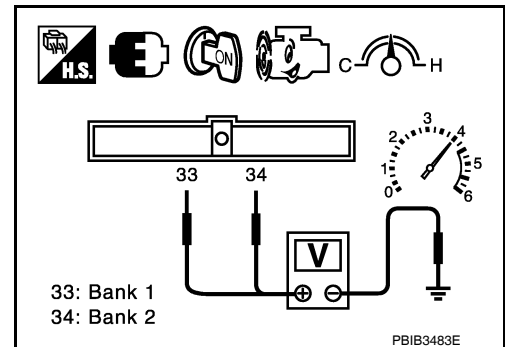
INFOID:000000006150563

PROCEDURE FOR MALFUNCTION B

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- Start engine and warm it up to the normal operating temperature.
- 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.
- Let engine idle 1 minute.
- Set voltmeter probes between ECM terminal 33 [HO2S2 (B1) signal] or 34 [HO2S2 (B2) signal] and ground.
- Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 0.18 V at least once during this procedure.
If the voltage can be confirmed in step 6, step 7 is not necessary.
- Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be below 0.18 V at least once during this procedure.
- If NG, go to [EC-1360, "Diagnosis Procedure"](#).



DTC P0138, P0158 HO2S2

< SERVICE INFORMATION >

[QR25DE]

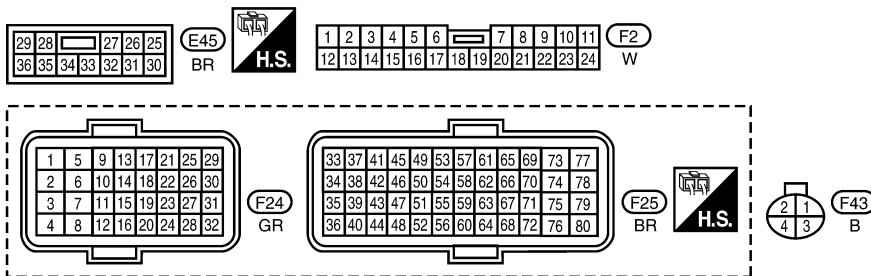
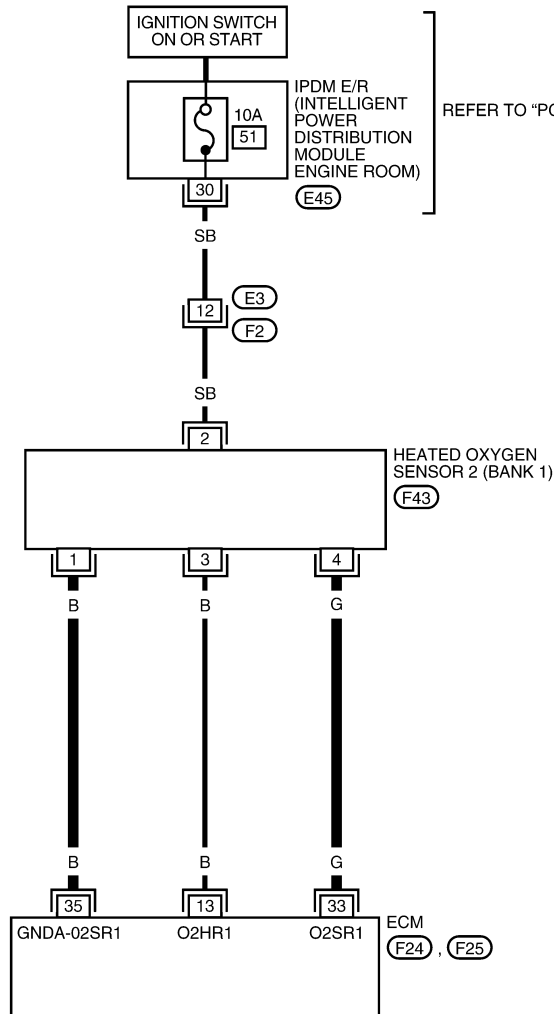
Wiring Diagram

INFOID:000000006150564

BANK 1

EC-O2S2B1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0262GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

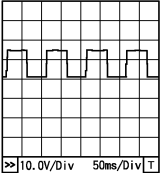
CAUTION:

DTC P0138, P0158 HO2S2

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	B	Heated oxygen sensor 2 heater (Bank 1)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	<p>Approximately 10 V★</p>  <p style="font-size: small; text-align: right;">P8IA8148J</p>
			<p>[Ignition switch: ON]</p> <ul style="list-style-type: none"> • Engine stopped <p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm. 	<p>BATTERY VOLTAGE (11 - 14 V)</p>
33	G	Heated oxygen sensor 2 (Bank 1)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	<p>0 - Approximately 1.0 V</p>
35	B	Sensor ground (Heated oxygen sensor 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	<p>Approximately 0 V</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P0138, P0158 HO2S2

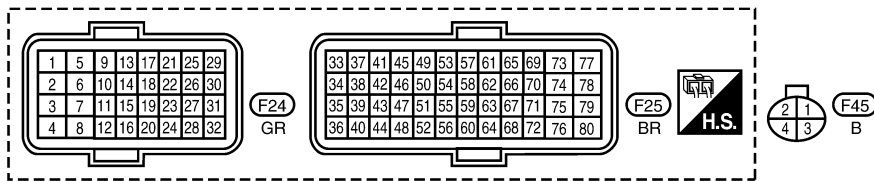
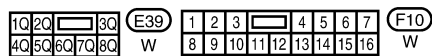
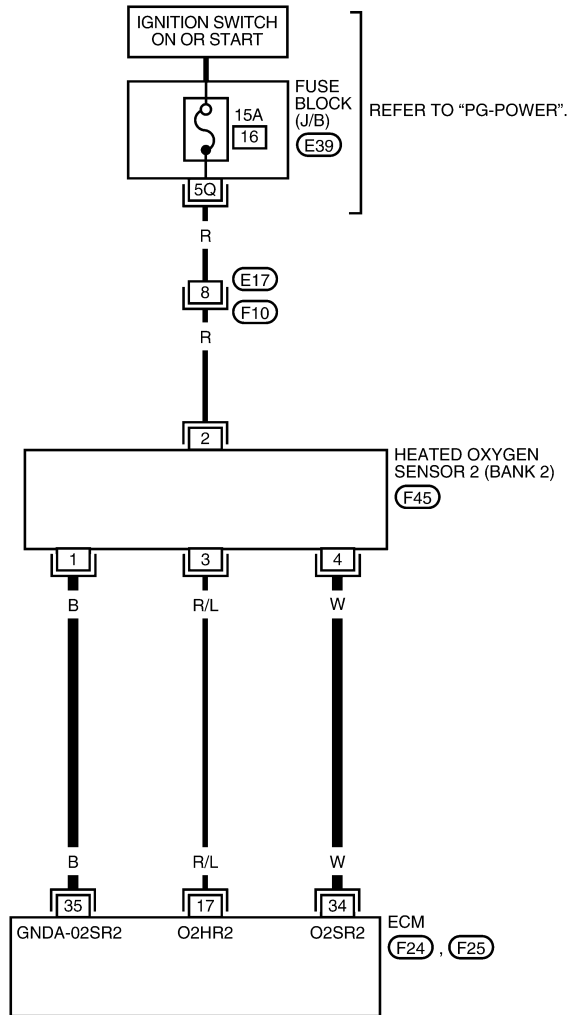
[QR25DE]

< SERVICE INFORMATION >

BANK 2

EC-O2S2B2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



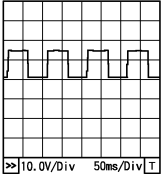
BBWA3034E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

A
 EC
 C
 D
 E
 F
 G
 H
 I
 J
 K
 L
 M
 N
 O
 P

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
17	R/L	Heated oxygen sensor 2 heater (Bank 2)	[Engine is running] <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★ 
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
34	W	Heated oxygen sensor 2 (Bank 2)	[Engine is running] <ul style="list-style-type: none"> Reving engine from idle to 3,000 rpm quickly after the following conditions are met. Engine: After warming up Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
35	B	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed 	Approximately 0 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

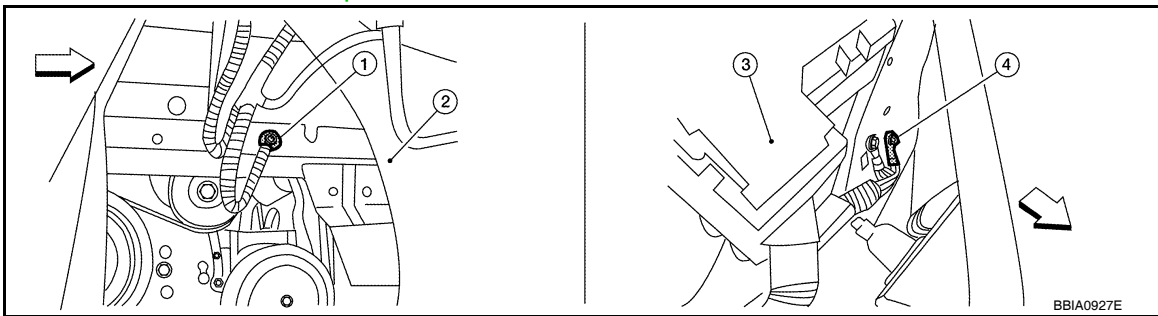
Diagnosis Procedure

INFOID:000000006150565

PROCEDURE FOR MALFUNCTION A

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.

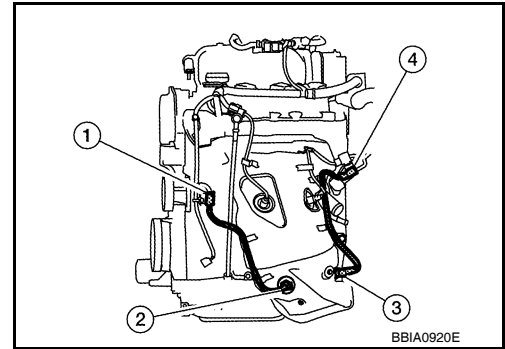
2. CHECK HO2S2 CONNECTOR FOR WATER

DTC P0138, P0158 HO2S2

[QR25DE]

< SERVICE INFORMATION >

1. Disconnect heated oxygen sensor 2 harness connector.
 - Heated oxygen sensor 2 (Bank 1) harness connector (1)
 - Heated oxygen sensor 2 (Bank 1) (2)
 - Heated oxygen sensor 2 (Bank 2) (3)
 - Heated oxygen sensor 2 (Bank 2) harness connector (4)
2. Check that water is not inside connectors.



OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace harness or connectors.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 35 and HO2S2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminals and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminal		Bank
	ECM	Sensor	
P0137	33	4	1
P0157	34	4	2

Continuity should exist.

2. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

DTC	Terminal		Bank
	ECM	Sensor	
P0137	33	4	1
P0157	34	4	2

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-1363, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace malfunctioning heated oxygen sensor 2. Refer to [EM-140, "Removal and Installation"](#).

6. CHECK INTERMITTENT INCIDENT

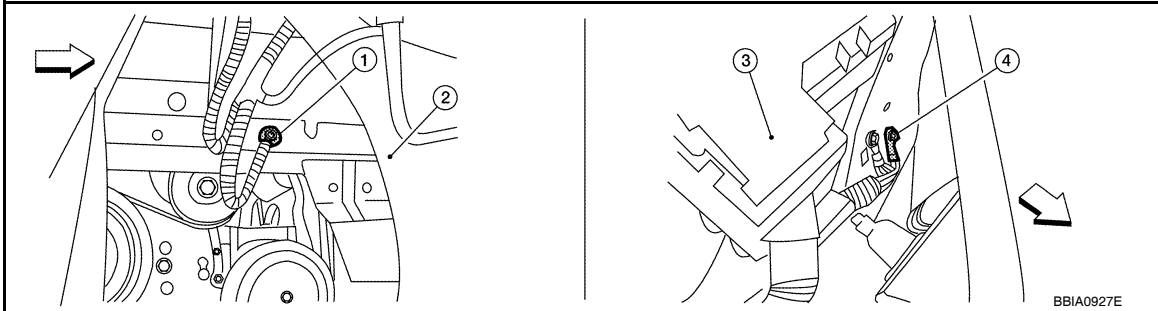
Refer to [EC-1236](#).

>> **INSPECTION END**

PROCEDURE FOR MALFUNCTION B

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.
Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Engine ground E9 (view with front wheel RH and fender protector RH removed.) 4. Engine ground E15 | <ol style="list-style-type: none"> 2. Washer tank 3. Fuse and fusible link box |
|---|--|

OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

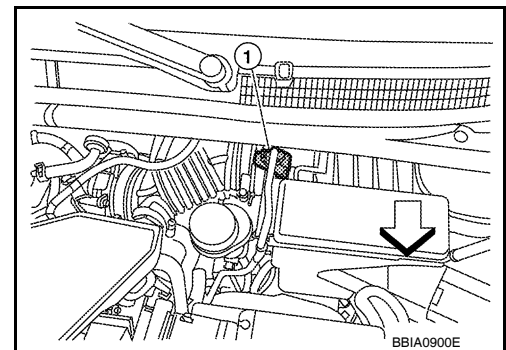
2. CLEAR THE SELF-LEARNING DATA

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. 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?

Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
 - ←: Vehicle front
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Check that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-1144, "Emission-related Diagnostic Information"](#).
7. Check that DTC P0000 is displayed.
8. 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 or No

- Yes >> Perform trouble diagnosis for DTC P0172 or P0175. Refer to [EC-1384](#).
 No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

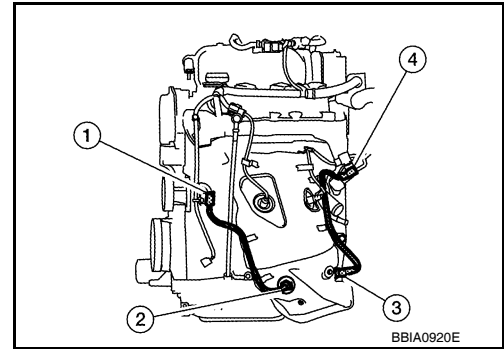
1. Turn ignition switch OFF.

DTC P0138, P0158 HO2S2

[QR25DE]

< SERVICE INFORMATION >

2. Disconnect heated oxygen sensor 2 harness connector.
 - Heated oxygen sensor 2 (Bank 1) harness connector (1)
 - Heated oxygen sensor 2 (Bank 1) (2)
 - Heated oxygen sensor 2 (Bank 2) (3)
 - Heated oxygen sensor 2 (Bank 2) harness connector (4)
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 35 and HO2S2 terminal 1. Refer to Wiring Diagram.



Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminals and HO2S2 terminal as follows. Refer to Wiring Diagram.

DTC	Terminal		Bank
	ECM	Sensor	
P0137	33	4	1
P0157	34	4	2

Continuity should exist.

2. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

DTC	Terminal		Bank
	ECM	Sensor	
P0137	33	4	1
P0157	34	4	2

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-1363, "Component Inspection"](#).

OK or NG

OK >> GO TO 6.

NG >> Replace malfunctioning heated oxygen sensor 2. Refer to [EM-140, "Removal and Installation"](#).

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

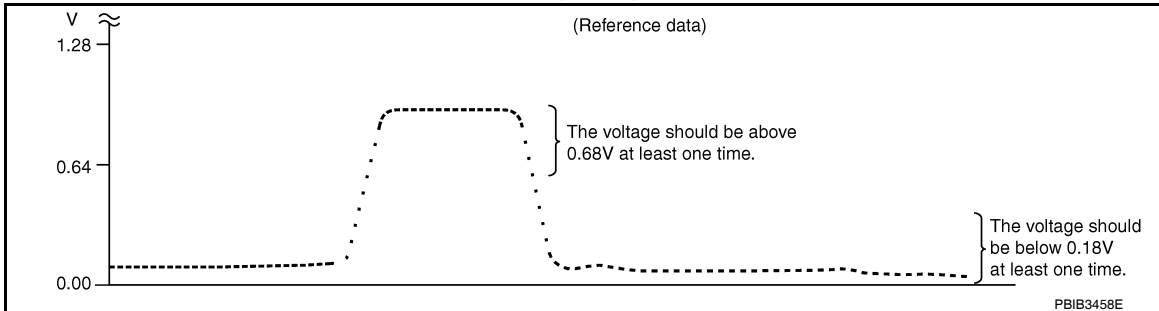
HEATED OXYGEN SENSOR 2

INFOID:000000006150566

< SERVICE INFORMATION >

Ⓟ With CONSULT-III

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. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-III.
6. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"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%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using oxygen sensor thread cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

ⓧ Without CONSULT-III

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. Set voltmeter probes between ECM terminal 33 [HO2S2 (B1) signal] or 34 [HO2S2 (B2) signal] and ground.

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)

The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
If the voltage can be confirmed at step 6, step 7 is not necessary.

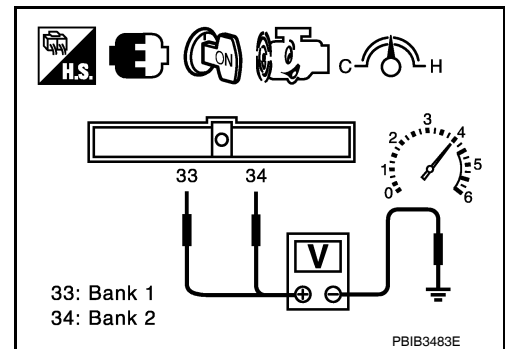
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).

The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.

8. If NG, replace heated oxygen sensor 2. Refer to [EM-140, "Removal and Installation"](#).

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using oxygen sensor thread cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

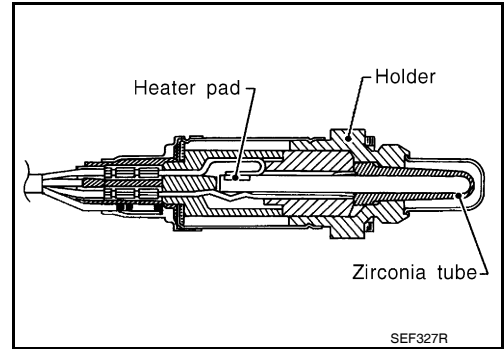


DTC P0139, P0159 HO2S2

Component Description

INFOID:000000006150568

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank. 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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150569

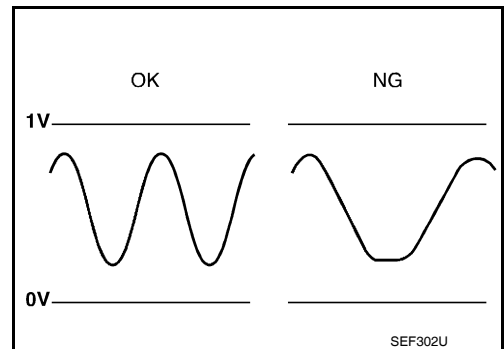
Specification data are reference values.

Monitor Item	Condition	Specification
HO2S2 (B1) HO2S2 (B2)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	0 - 0.3 V ↔ Approx. 0.6 - 1.0 V
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	<ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load 	LEAN ↔ RICH
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (delayed response) is complete.	CMPLT
HO2 S2 DIAG1 (B2)	DTC P0159 self-diagnosis (delayed response) is incomplete.	INCMP
	DTC P0159 self-diagnosis (delayed response) is complete.	CMPLT
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (slow response) is complete.	CMPLT
HO2 S2 DIAG2 (B2)	DTC P0159 self-diagnosis (slow response) is incomplete.	INCMP
	DTC P0159 self-diagnosis (slow response) is complete.	CMPLT

On Board Diagnosis Logic

INFOID:000000006150570

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.



DTC P0139, P0159 HO2S2

< SERVICE INFORMATION >

[QR25DE]

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139	Heated oxygen sensor 2 (bank 1) circuit slow response	The switching time between rich and lean of a heated oxygen sensor 2 signal delays more than the specified time computed by ECM.	<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel system • EVAP system • Intake air system
P0159	Heated oxygen sensor 2 (bank 2) circuit slow response		

DTC Confirmation Procedure

INFOID:000000006150571

1. INSPECTION START

Do you have CONSULT-III?

Do you have CONSULT-III?

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).

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
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. Make sure that “COOLAN TEMP/S” indicates more than 70°C (158°F).
9. Drive the vehicle at a speed of 60 km/h (38 MPH) on the suitable gear position and keep the speed.

CAUTION:

Always drive vehicle at a safe speed.

10. Release the accelerator pedal fully at least 5 seconds.

CAUTION:

- **Make it the condition that engine brake operates.**
- **Always drive vehicle safely.**
- **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”.

DTC	Data monitor item	Status
P0139	HO2 S2 DIAG1 (B1)	CMPLT
	HO2 S2 DIAG2 (B1)	
P0159	HO2 S2 DIAG1 (B2)	
	HO2 S2 DIAG2 (B2)	

Is “CMPLT” displayed on CONSULT-III screen?

YES >> GO TO 6.

< SERVICE INFORMATION >

NO-1: "CMPLT" are not displayed on DIAG 1>>Perform DTC confirmation procedure again.
 NO-2: "CMPLT" are not displayed on DIAG 2>>GO TO 4.

4.PERFORM DTC WORK SUPPORT

1. Open engine hood.
2. Select "HO2S2 (B1) P0139" or "HO2S2 (B2) P0159" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-III.
3. Start engine and follow the instruction of CONSULT-III display.

NOTE:

It will take at most 10 minutes until "COMPLETED" is displayed.

Is "COMPLETED" displayed on CONSULT-III 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-III

Perform ECM self-diagnosis.

Is DTC "P0139" or "P0159" detected?

- YES >> Proceed to [EC-1371, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

7.PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EC-1367, "Overall 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 [EC-1371, "Diagnosis Procedure"](#).

Overall Function Check

INFOID:000000006150572

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

 WITH GST

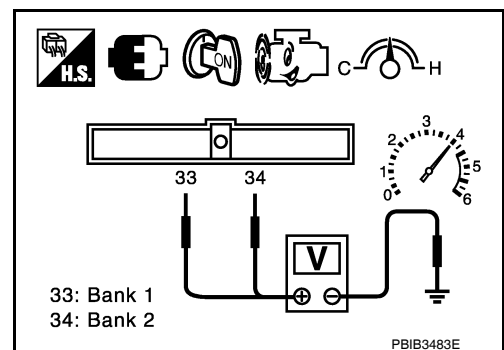
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 33 [HO2S2 (b1) signal] or 34 [HO2S2 (B2) signal] and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)

A change of voltage should be more than 0.8 V for 1 second during this procedure.

If the voltage can be confirmed in step 6, step 7 is not necessary.

7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).

A change of voltage should be more than 0.8 V for 1 second during this procedure.



DTC P0139, P0159 HO2S2

[QR25DE]

< SERVICE INFORMATION >

8. If NG, go to [EC-1371](#). "Diagnosis Procedure".

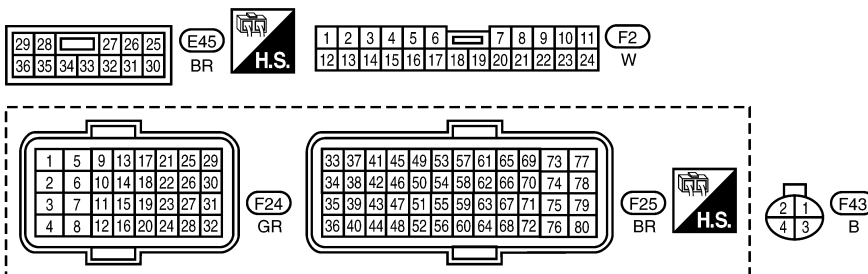
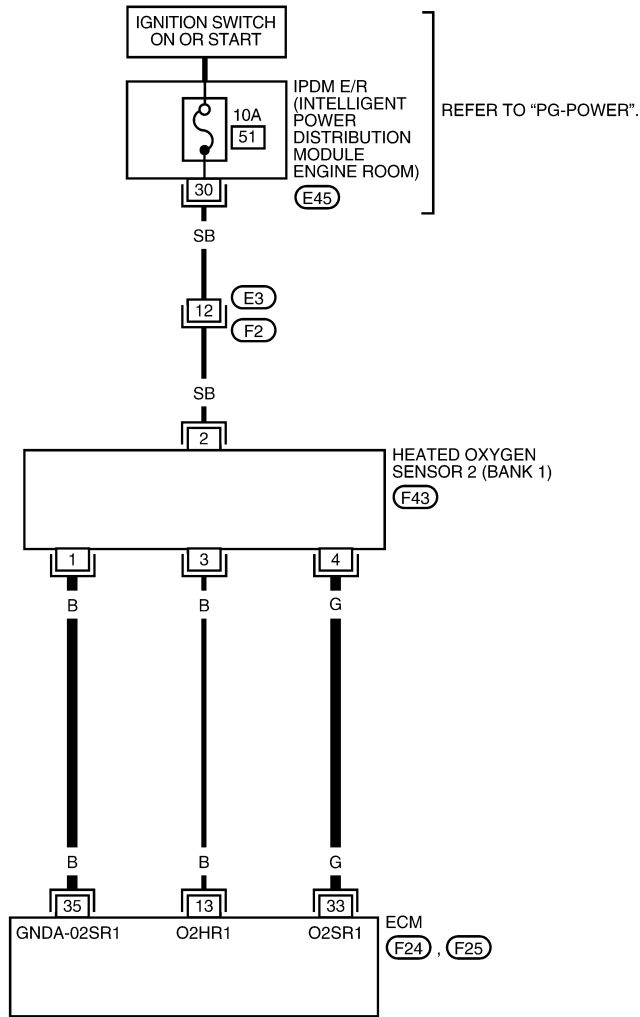
Wiring Diagram

INFOID:000000006150573

BANK 1

EC-O2S2B1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



AABWA0262GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

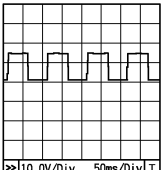
CAUTION:

DTC P0139, P0159 HO2S2

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	B	Heated oxygen sensor 2 heater (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Engine speed: Below 3,600 rpm after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★ 
			[Ignition switch: ON] <ul style="list-style-type: none"> • Engine stopped [Engine is running] <ul style="list-style-type: none"> • Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
33	G	Heated oxygen sensor 2 (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Revving engine from idle to 3,000 rpm quickly after the following conditions are met. - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
35	B	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 0 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P0139, P0159 HO2S2

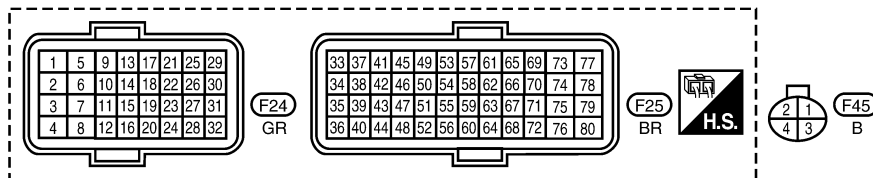
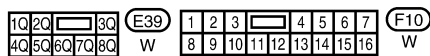
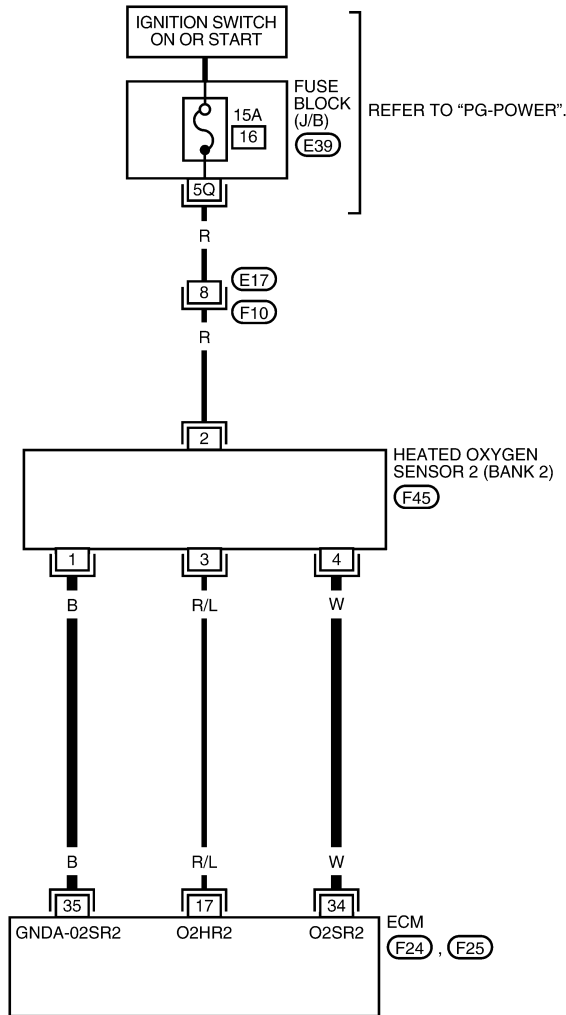
[QR25DE]

< SERVICE INFORMATION >

BANK 2

EC-O2S2B2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC

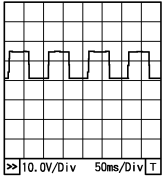


BBWA30034E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
17	R/L	Heated oxygen sensor 2 heater (Bank 2)	[Engine is running] <ul style="list-style-type: none"> Engine speed: Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	Approximately 10 V★ 
			[Ignition switch: ON] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed: Above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14 V)
34	W	Heated oxygen sensor 2 (Bank 2)	[Engine is running] <ul style="list-style-type: none"> Revsing engine from idle to 3,000 rpm quickly after the following conditions are met. <ul style="list-style-type: none"> - Engine: After warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load. 	0 - Approximately 1.0 V
35	B	Sensor ground (Heated oxygen sensor 2)	[Engine is running] <ul style="list-style-type: none"> Warm-up condition Idle speed 	Approximately 0 V

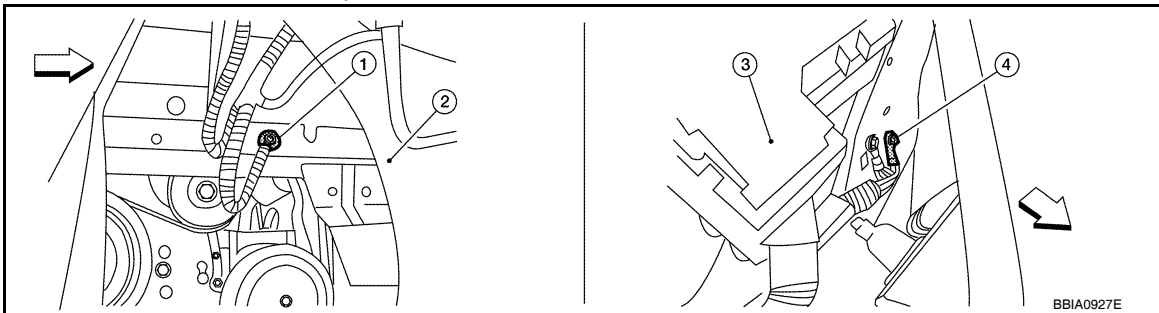
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150574

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
- Loosen and retighten ground screw on the body.
Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

- Body ground E9 (view with front wheel RH and fender protector RH removed.)
- Washer tank
- Fuse and fusible link box
- Body ground E15

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.

2. CLEAR THE SELF-LEARNING DATA

Ⓜ With CONSULT-III

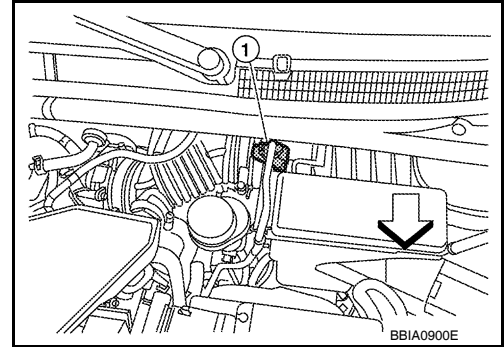
- Start engine and warm it up to normal operating temperature.

< SERVICE INFORMATION >

2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
 3. Clear the self-learning control coefficient by touching "CLEAR".
 4. Run engine for at least 10 minutes at idle speed.
- Is the 1st trip DTC P0171, P0174, P0172 or P0175 detected?
Is it difficult to start engine?**

⊗ **Without CONSULT-III**

1. Start engine and warm it up to normal operating temperature.
 2. Turn ignition switch OFF.
 3. Disconnect mass air flow sensor (1) harness connector, and restart and run engine for at least 5 seconds at idle speed.
- ⇐: Vehicle front
4. Stop engine and reconnect mass air flow sensor harness connector.
 5. Check that DTC P0102 is displayed.
 6. Erase the DTC memory. Refer to [EC-1144, "Emission-related Diagnostic Information"](#).
 7. Check that DTC P0000 is displayed.
 8. 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 or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to [EC-1375](#) or [EC-1384](#).
- No >> GO TO 3.

3.CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
 - Heated oxygen sensor 2 (Bank 1) harness connector (1)
 - Heated oxygen sensor 2 (Bank 1) (2)
 - Heated oxygen sensor 2 (Bank 2) (3)
 - Heated oxygen sensor 2 (Bank 2) harness connector (4)
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 35 and HO2S2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

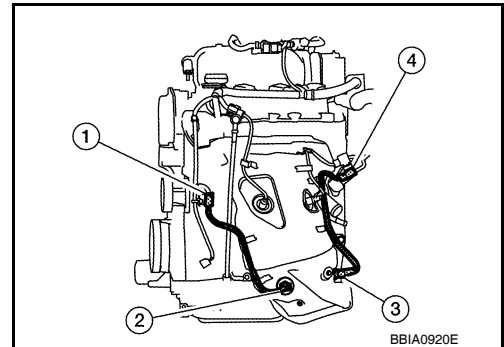
5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminals and HO2S2 terminal as follows. Refer to Wiring Diagram.



DTC	Terminal		Bank
	ECM	Sensor	
P0137	33	4	1
P0157	34	4	2

Continuity should exist.

2. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

DTC	Terminal		Bank
	ECM	Sensor	
P0137	33	4	1
P0157	34	4	2

Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-1373, "Component Inspection"](#).

OK or NG

OK >> GO TO 6.

NG >> Replace malfunctioning heated oxygen sensor 2. Refer to [EM-140, "Removal and Installation"](#).

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

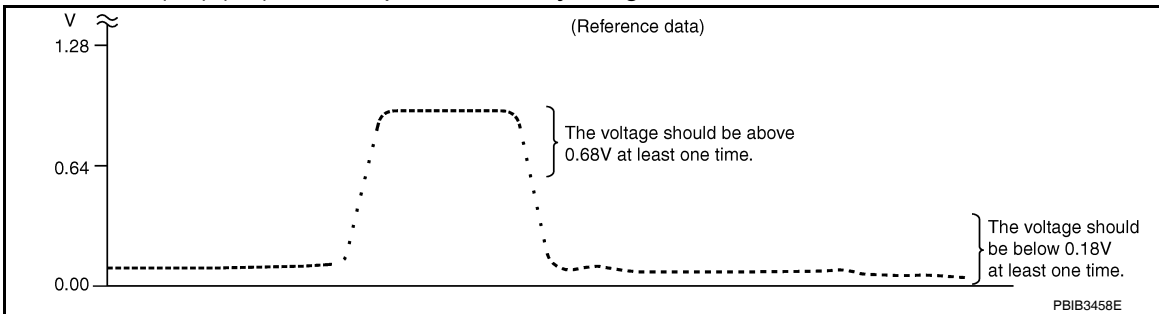
Component Inspection

INFOID:000000006150575

HEATED OXYGEN SENSOR 2

With CONSULT-III

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. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-III.
6. Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



"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%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using oxygen sensor thread cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

Without CONSULT-III

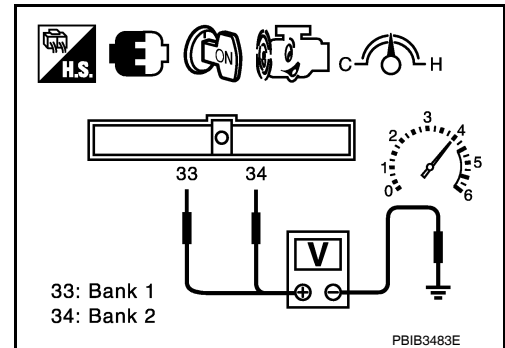
1. Start engine and warm it up to the normal operating temperature.

DTC P0139, P0159 HO2S2

[QR25DE]

< SERVICE INFORMATION >

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. Set voltmeter probes between ECM terminal 33 [HO2S2 (B1) signal] or 34 [HO2S2 (B2) signal] and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
If the voltage can be confirmed at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (CVT) or 3rd gear position (M/T).
The voltage should be above 0.68 V and below 0.18 V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2. Refer to [EM-140, "Removal and Installation"](#).



CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using oxygen sensor thread cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[QR25DE]

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

On Board Diagnosis Logic

INFOID:000000006150577

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (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
Air fuel ratio (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
P0171 0171 (Bank 1)	Fuel injection system too lean	<ul style="list-style-type: none"> Fuel injection system does not operate properly. The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.) 	<ul style="list-style-type: none"> Intake air leaks Air fuel ratio (A/F) sensor 1 Fuel injector Exhaust gas leaks Incorrect fuel pressure Lack of fuel Mass air flow sensor Incorrect PCV hose connection
P0174 0174 (Bank 2)			

DTC Confirmation Procedure

INFOID:000000006150578

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

④ WITH CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
- Clear the self-learning control coefficient by touching "CLEAR".
- Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction. Performing the following procedure is advised.
 - 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.
 - If engine starts, go to [EC-1380, "Diagnosis Procedure"](#).
If engine does not start, check exhaust and intake air leakage visually.
- Keep engine at idle for at least 5 minutes.
- Check 1st trip DTC.
- The 1st trip DTC P0171 or P0174 should be detected at this stage, if a malfunction exists. If so, go to [EC-1380, "Diagnosis Procedure"](#).
NOTE:
If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.
 - Turn ignition switch OFF and wait at least 10 seconds.
 - Start engine.
 - Maintain the following conditions for at least 10 consecutive minutes.
Hold the accelerator pedal as steady as possible.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

[QR25DE]

< SERVICE INFORMATION >

VHCL SPEED SE	50 - 120 km/h (31 - 75 MPH)
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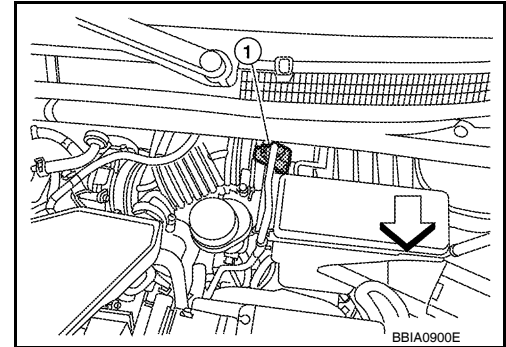
CAUTION:

Always drive vehicle at a safe speed.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-1380, "Diagnosis Procedure"](#).

GS† 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. Disconnect mass air flow sensor (1) harness connector.
- ↵: Vehicle front
- 4. Restart engine and let idle for at least 5 seconds.
- 5. Stop engine and reconnect mass air flow sensor harness connector.
- 6. Select Service \$03 with GST. Check that DTC P0102 is detected.
- 7. Select Service \$04 with GST and erase the DTC P0102.



- 8. Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction.
Performing the following procedure is advised.

- a. 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.

- b. If engine starts, go to [EC-1380, "Diagnosis Procedure"](#).
If engine does not start, check exhaust and intake air leakage visually.
- 9. Keep engine at idle for at least 5 minutes.
- 10. Check 1st trip DTC.
- 11. The 1st trip DTC P0171 or P0174 should be detected at this stage, if a malfunction exists. If so, go to [EC-1380, "Diagnosis Procedure"](#).

NOTE:

If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

- a. Turn ignition switch OFF and wait at least 10 seconds.
- b. Start engine.
- c. 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.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-1380, "Diagnosis Procedure"](#).

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

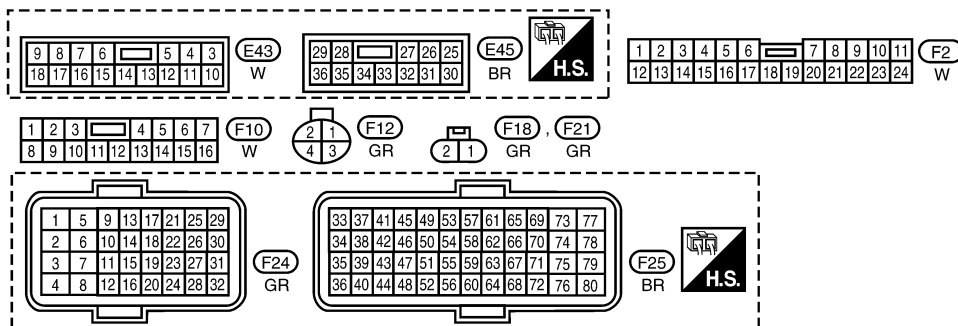
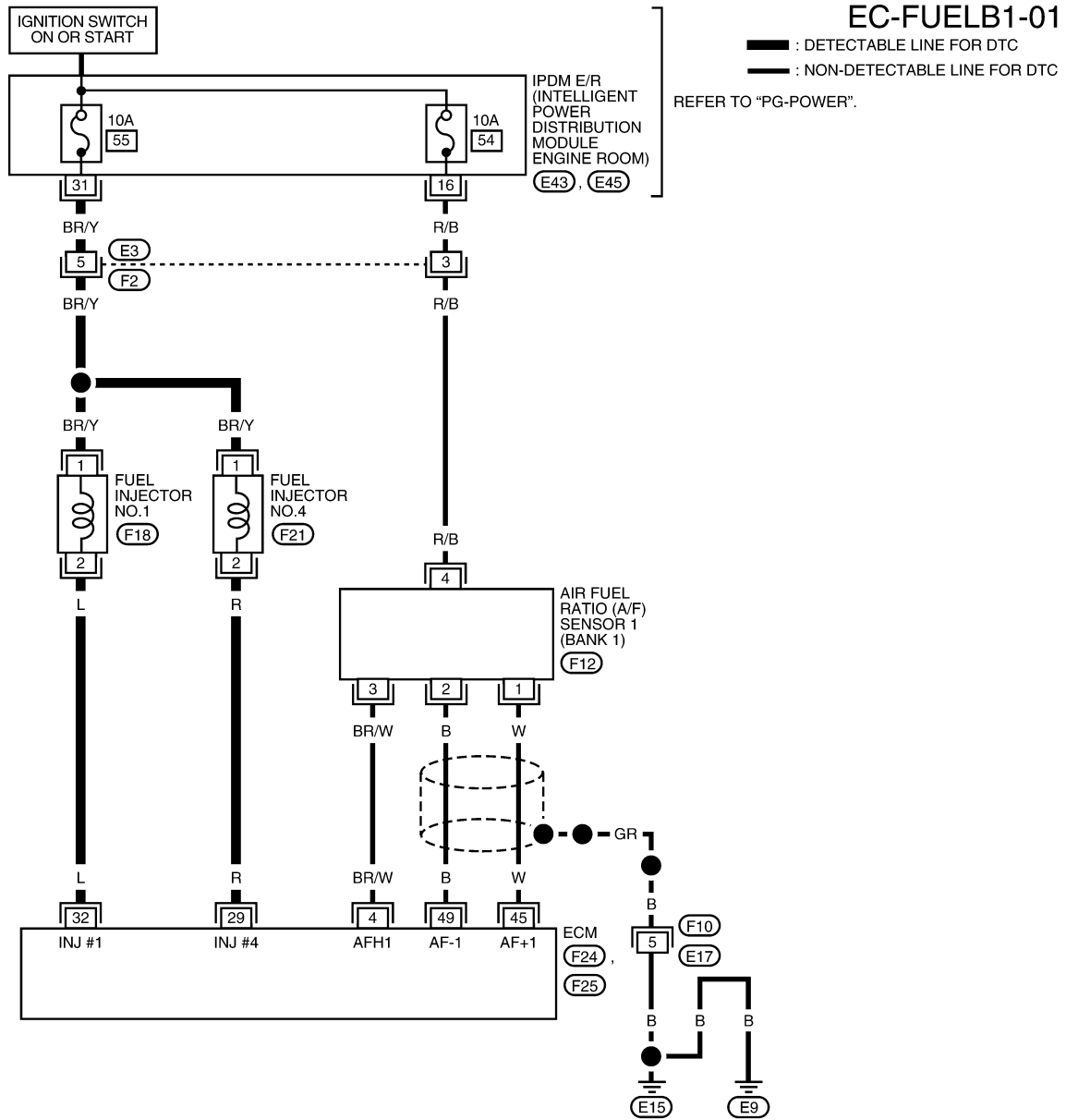
< SERVICE INFORMATION >

[QR25DE]

INFOID:000000006150579

Wiring Diagram

BANK 1



ABBWA0663GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

CAUTION:

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	BR/W	A/F sensor 1 heater (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed (More than 140 seconds after starting engine) 	Approximately 2.9 - 8.8 V★ <small>PBIA8148J</small>
29 32	R L	Fuel injector No. 4 Fuel injector No. 1	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14 V)★ <small>PBIB0529E</small>
			[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	BATTERY VOLTAGE (11 - 14 V)★ <small>PBIA4943J</small>
45	W	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	Approximately 1.8 V Output voltage varies with air fuel ratio.
49	B	A/F sensor 1 (Bank 1)	[Ignition switch: ON]	Approximately 2.2 V

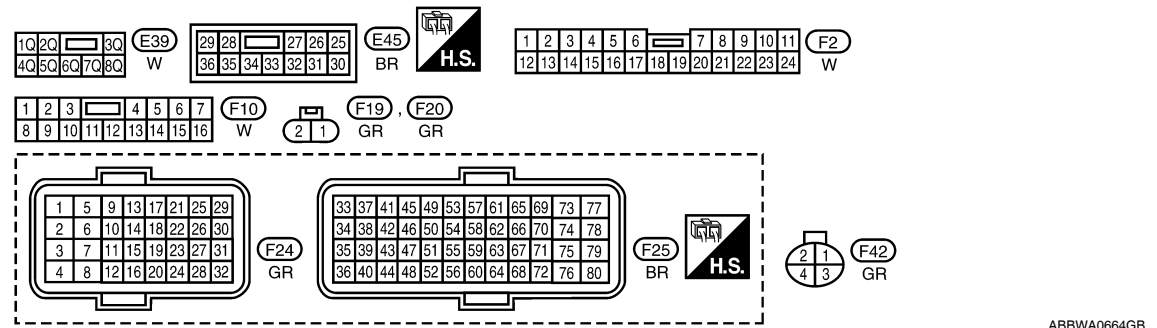
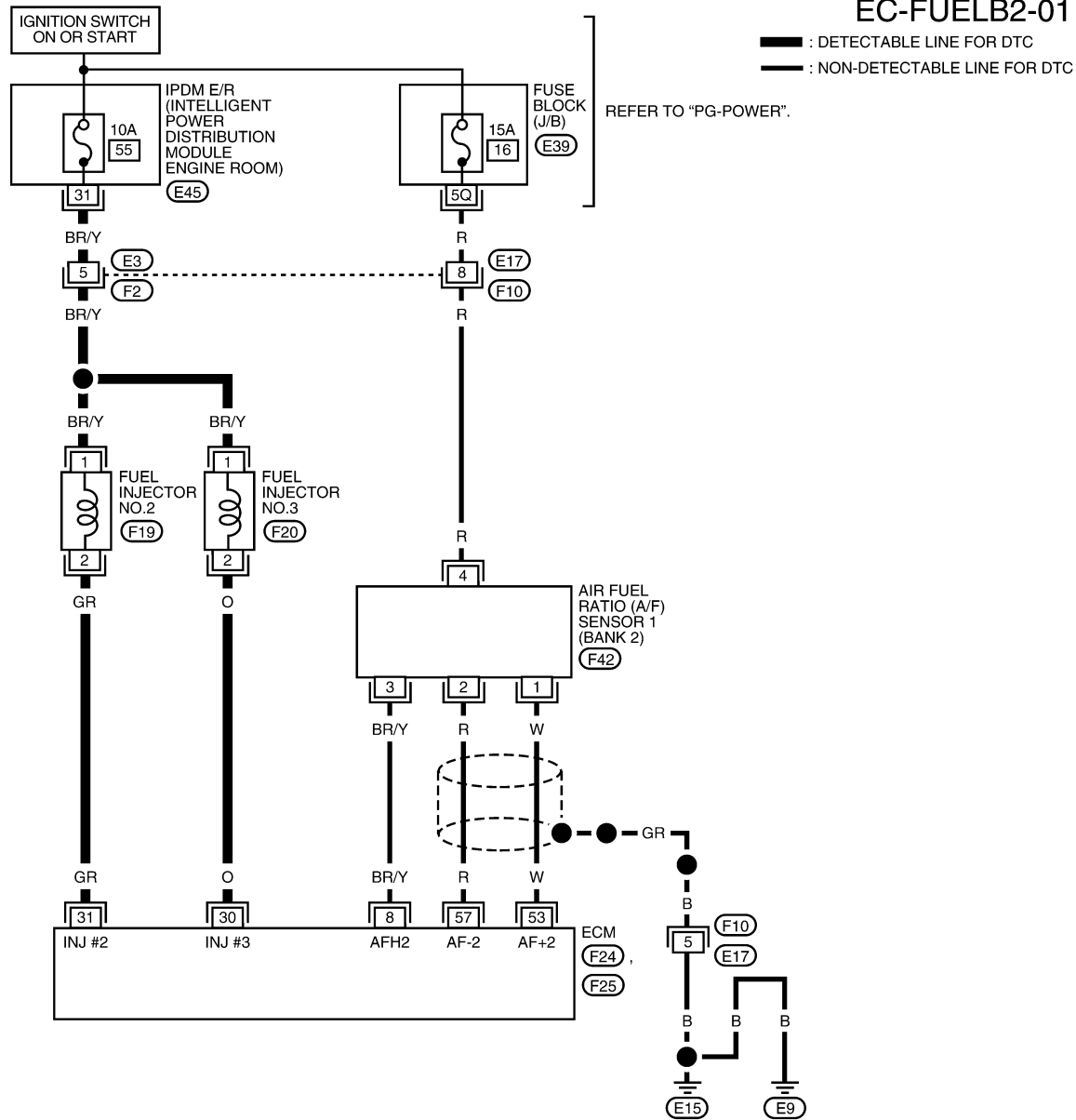
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[QR25DE]

BANK 2



ABBWA0664GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

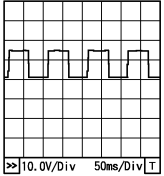
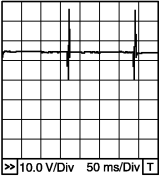
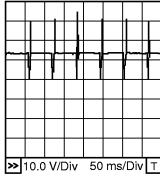
CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/Y	A/F sensor 1 heater (Bank 2)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBI A8148J
30 31	O GR	Fuel injector No. 3 Fuel injector No. 2	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14 V)★  PBI B0529E
			[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14 V)★  PBI A4943J
53	W	A/F sensor 1 (Bank 2)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
57	R	A/F sensor 1 (Bank 2)	[Ignition switch: ON]	Approximately 2.2 V

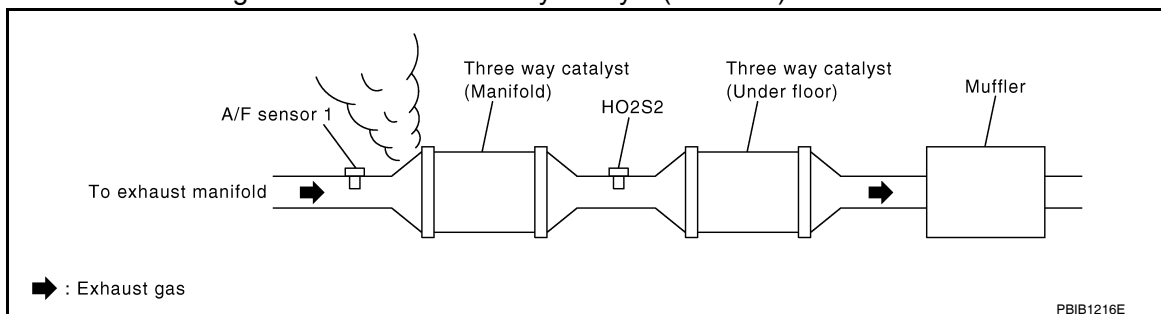
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150580

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Listen for an intake air leak after the mass air flow sensor.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

[QR25DE]

< SERVICE INFORMATION >

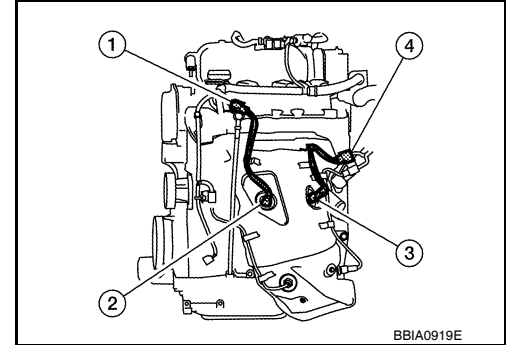
2. Check PCV hose connection.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace.

3. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector.
 - Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector (1)
 - Air fuel ratio (A/F) sensor 1 (Bank 1) (2)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) (3)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector (4)
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.



Bank	A/F sensor 1 terminal	ECM terminal
1	1	45
	2	49
2	1	53
	2	57

Continuity should exist.

5. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor terminal	ECM terminal	A/F sensor terminal	ECM terminal
1	45	1	53
2	49	2	57

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-1185, "Fuel Pressure Check"](#).
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1185, "Fuel Pressure Check"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-1639](#).)
- Fuel pressure regulator (Refer to [EC-1185, "Fuel Pressure Check"](#).)
- Fuel lines (Refer to [EM-148](#).)
- Fuel filter for clogging

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[QR25DE]

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III.

At idling : 1.0 - 4.0 g·m/sec

At 2,500 rpm : 4.0 - 10.0 g·m/sec

With GST

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check mass air flow sensor signal in Service \$01 with GST.

At idling : 1.0 - 4.0 g·m/sec

At 2,500 rpm : 4.0 - 10.0 g·m/sec

OK or NG

OK >> GO TO 7.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to [EC-1273](#).

7. CHECK FUNCTION OF FUEL INJECTORS

With CONSULT-III

1. Let engine idle.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Check that each circuit produces a momentary engine speed drop.

Without CONSULT-III

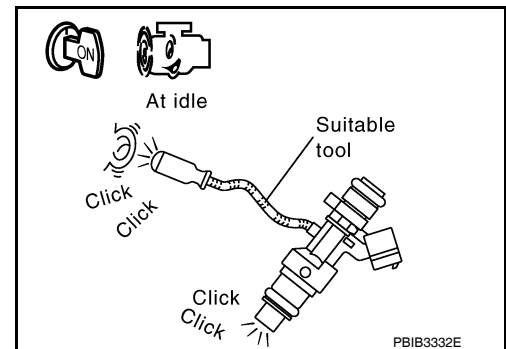
1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

OK or NG

OK >> GO TO 8.

NG >> Perform trouble diagnosis for [EC-1634](#).



8. CHECK FUEL INJECTOR

1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch OFF.
3. Reconnect all harness connectors disconnected.
4. Remove fuel tube assembly. Refer to [EM-148](#).
Keep fuel hose and all fuel injectors connected to fuel tube.
The fuel injector harness connectors should remain connected.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each fuel injector.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION

[QR25DE]

< SERVICE INFORMATION >

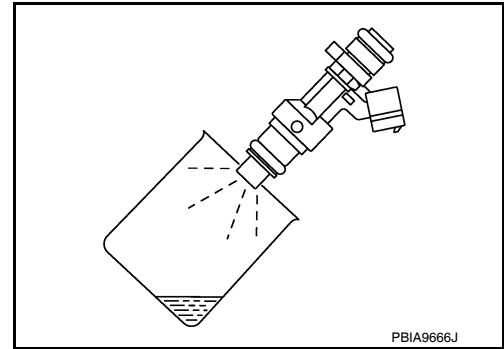
7. Crank engine for approximately 3 seconds. Check that fuel sprays out from fuel injectors.

Fuel should be sprayed evenly for each fuel injector.

OK or NG

OK >> GO TO 9.

NG >> Replace fuel injectors from which fuel does not spray out. Refer to [EM-148, "Removal and Installation"](#). Always replace O-ring with new ones.



9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

A

EC

C

D

E

F

G

H

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J

K

L

M

N

O

P

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[QR25DE]

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

On Board Diagnosis Logic

INFOID:000000006150581

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (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
Air fuel ratio (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 0172 (Bank 1)	Fuel injection system too rich	• Fuel injection system does not operate properly. • The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)	• Air fuel ratio (A/F) sensor 1 • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure • Mass air flow sensor
P0175 0175 (Bank 2)			

DTC Confirmation Procedure

INFOID:000000006150582

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

④ WITH CONSULT-III

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 and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
4. Clear the self-learning control coefficient by touching "CLEAR".
5. Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction.
Performing the following procedure is advised.
 - a. 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.
 - b. If engine starts, go to [EC-1389, "Diagnosis Procedure"](#).
If engine does not start, check exhaust and intake air leakage visually.
6. Keep engine at idle for at least 5 minutes.
7. Check 1st trip DTC.
8. The 1st trip DTC P0172 or P0175 should be detected at this stage, if a malfunction exists. If so, go to [EC-1389, "Diagnosis Procedure"](#).
NOTE:
If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.
 - a. Turn ignition switch OFF and wait at least 10 seconds.
 - b. Start engine.
 - c. Maintain the following conditions for at least 10 consecutive minutes.
Hold the accelerator pedal as steady as possible.

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[QR25DE]

VHCL SPEED SE	50 - 120 km/h (31 - 75 MPH)
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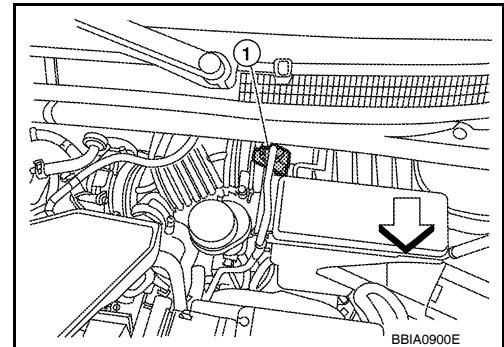
CAUTION:

Always drive vehicle at a safe speed.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-1389, "Diagnosis Procedure"](#).

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. Disconnect mass air flow sensor (1) harness connector.
 - ⇐: Vehicle front
- 4. Restart engine and let idle for at least 5 seconds.
- 5. Stop engine and reconnect mass air flow sensor harness connector.
- 6. Select Service \$03 with GST. Check that DTC P0102 is detected.
- 7. Select Service \$04 with GST and erase the DTC P0102.



- 8. Start engine.
If it is difficult to start engine, the fuel injection system has a malfunction.

Performing the following procedure is advised.

- a. 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.

- b. If engine starts, go to [EC-1389, "Diagnosis Procedure"](#).
If engine does not start, check exhaust and intake air leakage visually.
- 9. Keep engine at idle for at least 5 minutes.

- 10. Check 1st trip DTC.

- 11. The 1st trip DTC P0172 or P0175 should be detected at this stage, if a malfunction exists. If so, go to [EC-1389, "Diagnosis Procedure"](#).

NOTE:

If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

- a. Turn ignition switch OFF and wait at least 10 seconds.
- b. Start engine.
- c. 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.

- d. Check 1st trip DTC.
- e. If 1st trip DTC is detected, go to [EC-1389, "Diagnosis Procedure"](#).

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

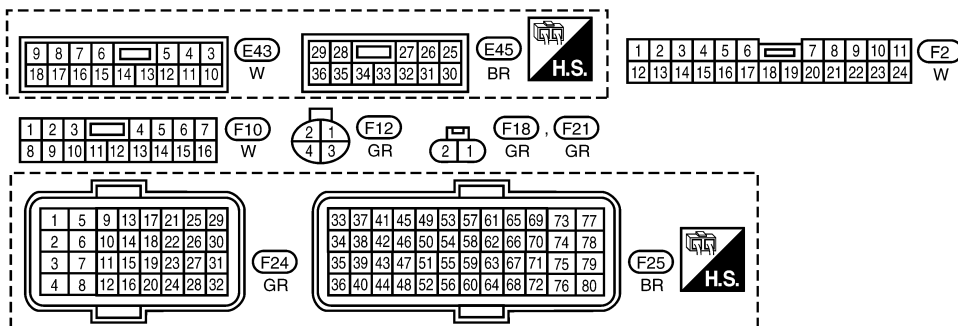
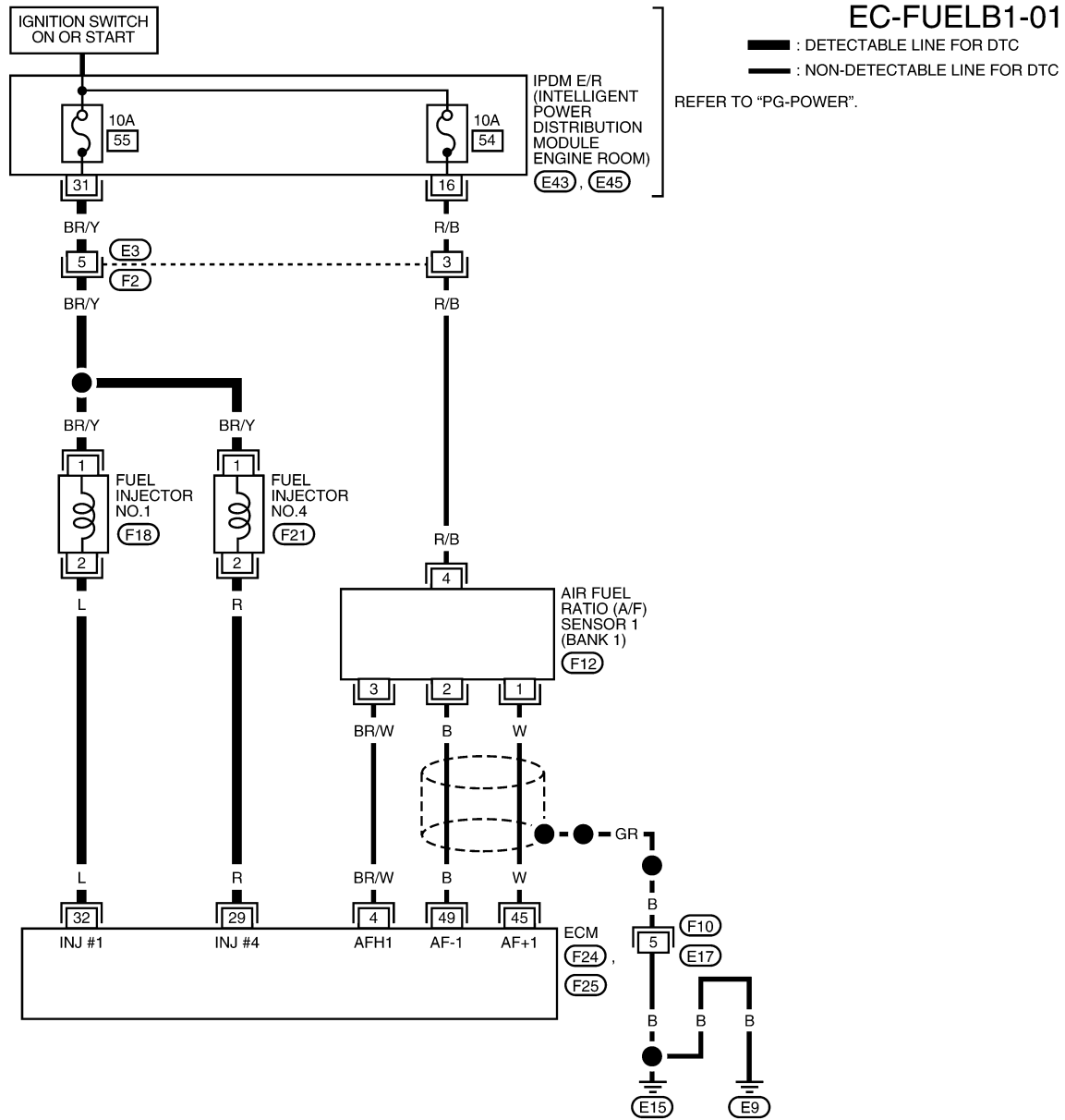
< SERVICE INFORMATION >

[QR25DE]

INFOID:000000006150583

Wiring Diagram

BANK 1



ABBWA0663GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

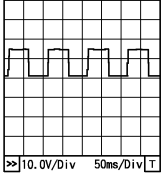
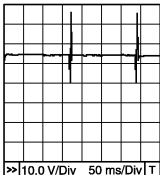
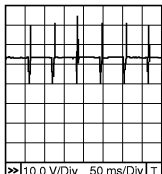
CAUTION:

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	BR/W	A/F sensor 1 heater (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed (More than 140 seconds after starting engine) 	Approximately 2.9 - 8.8 V★  <small>PBIA8148J</small>
29 32	R L	Fuel injector No. 4 Fuel injector No. 1	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIB0529E</small>
			[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	BATTERY VOLTAGE (11 - 14 V)★  <small>PBIA4943J</small>
45	W	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	Approximately 1.8 V Output voltage varies with air fuel ratio.
49	B	A/F sensor 1 (Bank 1)	[Ignition switch: ON]	Approximately 2.2 V

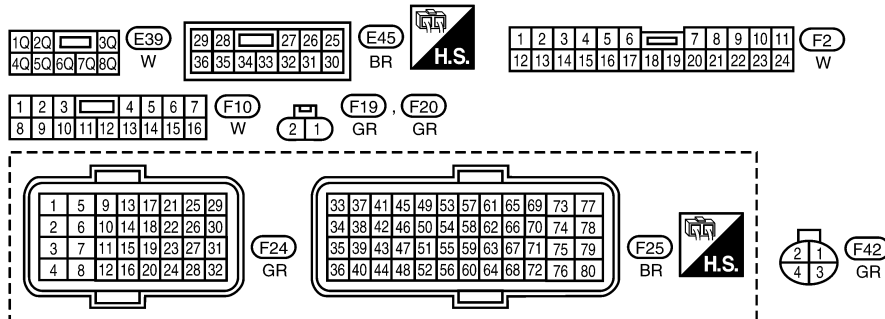
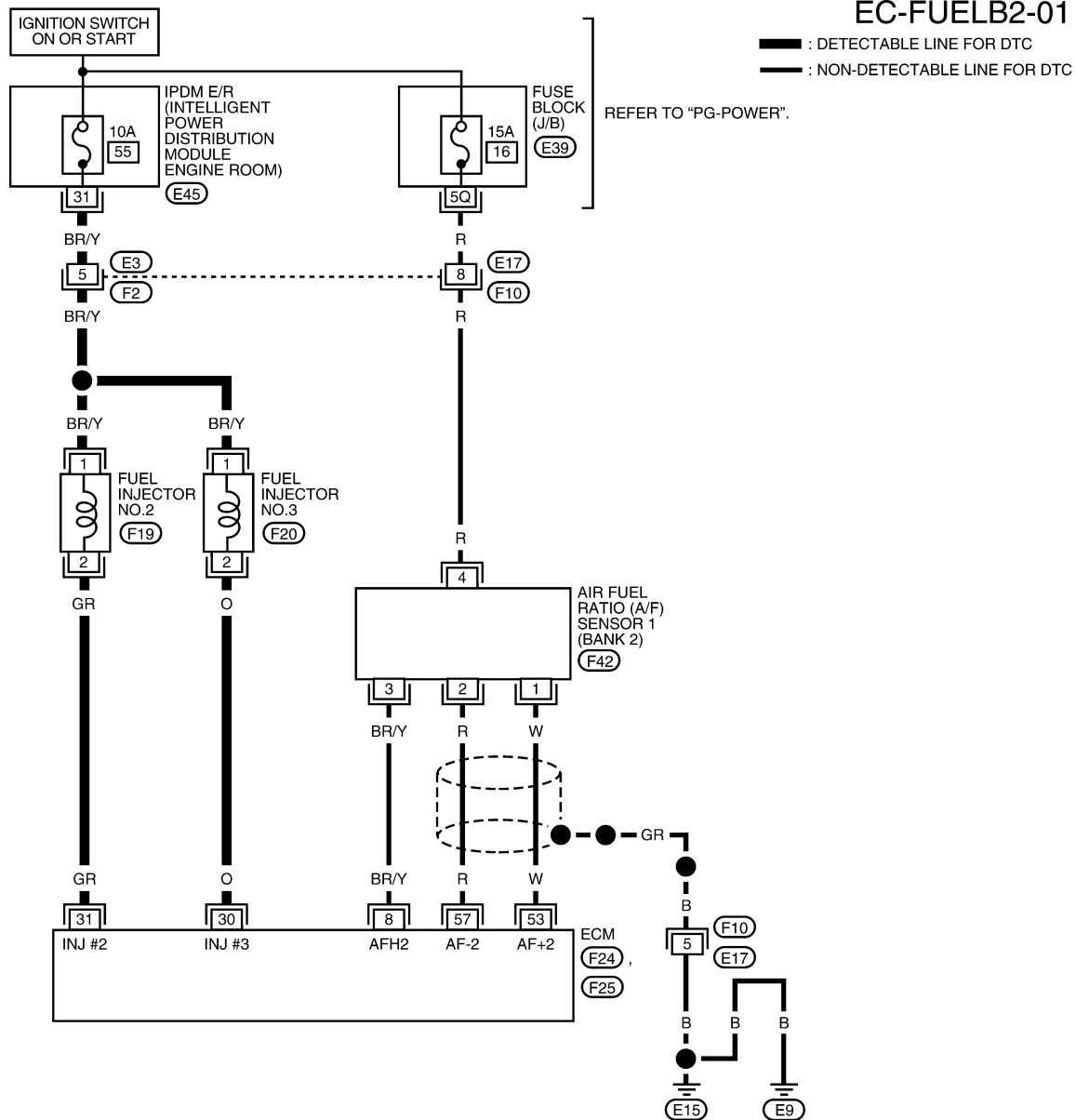
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

[QR25DE]

< SERVICE INFORMATION >

BANK 2



ABBWA0664GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

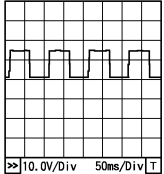
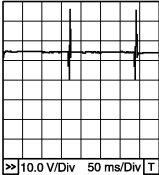
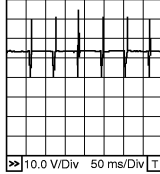
CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/Y	A/F sensor 1 heater (Bank 2)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★  PBIAB148J
30 31	O GR	Fuel injector No. 3 Fuel injector No. 2	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	BATTERY VOLTAGE (11 - 14 V)★  PBIAB0529E
			[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14 V)★  PBIAB4943J
53	W	A/F sensor 1 (Bank 2)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
57	R	A/F sensor 1 (Bank 2)	[Ignition switch: ON]	Approximately 2.2 V

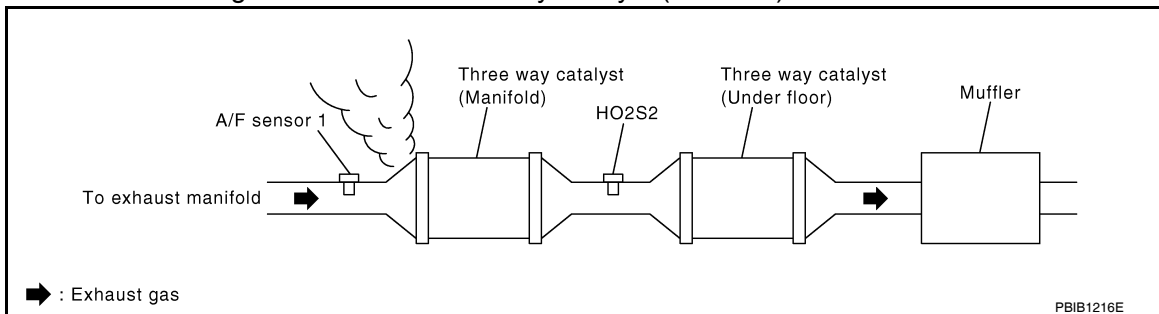
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150584

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Listen for an intake air leak after the mass air flow sensor.

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

[QR25DE]

< SERVICE INFORMATION >

2. Check PCV hose connection.

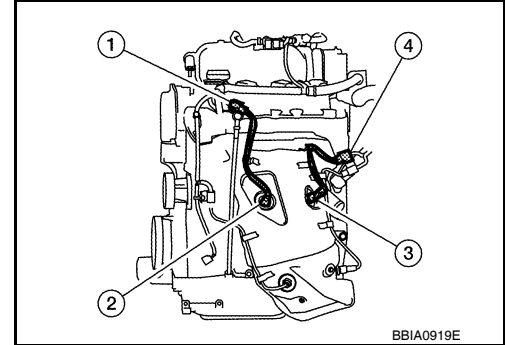
OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector.
 - Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector (1)
 - Air fuel ratio (A/F) sensor 1 (Bank 1) (2)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) (3)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector (4)
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.



Bank	A/F sensor 1 terminal	ECM terminal
1	1	45
	2	49
2	1	53
	2	57

Continuity should exist.

5. Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor terminal	ECM terminal	A/F sensor terminal	ECM terminal
1	45	1	53
2	49	2	57

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-1185, "Fuel Pressure Check"](#).
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1185, "Fuel Pressure Check"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-1639](#).)
- Fuel pressure regulator (Refer to [EC-1185, "Fuel Pressure Check"](#).)

>> Repair or replace.

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION

< SERVICE INFORMATION >

[QR25DE]

6. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-III.

At idling : 1.0 - 4.0 g·m/sec

At 2,500 rpm : 4.0 - 10.0 g·m/sec

With GST

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Check mass air flow sensor signal in Service \$01 with GST.

At idling : 1.0 - 4.0 g·m/sec

At 2,500 rpm : 4.0 - 10.0 g·m/sec

OK or NG

OK >> GO TO 7.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to [EC-1273](#).

7. CHECK FUNCTION OF FUEL INJECTORS

With CONSULT-III

1. Let engine idle.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Check that each circuit produces a momentary engine speed drop.

Without CONSULT-III

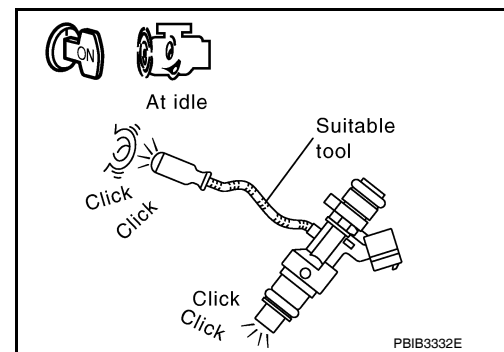
1. Let engine idle.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

OK or NG

OK >> GO TO 8.

NG >> Perform trouble diagnosis for [EC-1634](#).



8. CHECK FUEL INJECTOR

1. Remove fuel injector assembly. Refer to [EM-148](#).
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 ignition coil harness connectors.
4. Prepare pans or saucers under each fuel injector.
5. Crank engine for approximately 3 seconds.
Check that fuel does not drip from fuel injectors.

OK or NG

OK (Does not drip.) >> GO TO 9.

NG (Drips.) >> Replace the fuel injectors from which fuel is dripping. Refer to [EM-148. "Removal and Installation"](#). Always replace O-ring with new ones.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

DTC P0181 FTT SENSOR

< SERVICE INFORMATION >

[QR25DE]

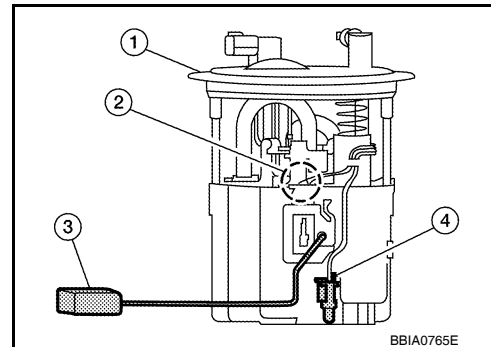
DTC P0181 FTT SENSOR

Component Description

INFOID:000000006150585

The fuel tank temperature sensor (4) 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.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)



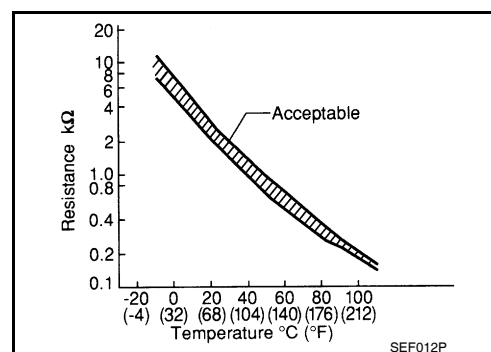
<Reference data>

Fluid temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference values and is measured between ECM terminal 95 (Fuel tank temperature sensor) and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result damage the ECM's transistor. Use ground other than ECM, such as ground.



On Board Diagnosis Logic

INFOID:000000006150586

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0181 0181	Fuel tank temperature sensor circuit range/performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	<ul style="list-style-type: none"> • Harness or connectors (Fuel tank temperature sensor circuit is open or shorted) • Fuel tank temperature sensor

DTC Confirmation Procedure

INFOID:000000006150587

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-III

1. Turn ignition switch ON wait at least 10 seconds.
2. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-1393. "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to following step.
3. Select "DATA MONITOR" mode with CONSULT-III.
4. Check "COOLAN TEMP/S" value.
If the "COOLAN TEMP/S" is less than 60°C (140°F), the result will be OK.
If the "COOLAN TEMP/S" is above 60°C (140°F), go to the following step.
5. Cool engine down until "COOLAN TEMP/S" signal is less than 60°C (140°F).
6. Wait at least 10 seconds.
7. Check 1st trip DTC.
8. If 1st trip DTC is detected, go to [EC-1393. "Diagnosis Procedure"](#).

WITH GST

DTC P0181 FTT SENSOR

[QR25DE]

< SERVICE INFORMATION >

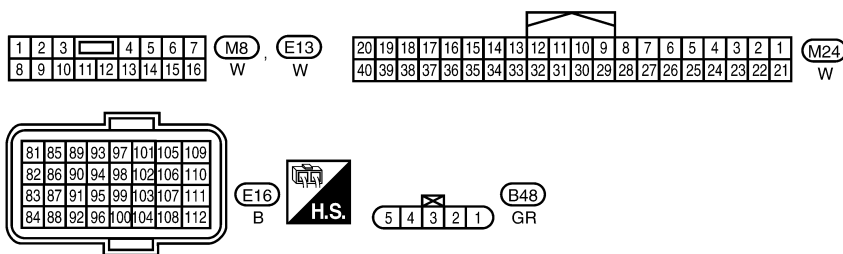
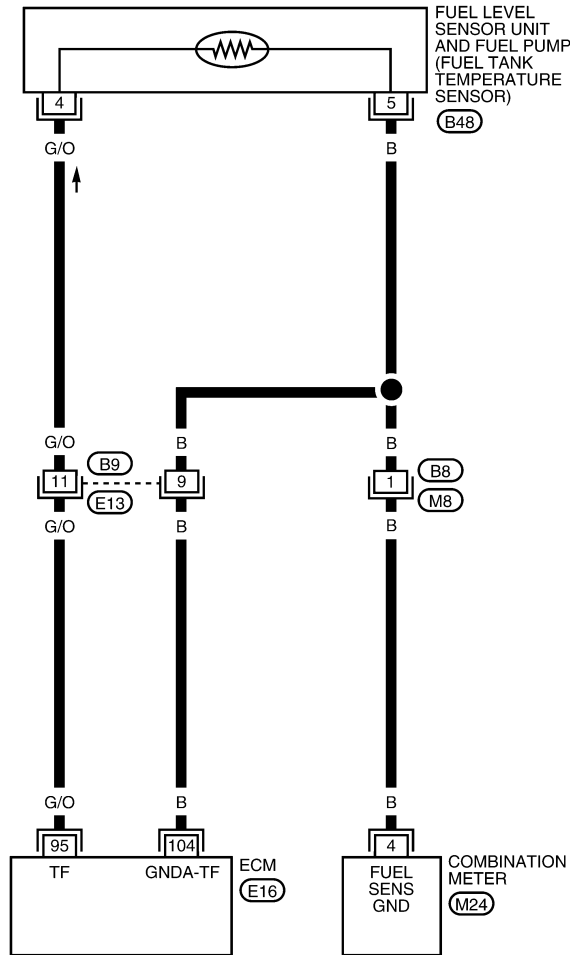
Follow the procedure "WITH CONSULT-III" above.

Wiring Diagram

INFOID:000000006150588

EC-FTTS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Diagnosis Procedure

INFOID:000000006150589

1. CHECK GROUND CONNECTIONS

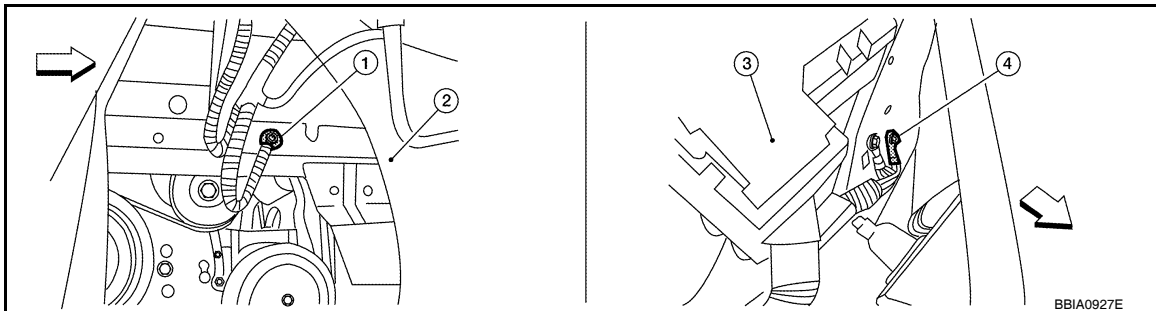
1. Turn ignition switch OFF.

DTC P0181 FTT SENSOR

[QR25DE]

< SERVICE INFORMATION >

- Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



⇐: Vehicle front

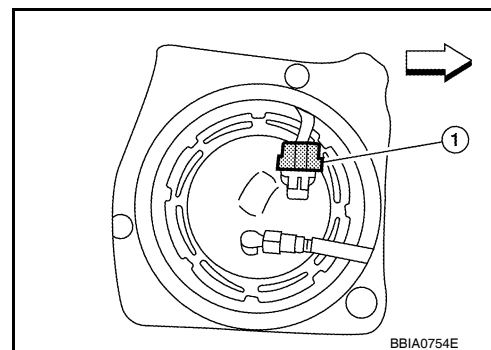
- Body ground E9 (view with front wheel RH and fender protector RH removed.)
- Washer tank
- Fuse and fusible link box
- Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect "fuel level sensor unit and fuel pump" harness connector (1).
- ⇐: Vehicle front
- Turn ignition switch ON.

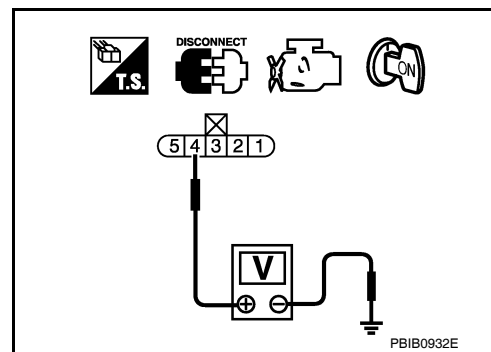


- Check voltage between "fuel level sensor unit and fuel pump" terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness for open or short between ECM and "fuel level sensor unit and fuel pump"

>> Repair open circuit or short to ground or short to power in harness or connector.

4. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect combination meter harness connector.

DTC P0181 FTT SENSOR

[QR25DE]

< SERVICE INFORMATION >

3. Check harness continuity between "fuel level sensor unit and fuel pump" terminal 5 and combination meter terminal 4, ECM terminal 104. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B8, M8
- Harness connectors B9, E13
- Harness for open or short between "fuel level sensor unit and fuel pump" and combination meter.
- Harness for open or short between "fuel level sensor unit and fuel pump" and ECM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, [EC-1395, "Component Inspection"](#).

OK or NG

OK >> GO TO 7.

NG >> Replace "fuel level sensor unit and fuel pump". Refer to [FL-6, "Removal and Installation"](#).

7. CHECK INTERMITTENT INCIDENT

Perform [EC-1236](#).

>> **INSPECTION END**

Component Inspection

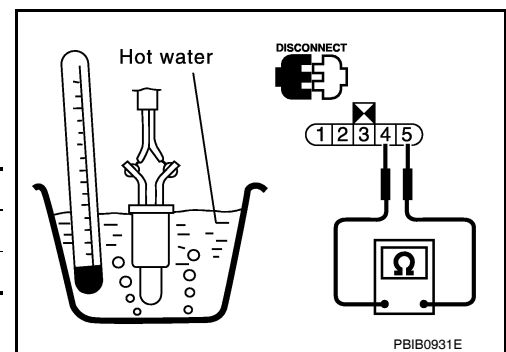
INFOID:000000006150590

FUEL TANK TEMPERATURE SENSOR

1. Check resistance between "fuel level sensor unit and fuel pump" terminal 4 and 5 by heating with hot water as shown in the figure. Refer to [FL-6, "Removal and Installation"](#) and [EC-1393, "Wiring Diagram"](#).

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

2. If NG, replace "fuel level sensor unit and fuel pump". Refer to [FL-6, "Removal and Installation"](#) and [EC-1393, "Wiring Diagram"](#).



DTC P0182, P0183 FTT SENSOR

< SERVICE INFORMATION >

[QR25DE]

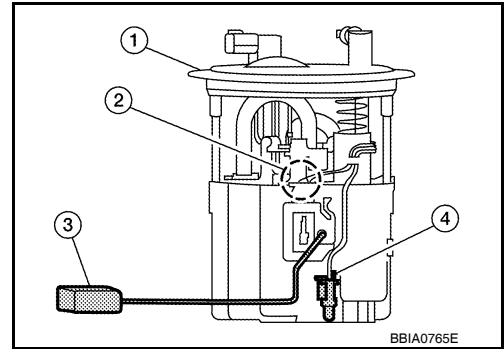
DTC P0182, P0183 FTT SENSOR

Component Description

INFOID:000000006150592

The fuel tank temperature sensor (4) 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.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)



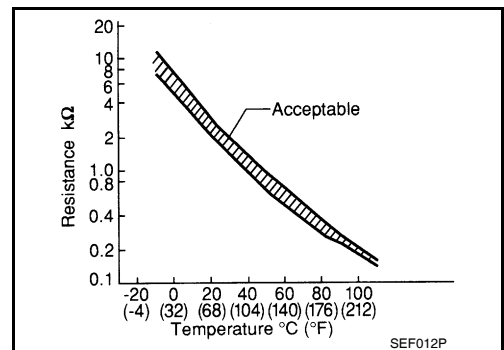
<Reference data>

Fluid temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference values and is measured between ECM terminal 95 (Fuel tank temperature sensor) and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result damage the ECM's transistor. Use ground other than ECM, such as ground.



On Board Diagnosis Logic

INFOID:000000006150593

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182 0182	Fuel tank temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Fuel tank temperature sensor circuit is open or shorted.) • Fuel tank temperature sensor
P0183 0183	Fuel tank temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006150594

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1397. "Diagnosis Procedure"](#).

DTC P0182, P0183 FTT SENSOR

< SERVICE INFORMATION >

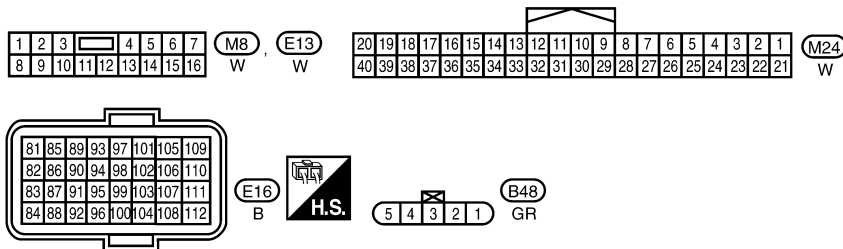
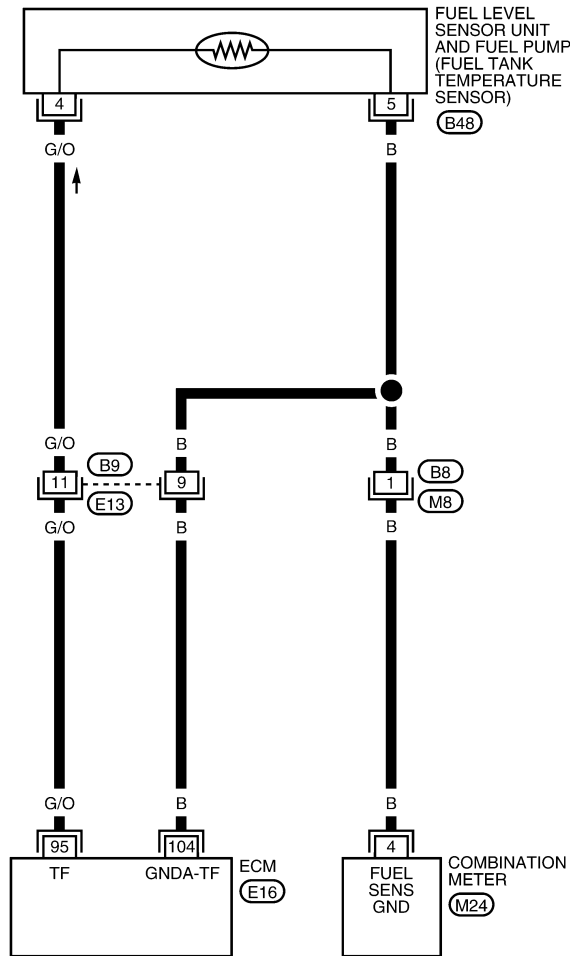
[QR25DE]

Wiring Diagram

INFOID:000000006150595

EC-FTTS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Diagnosis Procedure

INFOID:000000006150596

1. CHECK GROUND CONNECTIONS

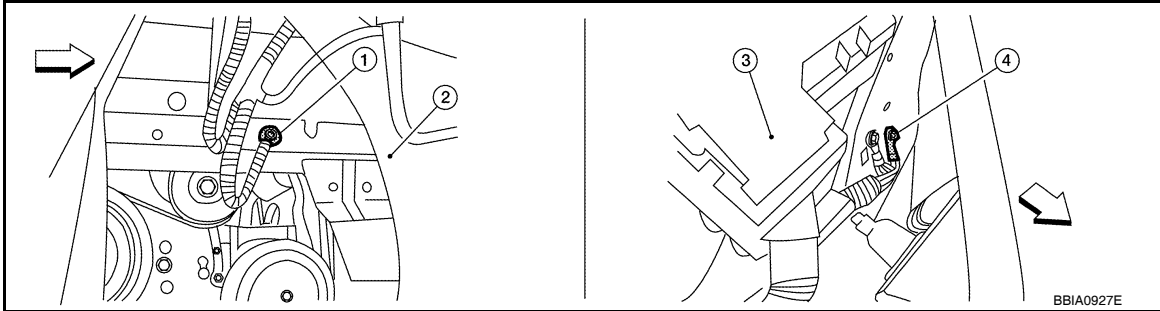
1. Turn ignition switch OFF.
2. Loosen and retighten ground screw on the body.

DTC P0182, P0183 FTT SENSOR

< SERVICE INFORMATION >

[QR25DE]

Refer to [EC-1242, "Ground Inspection"](#).



⇐: Vehicle front

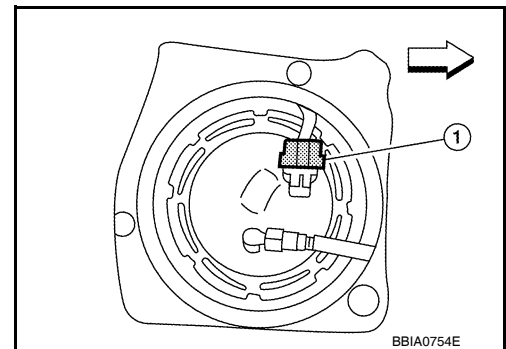
1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect "fuel level sensor unit and fuel pump" harness connector (1).
- ⇐: Vehicle front
2. Turn ignition switch ON.

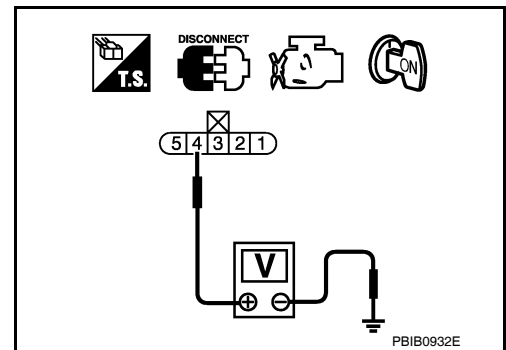


3. Check voltage between "fuel level sensor unit and fuel pump" terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness for open or short to ground or short between ECM and "fuel level sensor unit and fuel pump"

>> Repair open circuit or 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 combination meter harness connector.
3. Check harness continuity between "fuel level sensor unit and fuel pump" terminal 5 and combination meter terminal 4, ECM terminal 104. Refer to Wiring Diagram.

DTC P0182, P0183 FTT SENSOR

< SERVICE INFORMATION >

[QR25DE]

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B8, M8
- Harness connectors B9, E13
- Harness for open or short between "fuel level sensor unit and fuel pump" and combination meter
- Harness for open or short between "fuel level sensor unit and fuel pump" and ECM

>> Repair open circuit or short to ground or short to power in harness or connector.

6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, [EC-1399, "Component Inspection"](#).

OK or NG

OK >> GO TO 7.

NG >> Replace "fuel level sensor unit and fuel pump". Refer to [FL-6, "Removal and Installation"](#).

7. CHECK INTERMITTENT INCIDENT

Perform [EC-1236](#).

>> **INSPECTION END**

Component Inspection

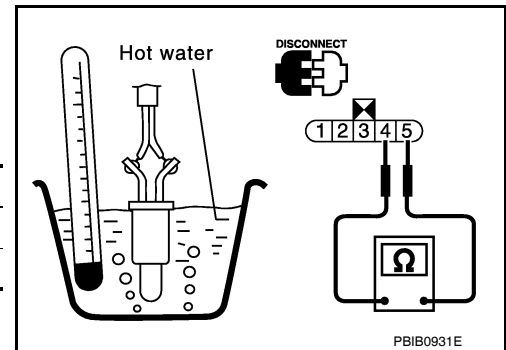
INFOID:000000006150597

FUEL TANK TEMPERATURE SENSOR

1. Check resistance between "fuel level sensor unit and fuel pump" terminal 4 and 5 by heating with hot water as shown in the figure. Refer to [FL-6, "Removal and Installation"](#) and [EC-1393, "Wiring Diagram"](#).

Temperature [°C (°F)]	Resistance (kΩ)
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

2. If NG, replace "fuel level sensor unit and fuel pump". Refer to [FL-6, "Removal and Installation"](#) and [EC-1393, "Wiring Diagram"](#).



DTC P0222, P0223 TP SENSOR

< SERVICE INFORMATION >

[QR25DE]

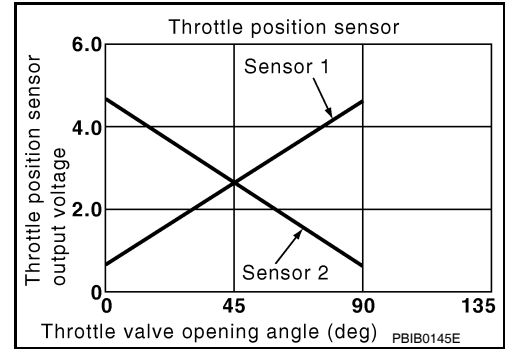
DTC P0222, P0223 TP SENSOR

Component Description

INFOID:000000006150599

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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. The ECM judges the current opening angle of the throttle valve from these signals and controls the throttle valve opening signal in response to driving conditions via the throttle control motor.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150600

Specification data are reference values.

Monitor item	Condition	Specification
TP SEN 1-B1 TP SEN 2-B1*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	More than 0.36 V
	• Selector lever: D (CVT), 1st (M/T) Accelerator pedal: Fully depressed	Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:000000006150601

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P0222 or P0223 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1520](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (TP sensor 1 circuit is open or shorted.) (APP sensor 2 circuit is shorted.) • Electric throttle control actuator (TP sensor 1) • Accelerator pedal position sensor (APP sensor 2)
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL illuminates.

Engine operation condition in fail-safe mode

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. So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006150602

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.

DTC P0222, P0223 TP SENSOR

[QR25DE]

< SERVICE INFORMATION >

2. Check DTC.
3. If DTC is detected, go to [EC-1402, "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006150603

EC-TPS1-01

A

EC

C

D

E

F

G

H

I

J

K

L

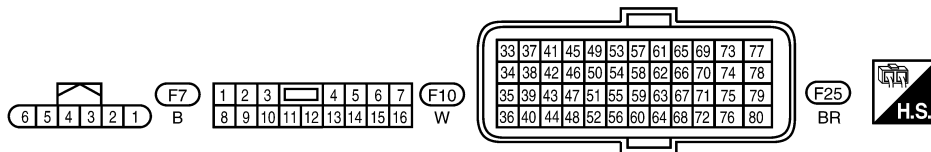
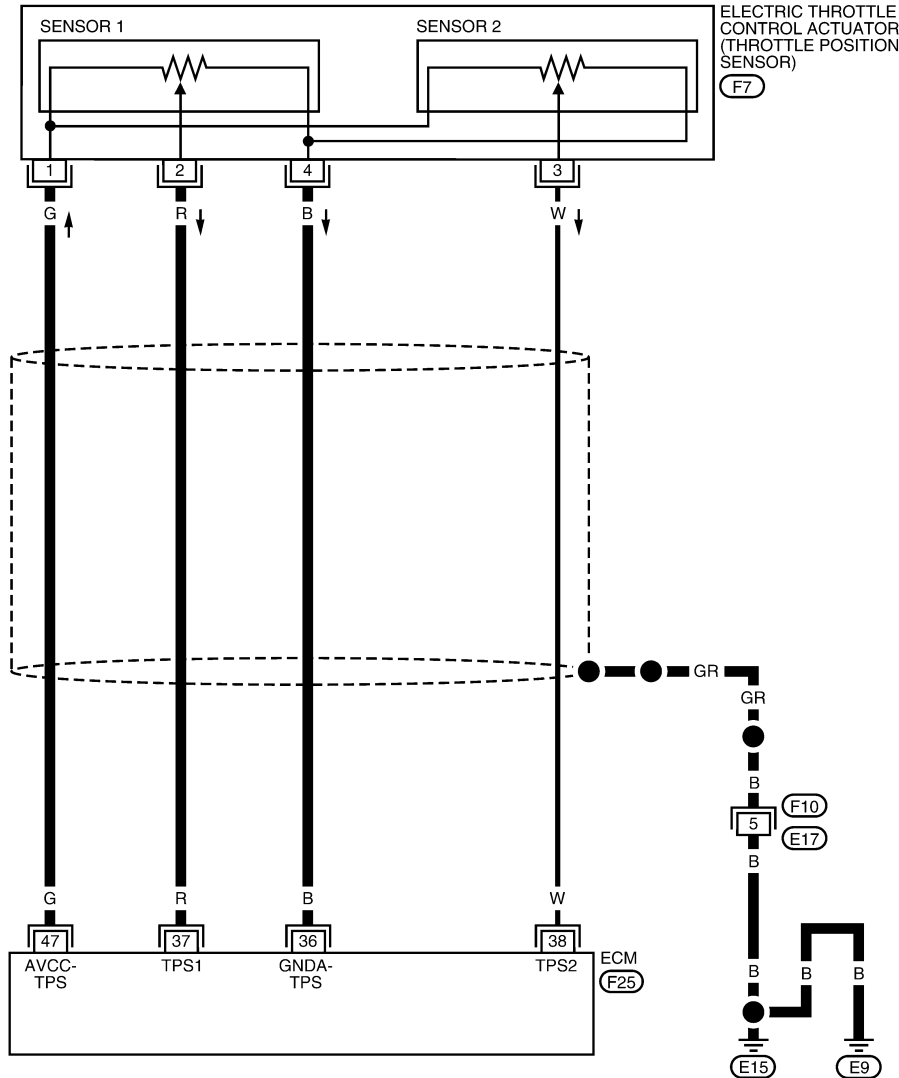
M

N

O

P

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

DTC P0222, P0223 TP SENSOR

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

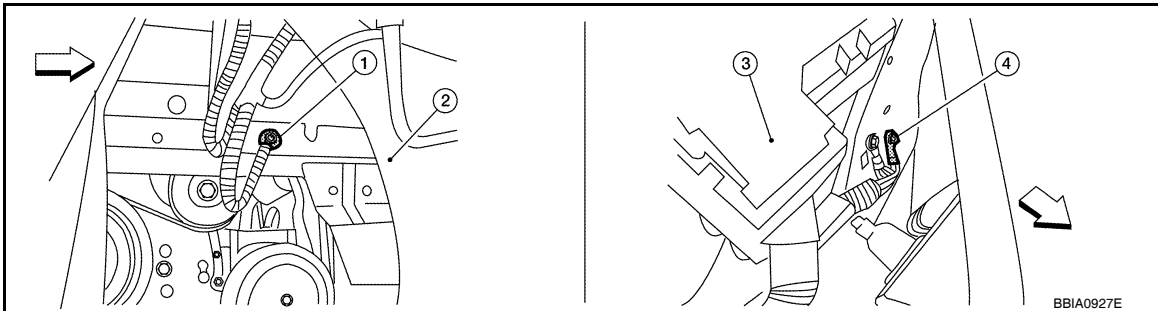
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
36	B	Sensor ground (Throttle position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
37	R	Throttle position sensor 1	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
38	W	Throttle position sensor 2	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
47	G	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

INFOID:000000006150604

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242. "Ground Inspection"](#).



↔: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

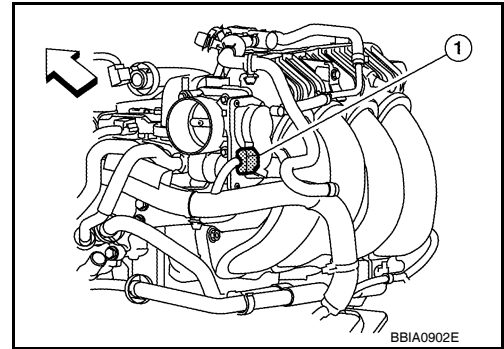
2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

DTC P0222, P0223 TP SENSOR

[QR25DE]

< SERVICE INFORMATION >

1. Disconnect electric throttle control actuator harness connector (1).
 - ⇐: Vehicle front
2. Turn ignition switch ON.

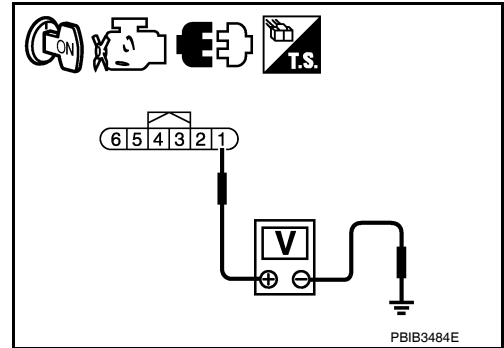


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness connectors.



3. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 36 and electric throttle control actuator terminal 4. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 37 and electric throttle control actuator terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-1404, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-135, "Removal and Installation"](#).

>> **INSPECTION END**

DTC P0222, P0223 TP SENSOR

< SERVICE INFORMATION >

[QR25DE]

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

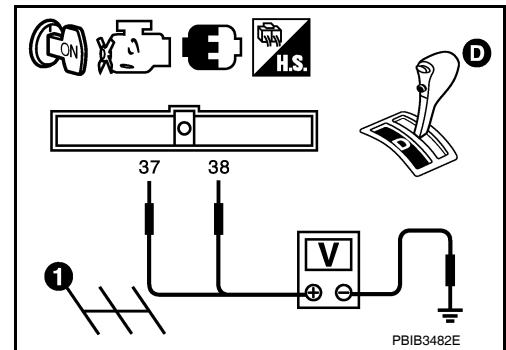
INFOID:000000006150605

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform [EC-1183](#). "Throttle Valve Closed Position Learning".
3. Turn ignition switch ON.
4. Set selector lever to D position (CVT) or 1st position (M/T).
5. Check voltage between ECM terminals 37 (TP sensor 1 signal), 38 (TP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
37 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
38 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V

6. If NG, replace electric throttle control actuator. Refer to [EM-135](#). "Removal and Installation".



DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[QR25DE]

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

On Board Diagnosis Logic

INFOID:000000006150607

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
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

- 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 (POS) 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 light 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 0300	Multiple cylinder misfires detected	Multiple cylinder misfire.	<ul style="list-style-type: none"> • Improper spark plug • Insufficient compression • Incorrect fuel pressure • Fuel injector circuit is open or shorted • Fuel injector • Intake air leak • The ignition signal circuit is open or shorted • Lack of fuel • Drive plate or flywheel • Air fuel ratio (A/F) sensor 1 • Incorrect PCV hose connection
P0301 0301	No.1 cylinder misfire detected	No. 1 cylinder misfires.	
P0302 0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	
P0303 0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	
P0304 0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	

DTC Confirmation Procedure

INFOID:000000006150608

CAUTION:

Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and let it idle for approximately 15 minutes.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-1406, "Diagnosis Procedure"](#).

NOTE:

If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

- a. Turn ignition switch OFF and wait at least 10 seconds.

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[QR25DE]

- b. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to table below.

Hold the accelerator pedal as steady as possible.

The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following condition should be satisfied at the same time:

Engine speed	Engine speed in the freeze frame data \pm 400 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) condition	When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F)
	When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F)

Driving time varies according to the engine speed in the freeze frame data.
Refer to the following table.

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

Diagnosis Procedure

INFOID:000000006150609

1. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

OK or NG

- OK >> GO TO 3.
NG >> Repair or replace.

3. PERFORM POWER BALANCE TEST

With CONSULT-III

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

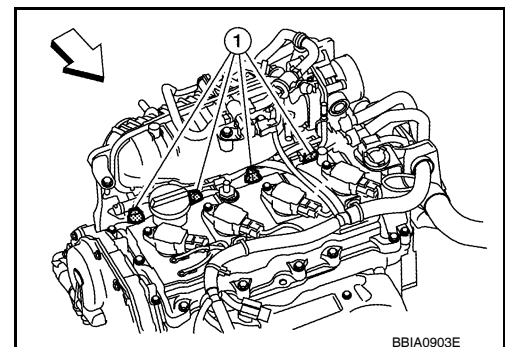
Without CONSULT-III

When disconnecting each fuel injector harness connector (1) one at a time, is there any cylinder which does not produce a momentary engine speed drop?

- : Vehicle front

Yes or No

- Yes >> GO TO 4.
No >> GO TO 9.



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4. CHECK FUEL INJECTOR

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

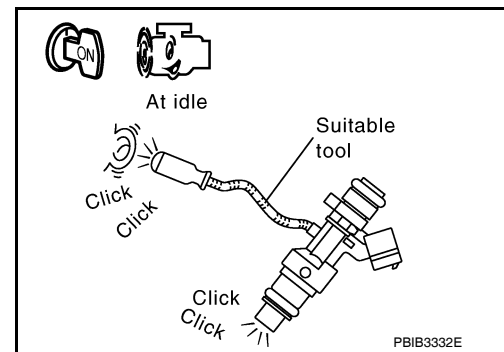
[QR25DE]

Does each fuel injector make an operating sound at idle?

Yes or No

Yes >> GO TO 5.

No >> Check fuel injector(s) and circuit(s). Refer to [EC-1634](#).



5. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

Perform the following procedure in a place with no combustible objects and good ventilation.

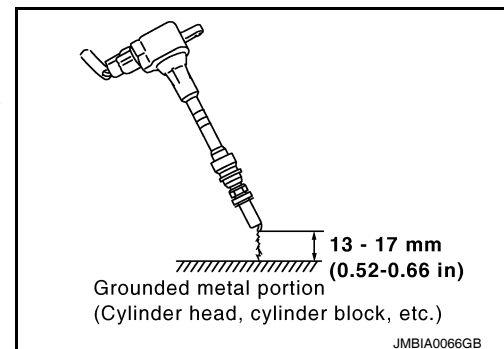
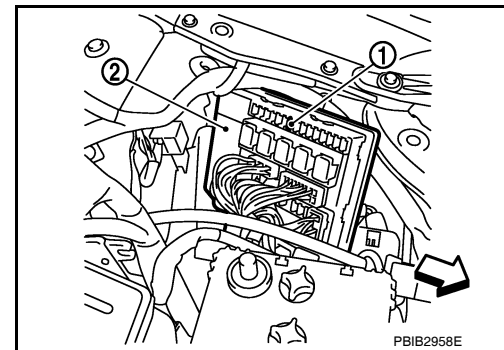
1. Turn ignition switch OFF.
2. Remove fuel pump fuse (1) in IPDM E/R (2) to release fuel pressure.

NOTE:

Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.

- ⇐: Vehicle front

3. Start engine.
4. After engine stalls, crank it two or three 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. Refer to [EM-145, "Removal and Installation"](#) and [EM-146, "Removal and Installation"](#).
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 made.

NOTE:

When the gap is less than 13 mm (0.52 in), a the spark might be generated even if the coil is malfunctioning.

OK or NG

OK >> GO TO 9.

NG >> GO TO 6.

6. CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a non-malfunctioning spark plug.
3. Crank engine for approximately 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[QR25DE]

Spark should be generated.

OK or NG

OK >> GO TO 7.

NG >> Check ignition coil, power transistor and their circuits. Refer to [EC-1644](#).

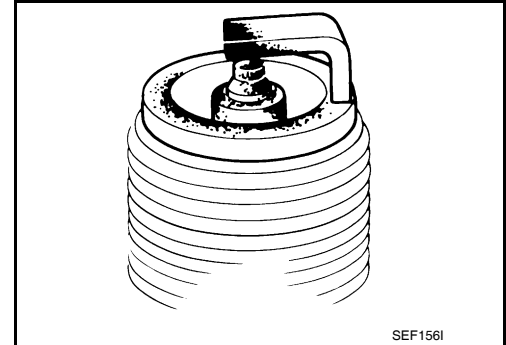
7. CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

OK or NG

OK >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-145, "Removal and Installation"](#).

NG >> 1. Repair or clean spark plug.
2. GO TO 8.



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.

OK or NG

OK >> **INSPECTION END**

NG >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-146, "Removal and Installation"](#).

9. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-175, "On-Vehicle Service"](#).

OK or NG

OK >> GO TO 10.

NG >> 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-1185, "Fuel Pressure Check"](#).
3. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1185, "Fuel Pressure Check"](#).

At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)

OK or NG

OK >> GO TO 12.

NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-1639](#).)
- Fuel pressure regulator (Refer to [EC-1185, "Fuel Pressure Check"](#).)
- Fuel lines (Refer to [EM-148](#).)
- Fuel filter for clogging

>> Repair or replace.

12. CHECK IGNITION TIMING

Check the following items. Refer to [EC-1177, "Basic Inspection"](#).

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[QR25DE]

Items	Specifications
Idle speed	CVT: 800 ± 50 rpm (in P or N position)
	M/T: 650 ± 50 rpm (in Neutral position)
Ignition timing	CVT: 10 ± 5° BTDC (in Neutral position)
	M/T: 10 ± 5° BTDC (in Neutral position)

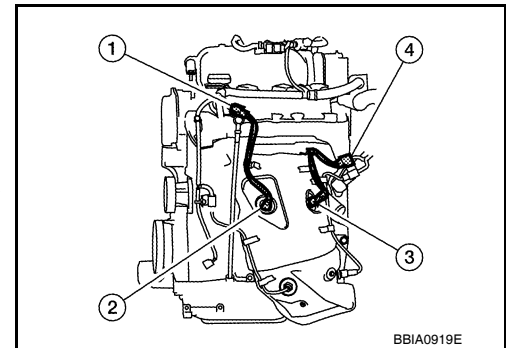
OK or NG

OK >> GO TO 13.

NG >> Follow the [EC-1177, "Basic Inspection"](#).

13. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect air fuel ratio (A/F) sensor 1 harness connector.
 - Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector (1)
 - Air fuel ratio (A/F) sensor 1 (Bank 1) (2)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) (3)
 - Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector (4)
- Disconnect ECM harness connector.
- Check harness continuity between the following terminals. Refer to Wiring Diagram.



Bank	A/F sensor 1 terminal	ECM terminal
1	1	45
	2	49
2	1	53
	2	57

Continuity should exist.

- Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor terminal	ECM terminal	A/F sensor terminal	ECM terminal
1	45	1	53
2	49	2	57

Continuity should not exist.

- Also check harness for short to power.

OK or NG

OK >> GO TO 14.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER

Refer to [EC-1258, "Component Inspection"](#).

OK or NG

OK >> GO TO 16.

NG >> GO TO 15.

15. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to [EM-140, "Removal and Installation"](#).

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.

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

< SERVICE INFORMATION >

[QR25DE]

- 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).

>> INSPECTION END

16. CHECK MASS AIR FLOW SENSOR

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Check mass air flow sensor signal in "DATA MONITOR" mode with CONSULT-III.

At idling : 1.0 - 4.0 g·m/sec
At 2,500 rpm : 4.0 - 10.0 g·m/sec

With GST

1. Start engine and warm it up to normal operating temperature.
2. Check mass air flow sensor signal in Service \$01 with GST.

At idling : 1.0 - 4.0 g·m/sec
At 2,500 rpm : 4.0 - 10.0 g·m/sec

OK or NG

- OK >> GO TO 17.
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to [EC-1273](#).

17. CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in [EC-1194, "Symptom Matrix Chart"](#).

OK or NG

- OK >> GO TO 18.
NG >> Repair or replace.

18. 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 [EC-1144, "Emission-related Diagnostic Information"](#).

>> GO TO 19.

19. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

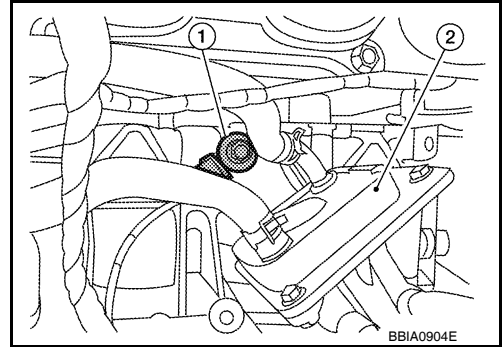
DTC P0327, P0328 KS

Component Description

INFOID:000000006150610

The knock sensor (1) 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.

- Engine oil cooler (2)



On Board Diagnosis Logic

INFOID:000000006150611

The MIL will not illuminate for these self-diagnoses.

DTC No.	Trouble Diagnosis Name	DTC Detected Condition	Possible Cause
P0327 0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Knock sensor circuit is open or shorted.) • Knock sensor
P0328 0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006150612

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Start engine and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1413. "Diagnosis Procedure"](#).

DTC P0327, P0328 KS



[QR25DE]

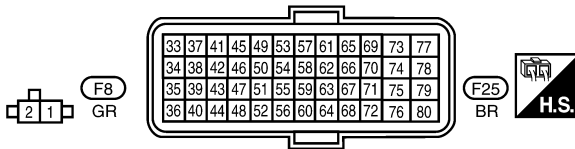
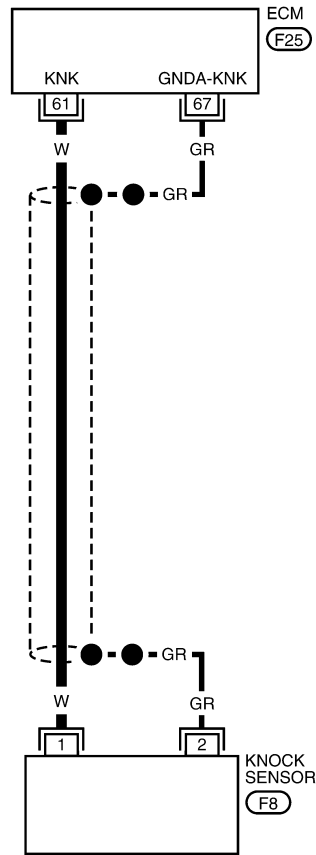
< SERVICE INFORMATION >

Wiring Diagram

INFOID:000000006150613

EC-KS-01

 : DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
61	W	Knock sensor	[Engine is running] • Idle speed	Approximately 2.5 V
67	GR	Sensor ground (Knock sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006150614

1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-I

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check resistance between ECM terminal 61 and ground. Refer to Wiring Diagram.

NOTE:

It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Resistance: Approximately 532 - 588 kΩ [at 20°C (68°F)]

- Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 2.

2. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-II

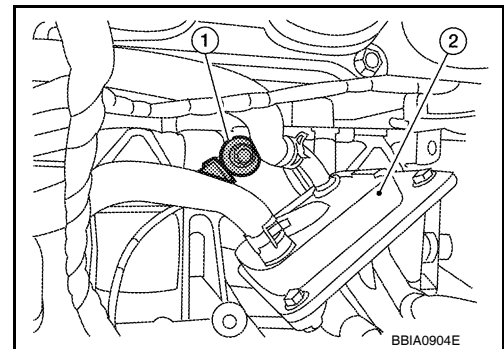
- Disconnect knock sensor (1) harness connector.
- Engine oil cooler (2)
- Check harness continuity between ECM terminal 61 and knock sensor terminal 1. Refer to Wiring Diagram.

Continuity should exist.

- Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK KNOCK SENSOR

Refer to [EC-1414, "Component Inspection"](#).

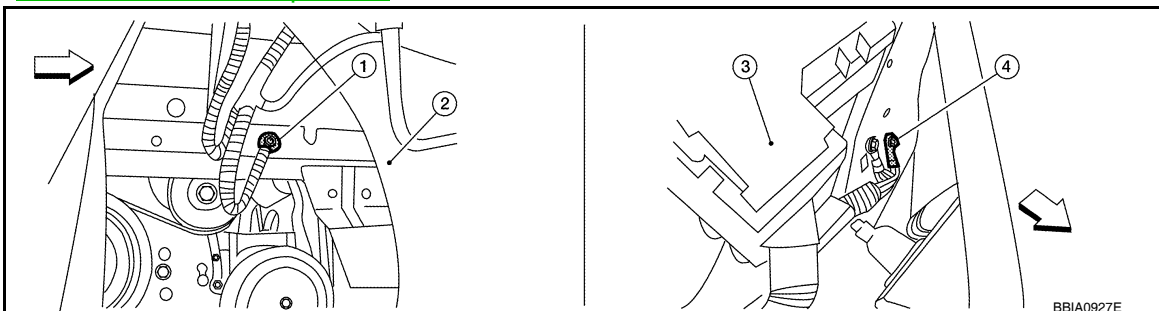
OK or NG

- OK >> GO TO 6.
- NG >> Replace knock sensor. Refer to [EM-189, "Disassembly and Assembly"](#).

4. CHECK GROUND CONNECTIONS

Loosen and retighten ground screws on the body.

Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

OK >> GO TO 5.

NG >> Repair or replace ground connections.

5.CHECK KNOCK SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT

1. Reconnect knock sensor harness connector.
2. Check harness continuity between ECM terminal 67 and knock sensor terminal 2.
Refer to Wiring Diagram.

Continuity should exist

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6.CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150615

KNOCK SENSOR

1. Check resistance between knock sensor terminal 1 and ground.

NOTE:

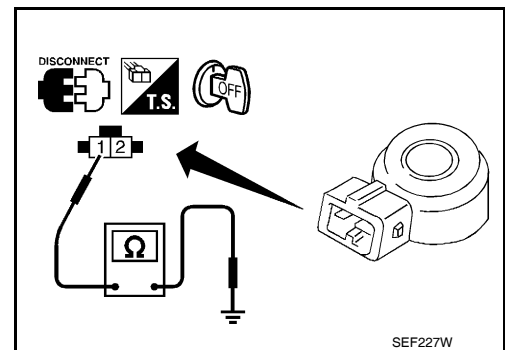
It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Resistance: Approximately 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.

2. If NG, replace knock sensor. Refer to [EM-189](#). "[Disassembly and Assembly](#)".



DTC P0335 CKP SENSOR (POS)

< SERVICE INFORMATION >

[QR25DE]

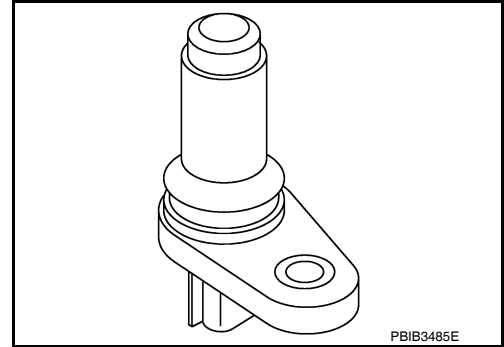
DTC P0335 CKP SENSOR (POS)

Component Description

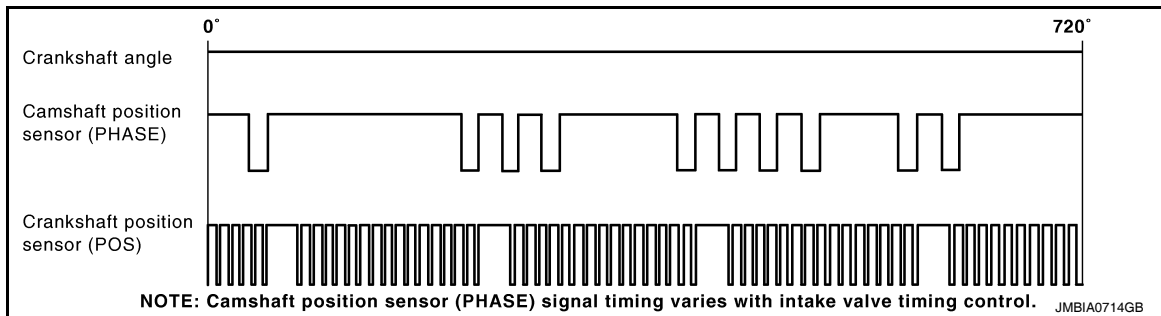
INFOID:000000006150617

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. 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.



PBIB3485E



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150618

Specification data are reference values.

Monitor item	Condition	Specification
ENG SPEED	• Run engine and compare CONSULT-III value with the tachometer indication.	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

INFOID:000000006150619

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor (POS) circuit	<ul style="list-style-type: none"> • The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. • The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. • The crankshaft position sensor (POS) signal is not in the normal pattern during engine running. 	<ul style="list-style-type: none"> • Harness or connectors [Crankshaft position sensor (POS) circuit is open or shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is sorted.) • Crankshaft position sensor (POS) • Accelerator pedal position sensor (APP sensor 2) • Refrigerant pressure sensor • EVAP control system pressure sensor • Signal plate

DTC Confirmation Procedure

INFOID:000000006150620

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

DTC P0335 CKP SENSOR (POS)

[QR25DE]

< SERVICE INFORMATION >

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

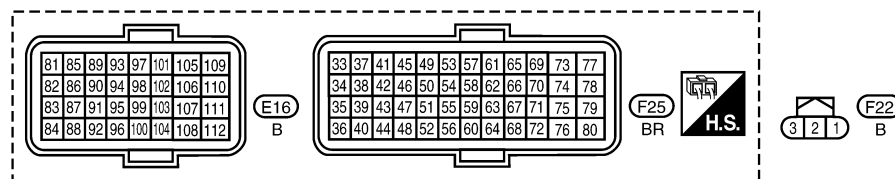
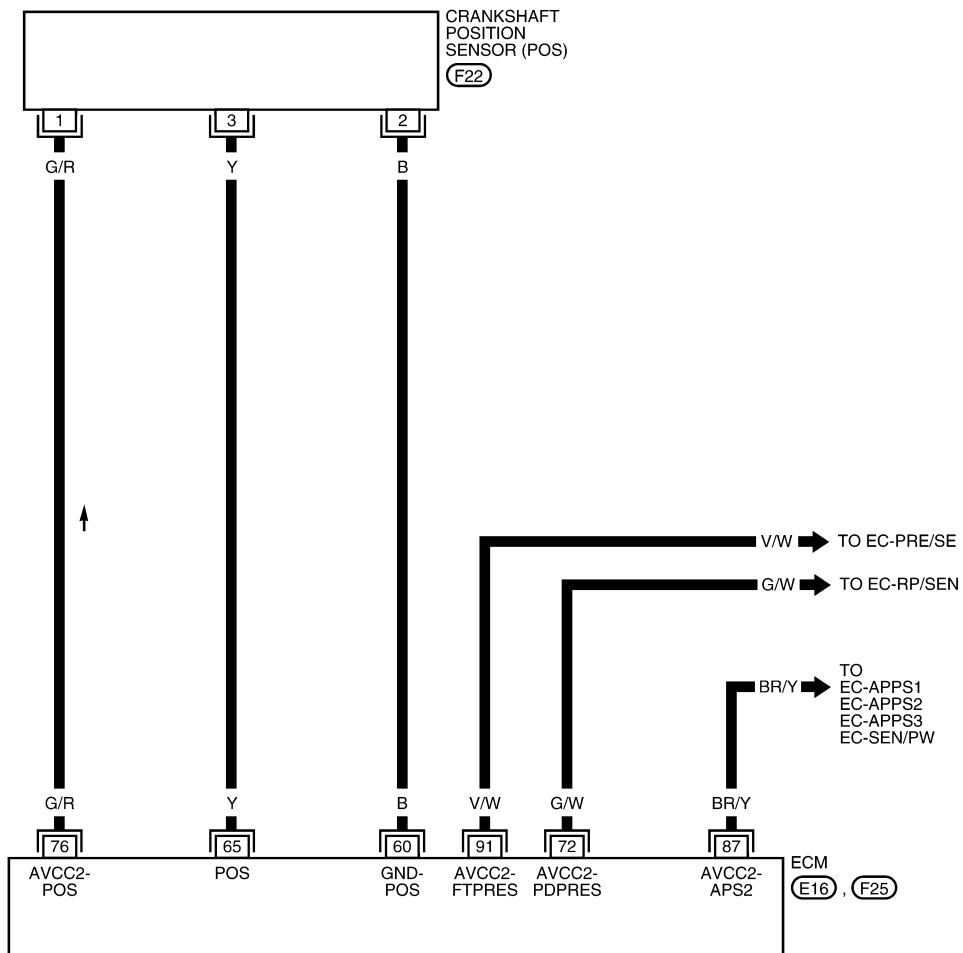
1. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1417. "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006150621

EC-POS-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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DTC P0335 CKP SENSOR (POS)

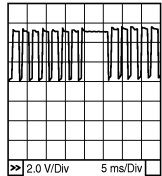
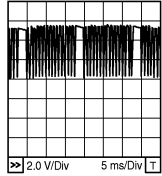
< SERVICE INFORMATION >

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-III.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
60	B	Sensor ground [Crankshaft position sensor (POS)]	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
65	Y	Crankshaft position sensor (POS)	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	Approximately 4.0 V★ 
			[Engine is running] • Engine speed: 2,000 rpm	Approximately 4.0 V★ 
72	G/W	Sensor power supply (Refrigerant pressure sen- sor)	[Ignition switch: ON]	Approximately 5 V
76	G/R	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
87	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
91	V/W	EVAP control system pres- sure sensor power supply	[Ignition switch: ON]	Approximately 5 V

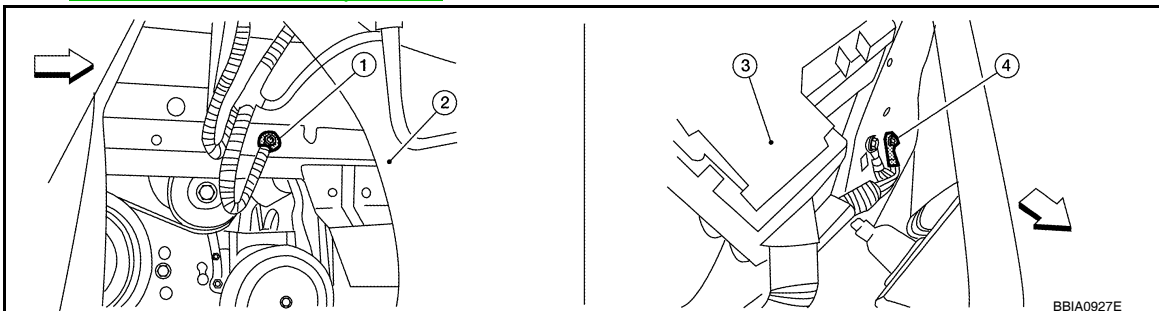
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150622

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



DTC P0335 CKP SENSOR (POS)

[QR25DE]

< SERVICE INFORMATION >

←: Vehicle front

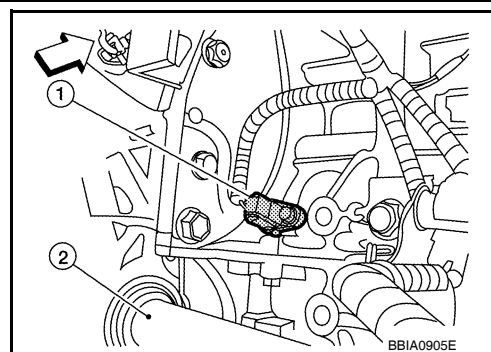
1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT-I

1. Disconnect crankshaft position (CKP) sensor (POS) (1) harness connector.
 - Drive shaft (RH) (2)
2. Turn ignition switch ON.

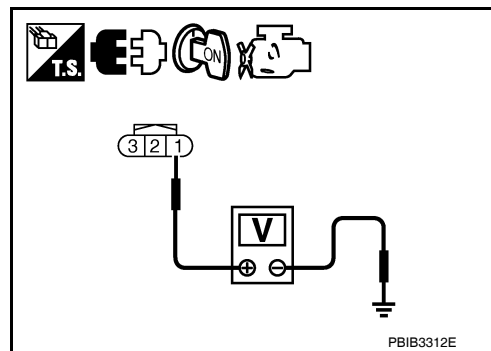


3. Check voltage between CKP sensor (POS) terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5V

OK or NG

- OK >> GO TO 9.
 NG >> GO TO 3.



3. CHECK CKP SENSOR (POS) POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between CKP sensor (POS) terminal 1 and ECM terminal 76. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
 NG >> Repair open circuit.

4. CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
72	Refrigerant pressure sensor terminal 3	EC-1654, "Wiring Diagram"
76	Crankshaft position sensor (POS) terminal 1	EC-1416, "Wiring Diagram"
87	APP sensor terminal 5	EC-1595, "Wiring Diagram"
91	EVAP control system pressure sensor terminal 3	EC-1474, "Wiring Diagram"

OK or NG

DTC P0335 CKP SENSOR (POS)

[QR25DE]

< SERVICE INFORMATION >

- OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5.CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28](#).

OK or NG

- OK >> GO TO 6.
NG >> Replace refrigerant pressure sensor. Refer to [MTC-92, "Removal and Installation for Refrigerant Pressure Sensor"](#).

6.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1478, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

7.CHECK APP SENSOR

Refer to [EC-1598, "Component Inspection"](#).

OK or NG

- OK >> GO TO 13.
NG >> GO TO 8.

8.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> **INSPECTION END**

9.CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between CKP sensor (POS) terminal 2 and ECM terminal 60.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 10.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10.CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between CKP sensor (POS) terminal 3 and ECM terminal 65.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 11.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

11.CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-1420, "Component Inspection"](#).

OK or NG

- OK >> GO TO 12.
NG >> Replace crankshaft position sensor (POS). Refer to [EM-189, "Disassembly and Assembly"](#).

12.CHECK GEAR TOOTH

DTC P0335 CKP SENSOR (POS)

[QR25DE]

< SERVICE INFORMATION >

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 13.

NG >> Replace the signal plate. Refer to [EM-189, "Disassembly and Assembly"](#).

13. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

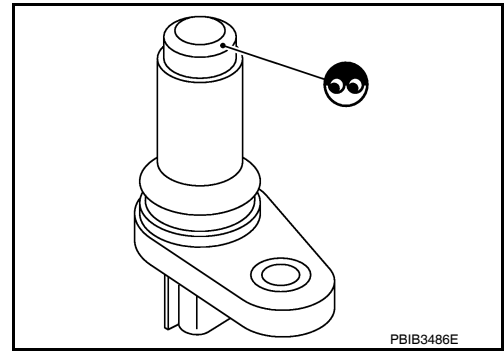
>> **INSPECTION END**

Component Inspection

INFOID:000000006150623

CRANKSHAFT POSITION SENSOR (POS)

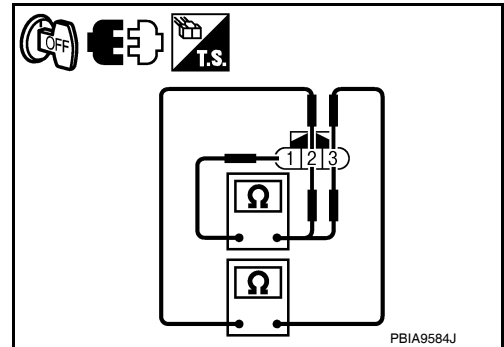
1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor. Refer to [EM-189, "Disassembly and Assembly"](#).
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞
1 (+) - 3 (-)	
2 (+) - 3 (-)	

6. If NG, replace crankshaft position sensor (POS). Refer to [EM-189, "Disassembly and Assembly"](#).



DTC P0340 CMP SENSOR (PHASE)

< SERVICE INFORMATION >

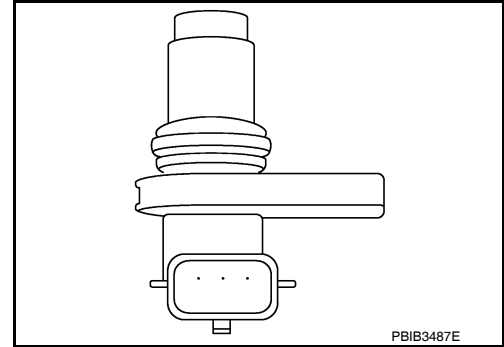
[QR25DE]

DTC P0340 CMP SENSOR (PHASE)

Component Description

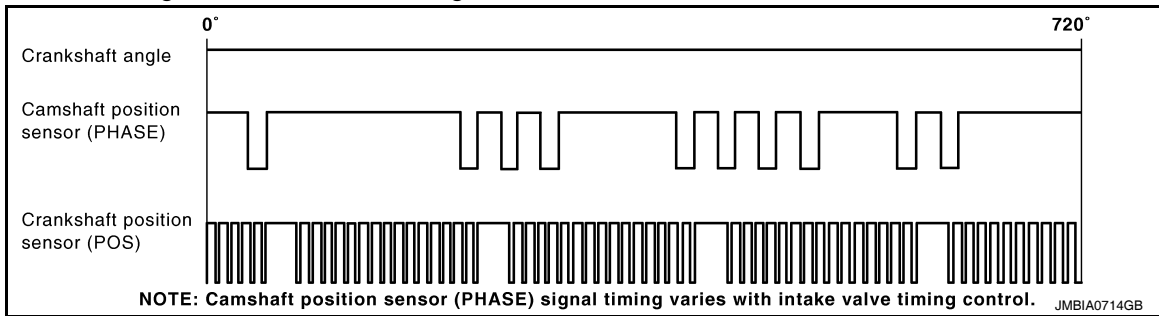
INFOID:000000006150625

The camshaft position sensor (PHASE) senses the protrusion of camshaft (INT) 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.



PBIB3487E

ECM receives the signals as shown in the figure.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150626

Specification data are reference values.

Monitor item	Condition	Specification
ENG SPEED	• Run engine and compare CONSULT-III value with the tachometer indication.	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

INFOID:000000006150627

NOTE:

If DTC P0340 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1520](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor (PHASE) circuit	<ul style="list-style-type: none"> The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. The cylinder No. signal is not set to ECM during engine running. The cylinder No. signal is not in the normal pattern during engine running. 	<ul style="list-style-type: none"> Harness or connectors [Camshaft position sensor (PHASE) circuit is open or shorted.] Camshaft position sensor (PHASE) Camshaft (INT) Starter motor (Refer to SC-11.) Starting system circuit (Refer to SC-11.) Dead (Weak) battery

DTC Confirmation Procedure

INFOID:000000006150628

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V with ignition switch ON.

1. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.

DTC P0340 CMP SENSOR (PHASE)

[QR25DE]

< SERVICE INFORMATION >

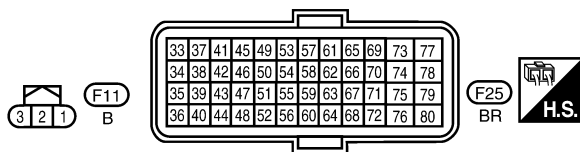
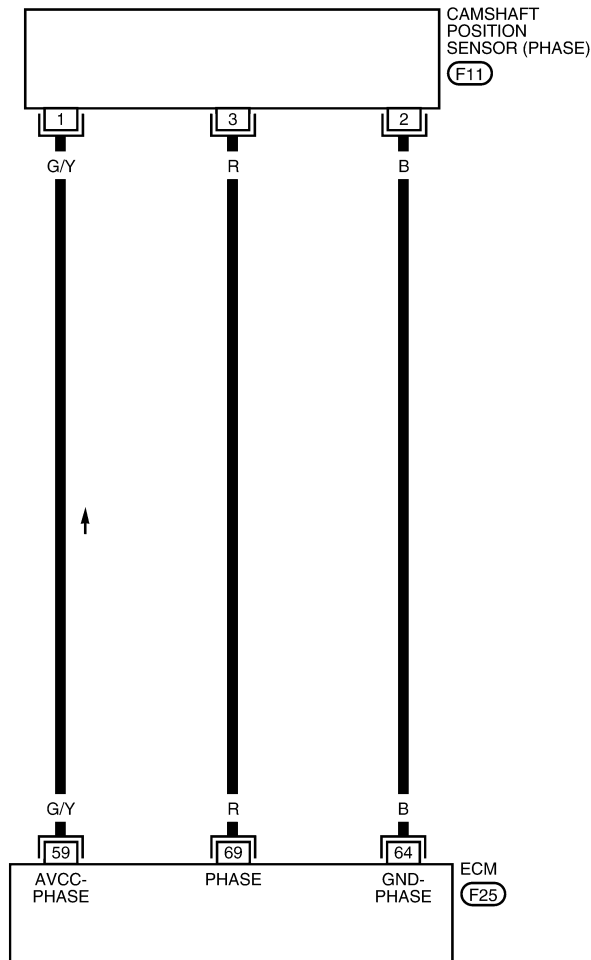
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1423, "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to next step.
4. Maintain engine speed at more than 800 rpm for at least 5 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-1423, "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006150629

EC-PHASE-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



BBWA3041E

DTC P0340 CMP SENSOR (PHASE)


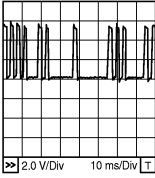
< SERVICE INFORMATION >

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-III.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
59	G/Y	Sensor power supply [Camshaft position sensor (PHASE)]	[Ignition switch: ON]	Approximately 5 V
64	B	Sensor ground [Camshaft position sensor (PHASE)]	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
69	R	Camshaft position sensor (PHASE)	[Engine is running] • Warm-up condition • Idle speed NOTE: The pulse cycle changes depending on rpm at idle	1.0 - 2.0 V★ 
			[Engine is running] • Engine speed: 2,000 rpm	1.0 - 2.0 V★ 

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150630

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

Yes or No

Yes >> GO TO 2.

No >> Check starting system. (Refer to [SC-11.](#))

2. CHECK GROUND CONNECTIONS

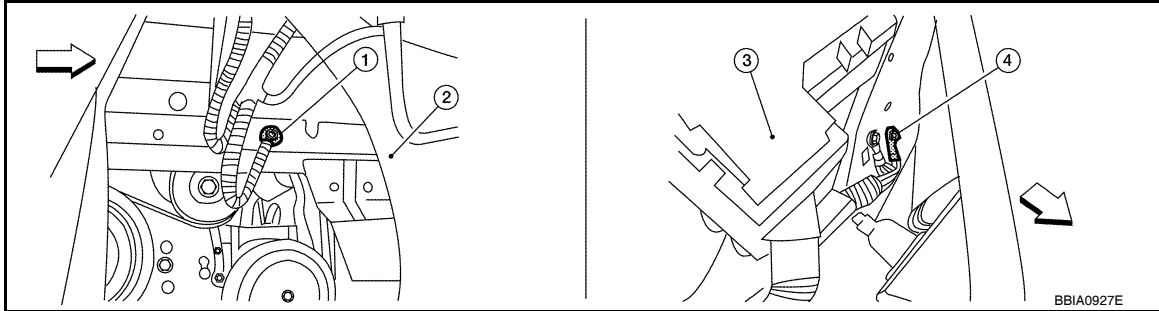
1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.

DTC P0340 CMP SENSOR (PHASE)

[QR25DE]

< SERVICE INFORMATION >

Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

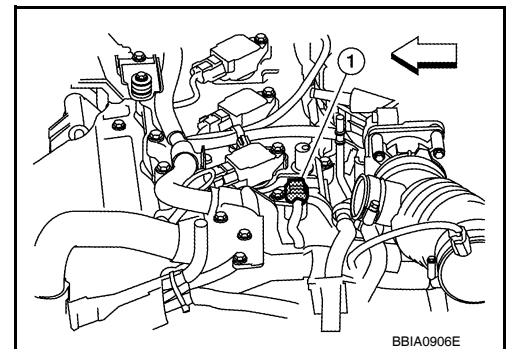
- 1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
- 2. Washer tank
- 3. Fuse and fusible link box
- 4. Body ground E15

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace ground connections.

3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

- 1. Disconnect camshaft position (CMP) sensor (PHASE) (1) harness connector.
 - ←: Vehicle front
- 2. Turn ignition switch ON.

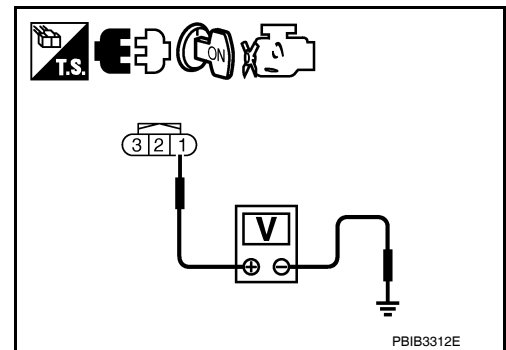


- 3. Check voltage between CMP sensor (PHASE) terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

- 1. Turn ignition switch OFF.
- 2. Disconnect ECM harness connector.
- 3. Check harness continuity between CMP sensor (PHASE) terminal 2 and ECM terminal 64. Refer to Wiring Diagram.

Continuity should exist.

- 4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0340 CMP SENSOR (PHASE)

[QR25DE]

< SERVICE INFORMATION >

5. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between CMP sensor (PHASE) terminal 3 and ECM terminal 69.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-1425. "Component Inspection"](#).

OK or NG

OK >> GO TO 7.

NG >> Replace camshaft position sensor (PHASE). Refer to [EM-153. "Removal and Installation"](#).

7. CHECK CAMSHAFT (INTAKE)

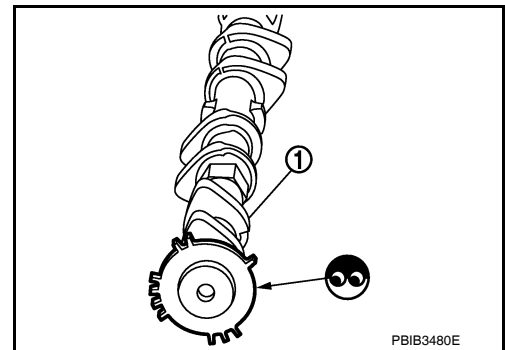
Check the following.

- Accumulation of debris to the signal plate of camshaft (1) rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 8.

NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft. Refer to [EM-153. "Removal and Installation"](#).



8. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

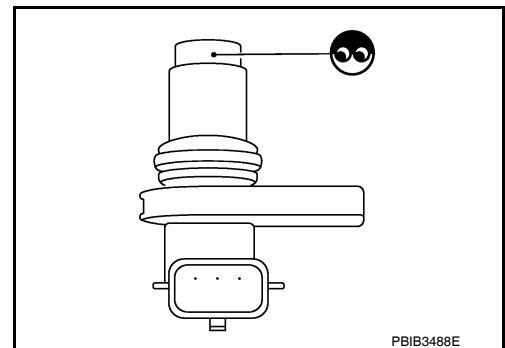
>> INSPECTION END

Component Inspection

INFOID:000000006150631

CAMSHAFT POSITION SENSOR (PHASE)

1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor (PHASE) harness connector.
3. Remove the sensor. Refer to [EM-153. "Removal and Installation"](#).
4. Visually check the sensor for chipping.



DTC P0340 CMP SENSOR (PHASE)

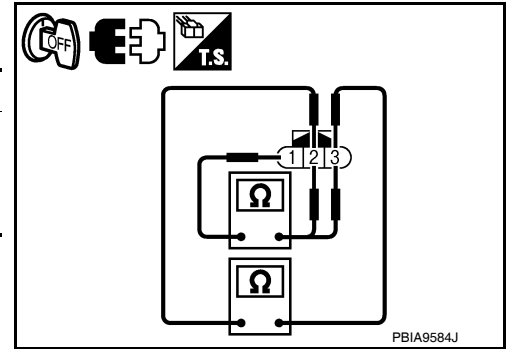
[QR25DE]

< SERVICE INFORMATION >

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞ Ω
1 (+) - 3 (-)	
2 (+) - 3 (-)	

6. If NG, replace camshaft position sensor (PHASE). Refer to [EM-153, "Removal and Installation"](#).



DTC P0420, P0430 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[QR25DE]

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

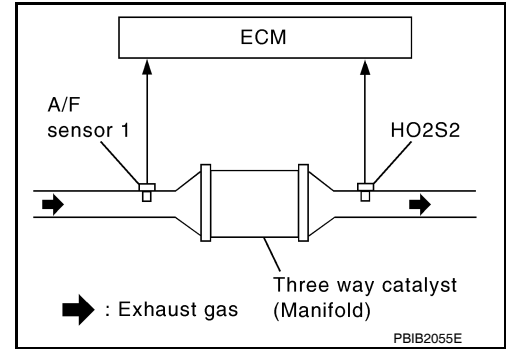
On Board Diagnosis Logic

INFOID:000000006150633

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 air fuel ratio (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 0420 (Bank 1)	Catalyst system efficiency below threshold	<ul style="list-style-type: none"> • Three way catalyst (manifold) does not operate properly. • Three way catalyst (manifold) does not have enough oxygen storage capacity. 	<ul style="list-style-type: none"> • Three way catalyst (manifold) • Exhaust tube • Intake air leaks • Fuel injector • Fuel injector leaks • Spark plug • Improper ignition timing
P0430 0430 (Bank 2)			

DTC Confirmation Procedure

INFOID:000000006150634

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-III

TESTING CONDITION:

Do not maintain engine speed for more than the specified minutes below.

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
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. 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 to 70°C (158°F).
7. Open engine hood.
8. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-III.
9. Rev engine up to between 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
If "INCMP" of "CATALYST" changed to "CMPLT", go to step 12.
10. Wait 5 seconds at idle.
11. Rev engine up to between 2,000 to 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to "CMPLT" (It will take approximately 5 minutes).
If not "CMPLT", stop engine and cool it down to less than 70°C (158°F) and then retest from step 1.
12. Select "SELF-DIAG RESULTS" mode with CONSULT-III.
13. Confirm that 1st trip DTC is not detected.
If 1st trip DTC is detected, go to [EC-1428, "Diagnosis Procedure"](#).

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[QR25DE]

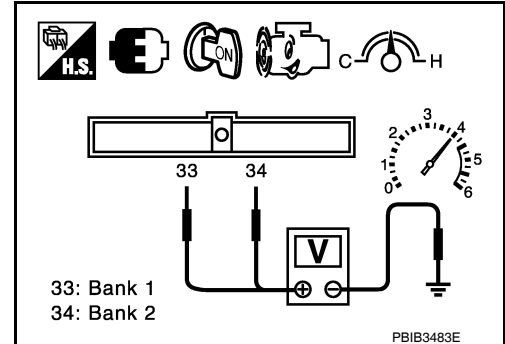
Overall Function Check

INFOID:000000006150635

Use this procedure to check the overall function of the three way catalyst (manifold). During this check, a 1st trip DTC might not be confirmed.

Ⓢ WITH GST

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. Open engine hood.
6. Set voltmeter probe between ECM terminals 33 [HO2S2 (B1) signal] or 34 [HO2S2 (B2) signal] and ground.
7. Keep engine speed at 2,500 rpm constant under no load.
8. Check that the voltage does not vary for more than 5 seconds.
If the voltage fluctuation cycle takes less than 5 seconds, go to [EC-1428, "Diagnosis Procedure"](#).
 - 1 cycle: 0.6 - 1.0 → 0 - 0.3 → 0.6 - 1.0



Diagnosis Procedure

INFOID:000000006150636

1. CHECK EXHAUST SYSTEM

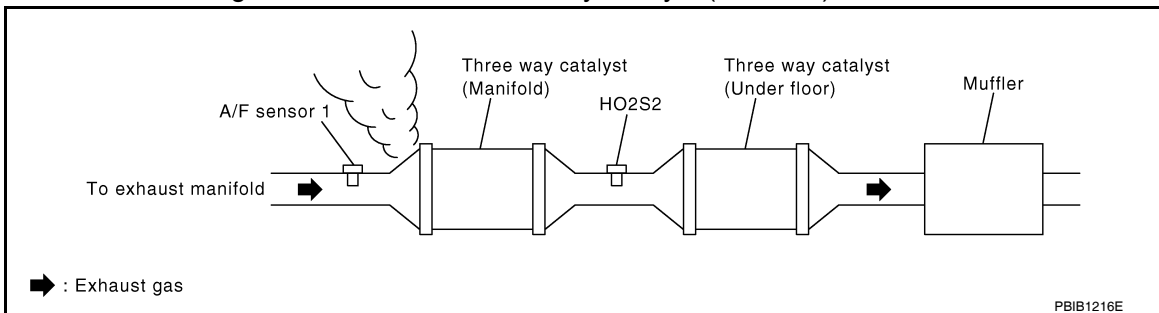
Visually check exhaust tubes and muffler for dents.

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace.

2. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (manifold).



OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace.

3. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace.

4. CHECK IGNITION TIMING

Check the following items. Refer to [EC-1177, "Basic Inspection"](#).

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[QR25DE]

Items	Specifications
Target idle speed	CVT: 650 ± 50 rpm (in P or N position)
	M/T: 800 ± 50 rpm (in Neutral position)
Ignition timing	CVT: 10 ± 5° BTDC (in P or N position)
	M/T: 10 ± 5° BTDC (in Neutral position)

OK or NG

- OK >> GO TO 5.
- NG >> Follow the [EC-1177, "Basic Inspection"](#).

5. CHECK FUEL INJECTORS

1. Stop engine and turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Turn ignition switch ON.
4. Check voltage between ECM terminals 29, 30, 31, 32 and ground with CONSULT-III or tester. Refer to Wiring Diagram for fuel injectors, [EC-1635, "Wiring Diagram"](#).

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> Perform [EC-1636, "Diagnosis Procedure"](#).

6. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:

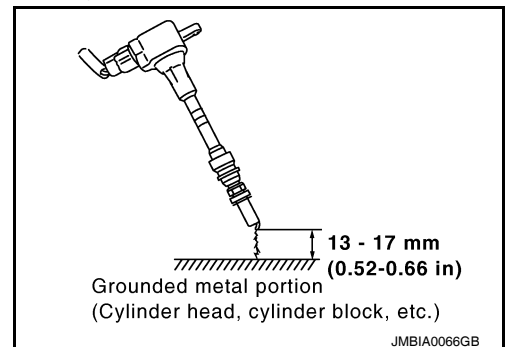
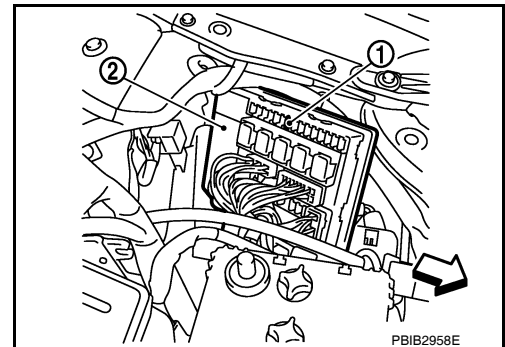
Perform following procedure in a place with no combustible objects and good ventilation.

1. Turn ignition switch OFF.
2. Remove fuel pump fuse (1) in IPDM E/R (2) to release fuel pressure.

NOTE:

Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.

- ⇐: Vehicle front
3. Start engine.
 4. After engine stalls, crank it two or three 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. Refer to [EM-145, "Removal and Installation"](#) and [EM-146, "Removal and Installation"](#).
 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 made.

NOTE:

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[QR25DE]

When the gap is less than 13 mm (0.52 in), a the spark might be generated even if the coil is malfunctioning.

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 7.

7.CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect non- malfunctioning spark plug.
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.

OK or NG

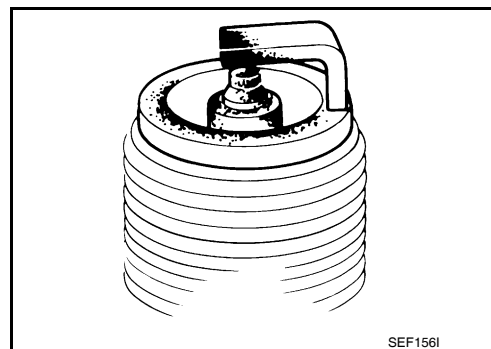
- OK >> GO TO 8.
- NG >> Check ignition coil, power transistor and their circuits. Refer to [EC-1644](#).

8.CHECK SPARK PLUG

Check the initial spark plug for fouling, etc.

OK or NG

- OK >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to [EM-145. "Removal and Installation"](#).
- NG >> 1. Repair or clean spark plug.
2. GO TO 9.



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.

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace spark plug (s) with standard type one (s). For spark plug type, refer to [EM-146. "Removal and Installation"](#).

10.CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Remove fuel injector assembly.
Refer to [EM-148](#).
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.
5. Turn ignition switch ON.
Check that fuel does not drip from fuel injector.

OK or NG

- OK (Does not drip.)>>GO TO 11.
- NG (Drips.)>>Replace the fuel injector (s) from which fuel is dripping. Refer to [EM-148. "Removal and Installation"](#).

11.CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

< SERVICE INFORMATION >

[QR25DE]

Trouble is fixed.>>**INSPECTION END**

Trouble is not fixed.>>Replace malfunctioning three way catalyst (manifold). Refer to [EM-140, "Removal and Installation"](#).

A

EC

C

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DTC P0441 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[QR25DE]

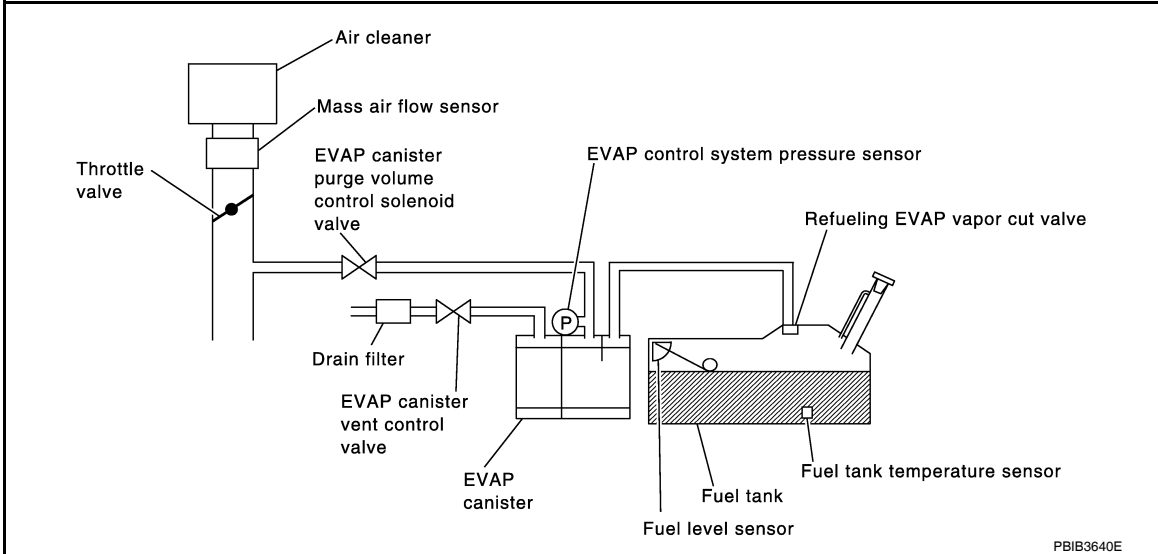
DTC P0441 EVAP CONTROL SYSTEM

System Description

INFOID:000000006150637

NOTE:

If DTC P0441 is displayed with other DTC such as P2122, P2123, P2127, P2128, 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.

On Board Diagnosis Logic

INFOID:000000006150638

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 0441	EVAP control system incorrect purge flow	<ul style="list-style-type: none"> EVAP control system does not operate properly. EVAP control system has a leak between intake manifold and EVAP control system pressure sensor. 	<ul style="list-style-type: none"> EVAP canister purge volume control solenoid valve stuck closed EVAP control system pressure sensor and the circuit Loose, disconnected or improper connection of rubber tube Blocked rubber tube Cracked EVAP canister EVAP canister purge volume control solenoid valve circuit Accelerator pedal position sensor Blocked purge port EVAP canister vent control valve Drain filter

DTC Confirmation Procedure

INFOID:000000006150639

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-III

DTC P0441 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 70 seconds.
4. Select "PURG FLOW P0441" of "EVAPORATIVE SYSTEM" in "DTC & SRT CONFIRMATION" mode with CONSULT-III.
5. Touch "START".
If "COMPLETED" is displayed, go to step 7.
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-III screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

Selector lever	Suitable position
VHCL SPEED SE	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,800 rpm
B/FUEL SCHDL	1.0 - 10.0 msec
COOLAN TEMP/S	More than 0°C (32 °F)

If TESTING does not change for a long time, retry from step 2.

7. Check that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-1433, "Diagnosis Procedure"](#).

Overall Function Check

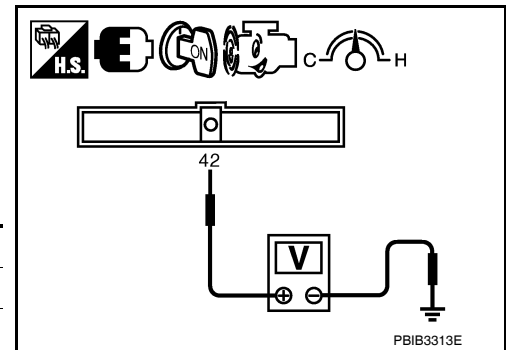
INFOID:000000006150640

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Lift up drive wheels.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.
5. Set voltmeter probes to ECM terminals 42 (EVAP control system pressure sensor signal) and ground.
6. Check EVAP control system pressure sensor value at idle speed and note it.
7. Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Selector lever	Any position other than P, N or R



8. 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.
9. If NG, go to [EC-1433, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150641

1. CHECK EVAP CANISTER

1. Turn ignition switch OFF.
2. Check EVAP canister for cracks.

OK or NG

OK (With CONSULT-III)>>GO TO 2.

OK (Without CONSULT-III)>>GO TO 3.

NG >> Replace EVAP canister. Refer to [FL-14, "Removal and Installation"](#).

2. CHECK PURGE FLOW

DTC P0441 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

Ⓟ With CONSULT-III

1. 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-1127, "Description"](#).
2. Start engine and let it idle.
3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III.
4. Rev engine up to 2,000 rpm.
5. Touch "Qd" and "Qu" on CONSULT-III screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

PURG VOL CONT/V	VACUUM
100%	Should exist.
0%	Should not exist.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 4.

3. CHECK PURGE FLOW

ⓧ Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
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-1127, "Description"](#).
4. Start engine and let it idle.
Do not depress accelerator pedal even slightly.
5. Check vacuum gauge indication before 60 seconds pass after starting engine.

Vacuum should not exist.

6. Rev engine up to 2,000 rpm after 100 seconds pass after starting engine.

Vacuum should exist.

OK or NG

- OK >> GO TO 7.
NG >> GO TO 4.

4. CHECK EVAP PURGE LINE

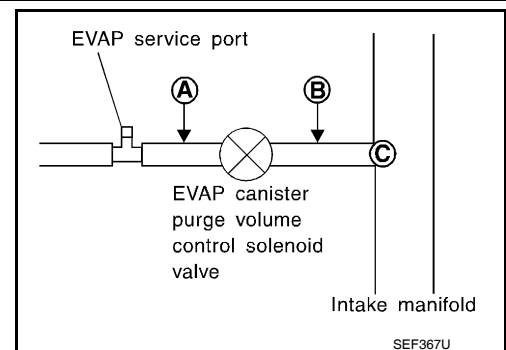
1. Turn ignition switch OFF.
2. Check EVAP purge line for improper connection or disconnection.
Refer to [EC-1127, "Description"](#).

OK or NG

- OK >> GO TO 5.
NG >> Repair it.

5. CHECK EVAP PURGE HOSE AND PURGE PORT

1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.
2. Blow air into each hose and EVAP purge port **C**.



DTC P0441 EVAP CONTROL SYSTEM

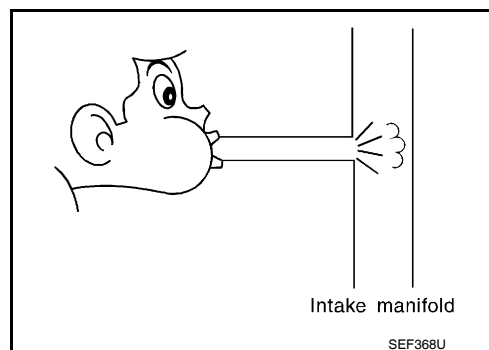
[QR25DE]

< SERVICE INFORMATION >

3. Check that air flows freely.

OK or NG

- OK (With CONSULT-III)>>GO TO 6.
- OK (Without CONSULT-III)>>GO TO 7.
- NG >> Repair or clean hoses and/or purge port.



6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1457](#). "Component Inspection".

OK or NG

- OK >> GO TO 8.
- NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-135](#). "Removal and Installation".

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#). "Removal and Installation".

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to [EC-1472](#) for DTC P0452 and [EC-1479](#) for DTC P0453.

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14](#). "Removal and Installation".

10. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 11.
- NG >> Clean the rubber tube using an air blower.

11. CHECK DRAIN FILTER

Refer to [EC-1436](#). "Component Inspection".

OK or NG

- OK >> GO TO 12.
- NG >> Replace drain filter.

12. CHECK EVAP CANISTER VENT CONTROL VALVE

DTC P0441 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

Refer to [EC-1462. "Component Inspection"](#).

OK or NG

OK >> GO TO 13.

NG >> Replace EVAP canister vent control valve. Refer to [FL-14. "Removal and Installation"](#).

13.CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-1127. "Description"](#).

OK or NG

OK >> GO TO 14.

NG >> Replace it.

14.CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 15.

15.CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

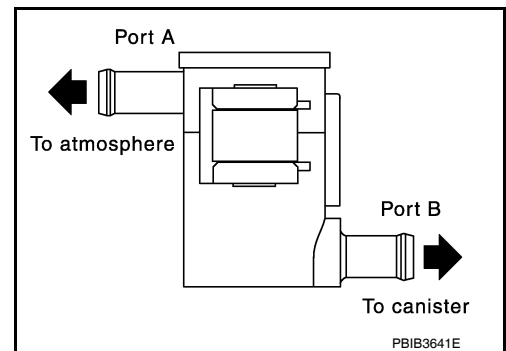
>> **INSPECTION END**

Component Inspection

INFOID:000000006150642

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter.



DTC P0442 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

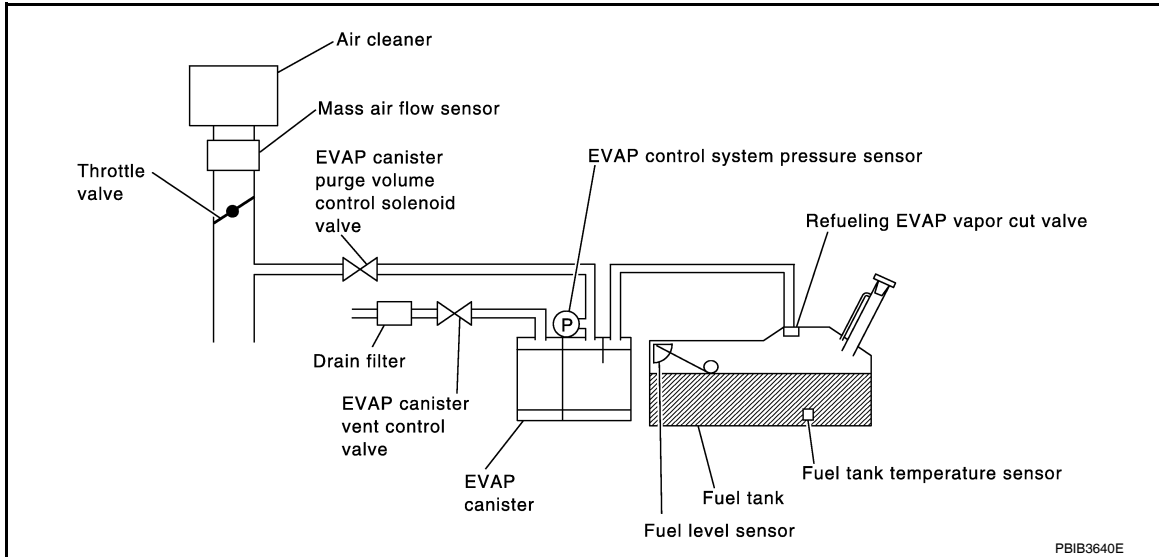
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DTC P0442 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

INFOID:000000006150643

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum. If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following Vacuum test conditions. The EVAP canister vent control valve is closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve will then be opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0442 0442	EVAP control system small leak detected (negative pressure)	EVAP control system has a leak, EVAP control system does not operate properly.	<ul style="list-style-type: none"> • Incorrect fuel tank vacuum relief valve • Incorrect fuel filler cap used • Fuel filler cap remains open or fails to close. • Foreign matter caught in fuel filler cap. • Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (pipe and rubber tube) leaks • EVAP purge line rubber tube bent • Loose or disconnected rubber tube • EVAP canister vent control valve and the circuit • EVAP canister purge volume control solenoid valve and the circuit • Fuel tank temperature sensor • O-ring of EVAP canister vent control valve is missing or damaged • Drain filter • EVAP canister is saturated with water • EVAP control system pressure sensor • Fuel level sensor and the circuit • Refueling EVAP vapor cut valve • ORVR system leaks

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.

DTC P0442 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[QR25DE]

DTC Confirmation Procedure

INFOID:000000006150644

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" 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 0 to 10°C (32 to 140°F).
- Open engine hood before conducting following procedure.

WITH CONSULT-III

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
4. Check the following conditions are met.
COOLAN TEMP/S: 0 - 100°C (32 - 212°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
5. Select "EVP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.
NOTE:
If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-1177, "Basic Inspection"](#).
6. Check that "OK" is displayed.
If "NG" is displayed, refer to [EC-1438, "Diagnosis Procedure"](#).

WITH GST

NOTE:

Be sure to read the explanation of Driving Pattern on [EC-1144, "Emission-related Diagnostic Information"](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to Driving Pattern, [EC-1144, "Emission-related Diagnostic Information"](#)
3. Stop vehicle.
4. Turn ignition switch OFF and wait at least 10 seconds and then turn ignition switch ON.
5. Select Service \$07 with GST.
 - If P0442 is displayed on the screen, go to [EC-1438, "Diagnosis Procedure"](#).
 - If P0441 is displayed on the screen, go to [EC-1433, "Diagnosis Procedure"](#) for DTC P0441.

Diagnosis Procedure

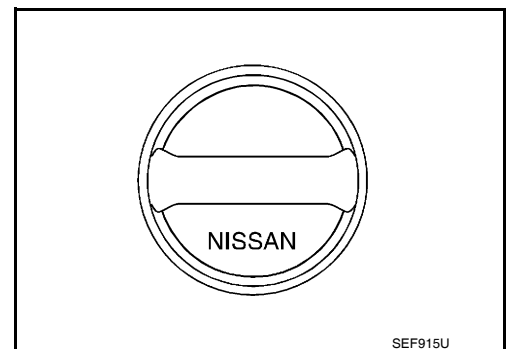
INFOID:000000006150645

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
- NG >> Replace with genuine NISSAN fuel filler cap. Refer to [FL-10, "Component"](#).



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.
- NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.

DTC P0442 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

2. Retighten until rereaching sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-1129. "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace fuel filler cap with a genuine one. Refer to [FL-10. "Component"](#).

5. INSTALL THE PRESSURE PUMP

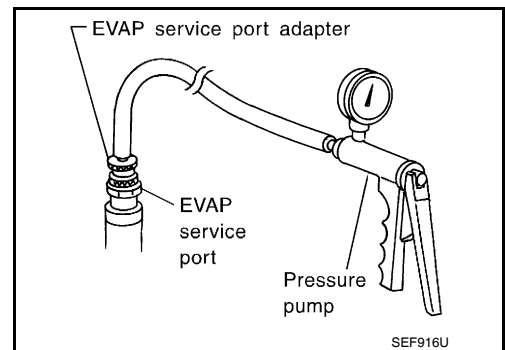
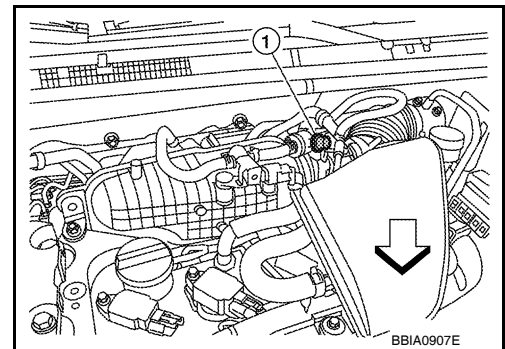
To locate the EVAP leak, install EVAP service port (1) adapter and pressure pump to EVAP service port securely.

For the location of EVAP service port, refer to [EC-1127. "Description"](#).

•  Vehicle front

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



With CONSULT-III>>GO TO 6.

Without CONSULT-III>>GO TO 7.

6. CHECK FOR EVAP LEAK

 **With CONSULT-III**

1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-III.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

CAUTION:

- Never use compressed air or a high pressure pump.
- Never exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

DTC P0442 EVAP CONTROL SYSTEM

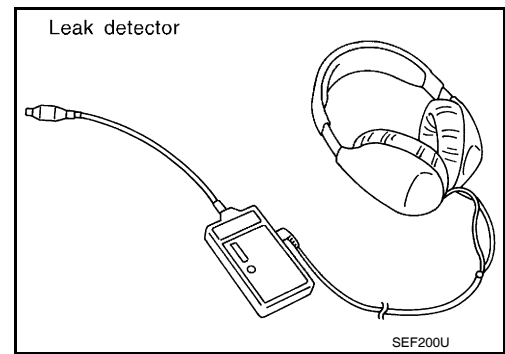
[QR25DE]

< SERVICE INFORMATION >

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1127, "Description"](#).

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace.



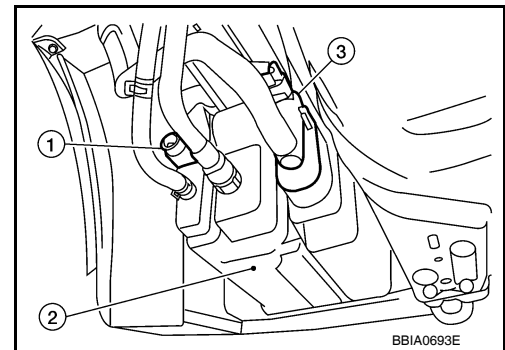
7. CHECK FOR EVAP LEAK

⊗ Without CONSULT-III

1. Turn ignition switch OFF.
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (0.013 to 0.028 kg/cm², 0.19 to 0.39 psi), then remove pump and EVAP service port adapter.

CAUTION:

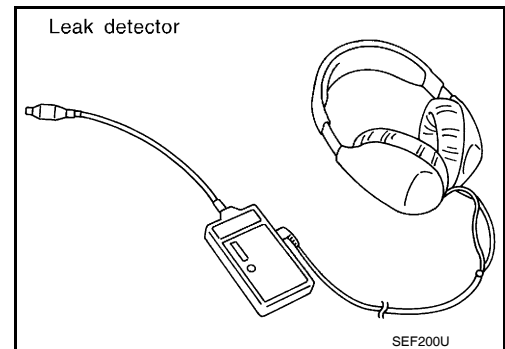
- Never use compressed air or a high pressure pump.
- Never exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1127, "Description"](#).

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace.



8. CHECK DRAIN FILTER

Refer to [EC-1443, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
NG >> Replace drain filter.

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following,

- EVAP canister vent control valve is installed properly. Refer to [FL-14, "Removal and Installation"](#).
- EVAP canister vent control valve. Refer to [EC-1462, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14, "Removal and Installation"](#).

DTC P0442 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[QR25DE]

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

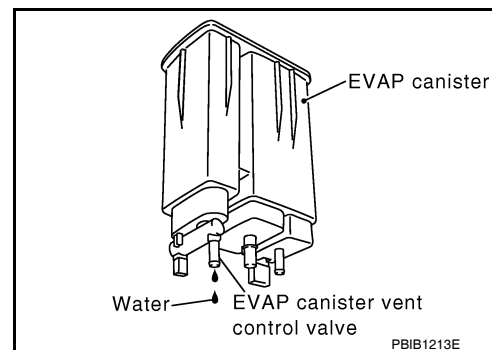
1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to [FL-14, "Removal and Installation"](#).
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 11.

No (With CONSULT-III)>>GO TO 13.

No (Without CONSULT-III)>>GO TO 14.



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 1.9 kg (4.2 lb).

OK or NG

OK (With CONSULT-III)>>GO TO 13.

OK (Without CONSULT-III)>>GO TO 14.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose connected to EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister. Refer to [FL-14, "Removal and Installation"](#).

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum.

Vacuum should exist.

OK or NG

OK >> GO TO 16.

NG >> GO TO 15.

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-III

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.

OK or NG

OK >> GO TO 17.

NG >> GO TO 15.

DTC P0442 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

15. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-1204, "Vacuum Hose Drawing"](#).

OK or NG

OK >> GO TO 16.

NG >> Repair or reconnect the hose.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1457, "Component Inspection"](#).

OK or NG

OK >> GO TO 17.

NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-135, "Removal and Installation"](#).

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-1395, "Component Inspection"](#).

OK or NG

OK >> GO TO 18.

NG >> Replace fuel level sensor unit. Refer to [FL-6, "Removal and Installation"](#).

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1478, "Component Inspection"](#).

OK or NG

OK >> GO TO 19.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

19. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-1127](#).

OK or NG

OK >> GO TO 20.

NG >> Repair or reconnect the hose.

20. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 21.

21. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kinks, looseness and improper connection. For location, refer to [EC-1132](#).

OK or NG

OK >> GO TO 22.

NG >> Repair or replace hoses and tubes.

22. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kinks, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 23.

NG >> Repair or replace hoses, tubes or filler neck tube. Refer to [FL-10, "Removal and Installation"](#).

23. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1135, "Component Inspection"](#).

OK or NG

OK >> GO TO 24.

NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-10, "Removal and Installation"](#).

DTC P0442 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[QR25DE]

24. CHECK FUEL LEVEL SENSOR

Refer to [FL-6](#).

OK or NG

OK >> GO TO 25.

NG >> Replace fuel level sensor unit. Refer to [FL-6, "Removal and Installation"](#).

25. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

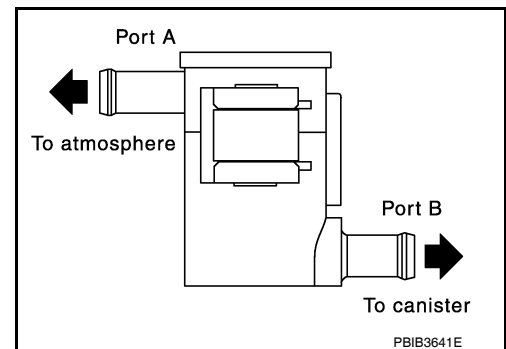
>> **INSPECTION END**

Component Inspection

INFOID:000000006150646

DRAIN FILTER

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter.



DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[QR25DE]

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:000000006150647

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed* ¹	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage* ¹		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Combination meter	Vehicle speed* ²		

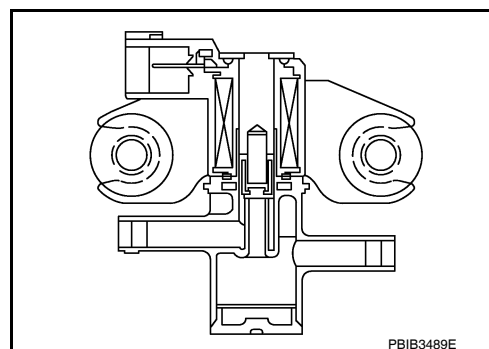
*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to the ECM though CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150648

Specification data are reference values.

Monitor item	Condition	Specification
PURG VOL C/V	<ul style="list-style-type: none"> Engine: After warming up Selector lever: P or N (CVT), Neutral (M/T) Air conditioner switch: OFF No load 	Idle (Accelerator pedal: Not depressed even slightly, after engine starting)
		2,000 rpm

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[QR25DE]

On Board Diagnosis Logic

INFOID:000000006150649

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0443 0443	EVAP canister purge volume control solenoid valve	A The canister purge flow is detected during the vehicle is stopped while the engine is running, even when EVAP canister purge volume control solenoid valve is completely closed.	<ul style="list-style-type: none">• EVAP control system pressure sensor• EVAP canister purge volume control solenoid valve (EVAP canister purge volume control solenoid valve is stuck open.)• EVAP canister vent control valve• Drain filter• EVAP canister• Hoses (Hoses are connected incorrectly or clogged.)
		B The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	

DTC Confirmation Procedure

INFOID:000000006150650

Perform PROCEDURE FOR MALFUNCTION A first.

If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

TESTING CONDITION:

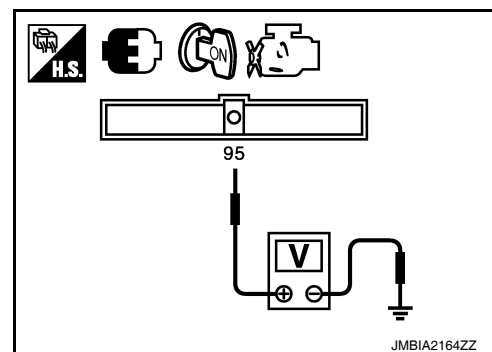
- Perform "DTC Confirmation Procedure" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Always perform test at a temperature of 5 to 60°C (41 to 140°F).
- Cool the vehicle so that engine coolant temperature becomes same level as ambient temperature.

④ With CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Check that the following condition are met.
FUEL T/TMP SE: 0 – 35°C (32 – 95°F)
3. Start engine and wait at least 60 seconds.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-1448. "Diagnosis Procedure"](#).

④ With GST

1. Turn ignition switch ON.
2. Set voltmeter probes to ECM terminal 95 (FTT sensor signal) and ground.
3. Check that the voltage is 3.1 – 4.2 V.
4. Start engine and wait at least 60 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-1448. "Diagnosis Procedure"](#).



PROCEDURE FOR MALFUNCTION B

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

④ With CONSULT-III

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

< SERVICE INFORMATION >

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
5. Touch "START".
6. Start engine and let it idle until "TESTING" on CONSULT-III changes to "COMPLETED". (It will take approximately 10 seconds.)
If "TESTING" is not displayed after 5 minutes, retry from step 2.
7. Check that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-1448, "Diagnosis Procedure"](#).

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. Start engine and let it idle for at least 20 seconds.
4. Select Service \$07 with GST.
5. If 1st trip DTC is detected, go to [EC-1448, "Diagnosis Procedure"](#).

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QR25DE]

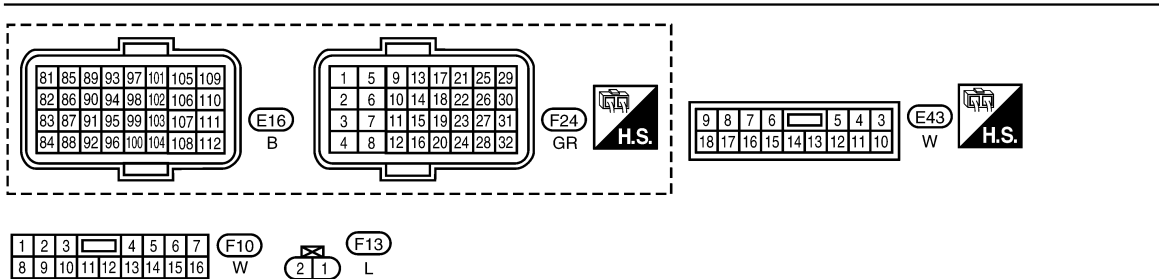
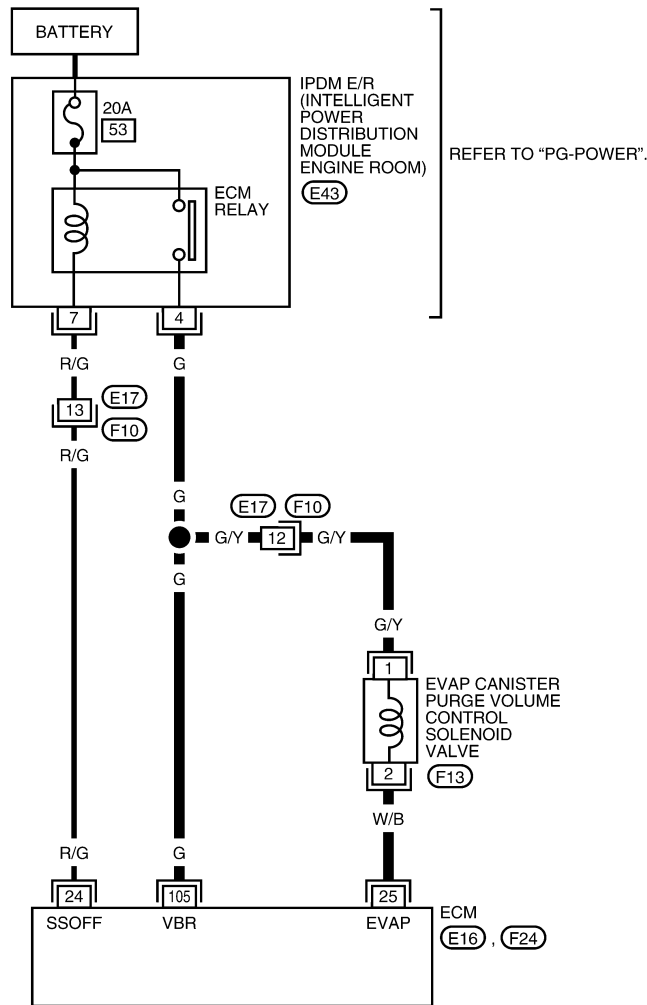
< SERVICE INFORMATION >

INFOID:000000006150651

Wiring Diagram

EC-PGC/V-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0665GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

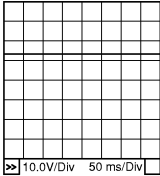
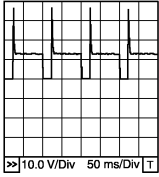
CAUTION:

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
25	W/B	EVAP canister purge volume control solenoid valve	[Engine is running] • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting.	BATTERY VOLTAGE (11 - 14 V)★  PBIB0050E
			[Engine is running] • Engine speed: Approx. 2,000 rpm (More than 100 seconds after starting engine)	BATTERY VOLTAGE (11 - 14 V)★  PBIB0520E
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

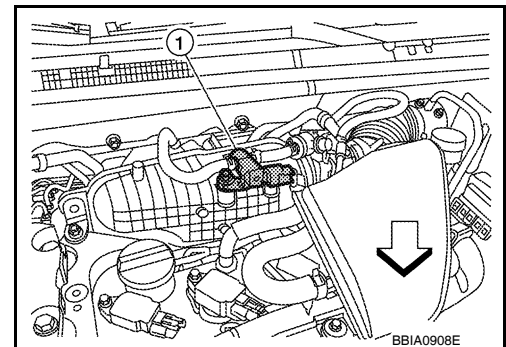
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150652

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve (1) harness connector.
- ⇐: Vehicle front
3. Turn ignition switch ON.



DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

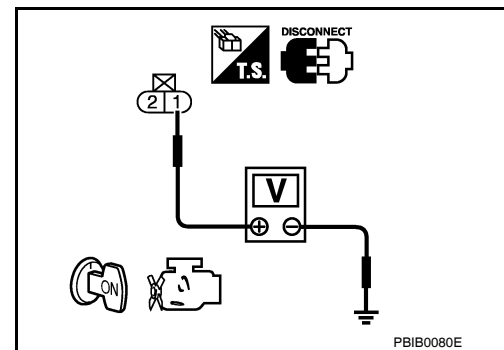
< SERVICE INFORMATION >

4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 25 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

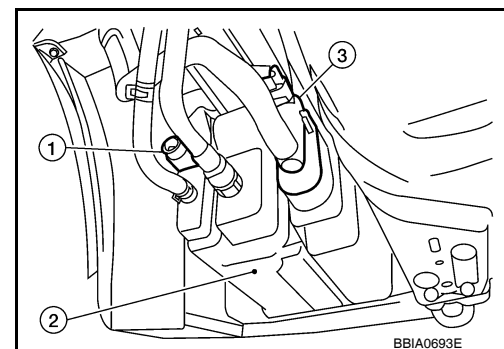
4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check that water is not inside connectors.



OK or NG

- OK >> GO TO 5.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1478, "Component Inspection"](#).

OK or NG

- OK (With CONSULT-III) >> GO TO 6.
- OK (Without CONSULT-III) >> GO TO 7.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Start engine.

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

< SERVICE INFORMATION >

4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1451, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-135, "Removal and Installation"](#).

8. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 9.
- NG >> Clean the rubber tube using an air blower.

9. CHECK DRAIN FILTER

Refer to [EC-1436, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.
- NG >> Replace drain filter.

10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1462, "Component Inspection"](#).

OK or NG

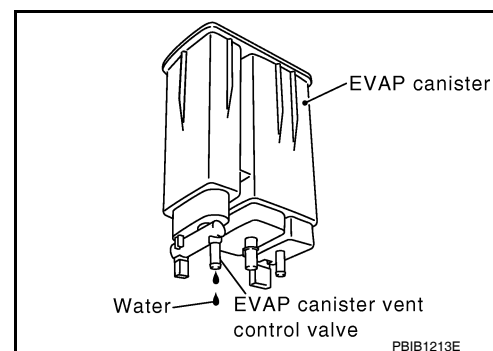
- OK >> GO TO 11.
- NG >> Replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).

11. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached. Refer to [FL-14, "Removal and Installation"](#).
2. Does water drain from the EVAP canister?

YES or NO

- YES >> GO TO 12.
- NO >> GO TO 14.



12. 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 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 14.
- NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

< SERVICE INFORMATION >

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-14, "Removal and Installation"](#).

14. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

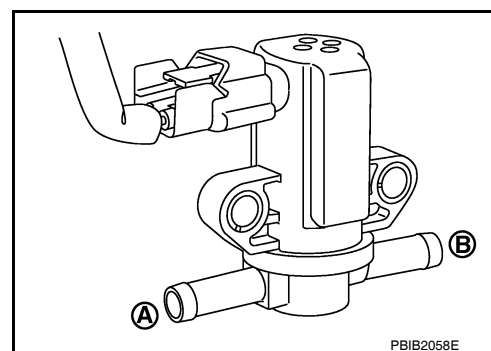
INFOID:000000006150653

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Ⓟ With CONSULT-III

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

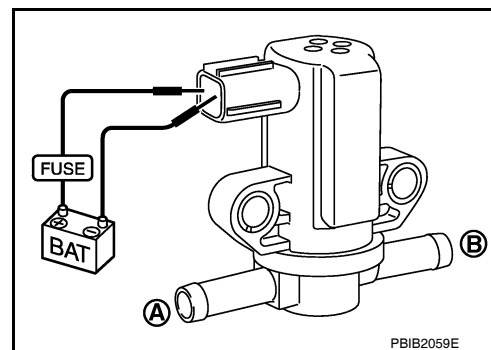
Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No



ⓧ Without CONSULT-III

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	Yes
No supply	No



DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[QR25DE]

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Description

INFOID:000000006150655

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed* ¹	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage* ¹		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Combination meter	Vehicle speed* ²		

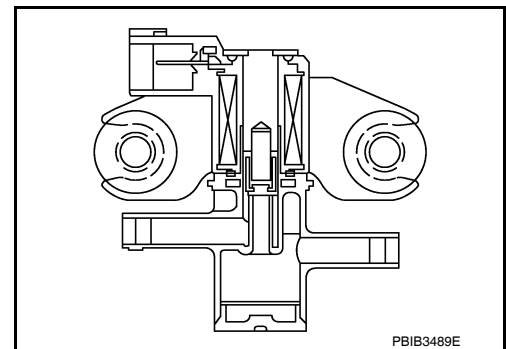
*1: The ECM determines the start signal status by the signal of engine speed and battery voltage.

*2: This signal is sent to the ECM through CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150655

Specification data are reference values.

Monitor item	Condition	Specification
PURG VOL C/V	<ul style="list-style-type: none"> • Engine: After warming up • Selector lever: P or N (CVT), Neutral (M/T) • Air conditioner switch: OFF • No load 	Idle (Accelerator pedal: Not depressed even slightly, after engine starting)
	2,000 rpm	20 - 90%

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[QR25DE]

On Board Diagnosis Logic

INFOID:000000006150657

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444 0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	<ul style="list-style-type: none"> • Harness or connectors (EVAP canister purge volume control solenoid valve circuit is open or shorted.) • EVAP canister purge volume control solenoid valve
P0445 0445	EVAP canister purge volume control solenoid valve circuit shorted	An excessively high voltage signal is sent to ECM through the valve	<ul style="list-style-type: none"> • Harness or connectors (EVAP canister purge volume control solenoid valve circuit is shorted.) • EVAP canister purge volume control solenoid valve

DTC Confirmation Procedure

INFOID:000000006150658

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11 V at idle.

1. Start engine and let it idle for at least 13 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1455. "Diagnosis Procedure"](#).

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

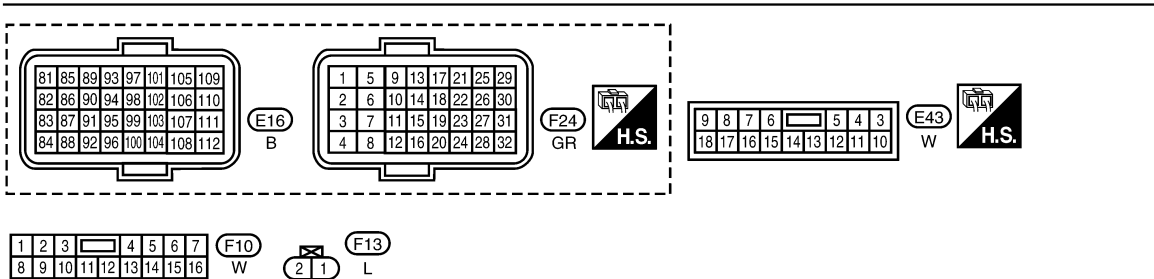
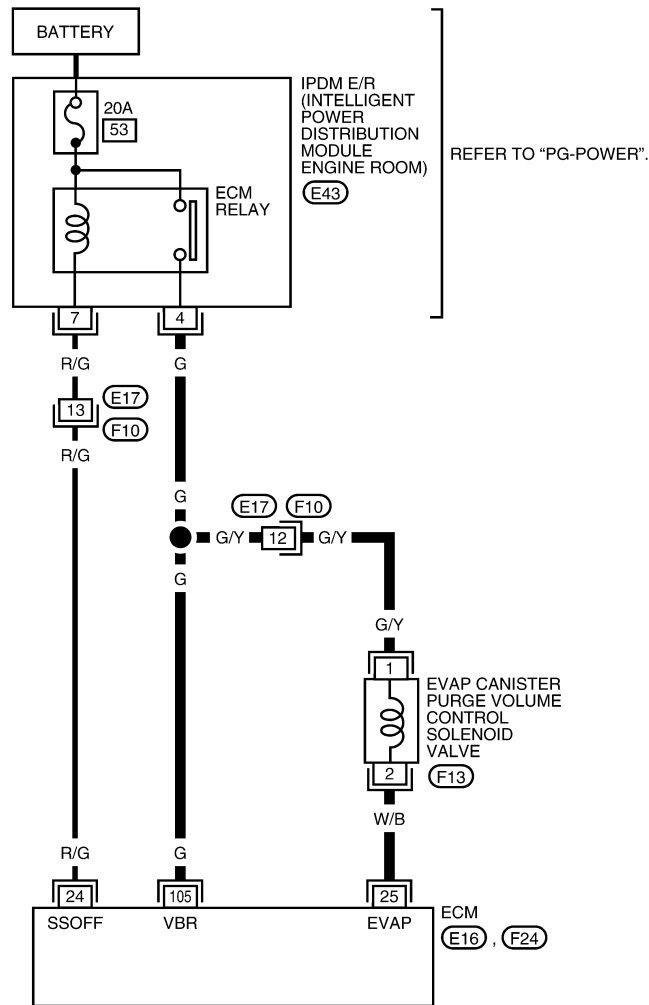
[QR25DE]

INFOID:000000006150659

Wiring Diagram

EC-PGC/V-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0665GB

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

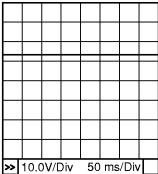
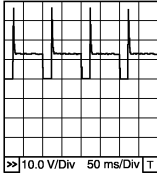
CAUTION:

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] • For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] • More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
25	W/B	EVAP canister purge volume control solenoid valve	[Engine is running] • Idle speed • Accelerator pedal: Not depressed even slightly, after engine starting.	BATTERY VOLTAGE (11 - 14 V)★  PBIB0050E
			[Engine is running] • Engine speed: Approx. 2,000 rpm (More than 100 seconds after starting engine)	BATTERY VOLTAGE (11 - 14 V)★  PBIB0520E
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

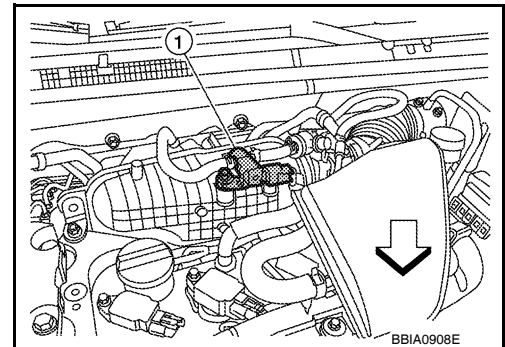
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150660

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect EVAP canister purge volume control solenoid valve (1) harness connector.
- Turn ignition switch ON.



DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

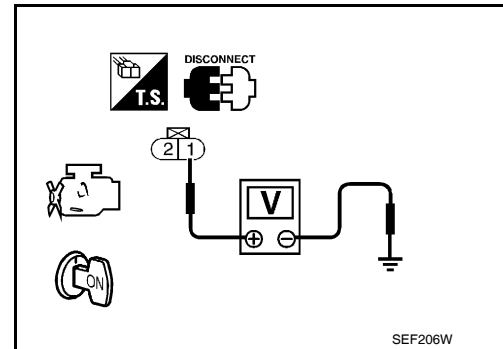
< SERVICE INFORMATION >

4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 25 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK (With CONSULT-III) >> GO TO 4.
- OK (Without CONSULT-III) >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1457. "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-135. "Removal and Installation"](#).

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

< SERVICE INFORMATION >

[QR25DE]

Component Inspection

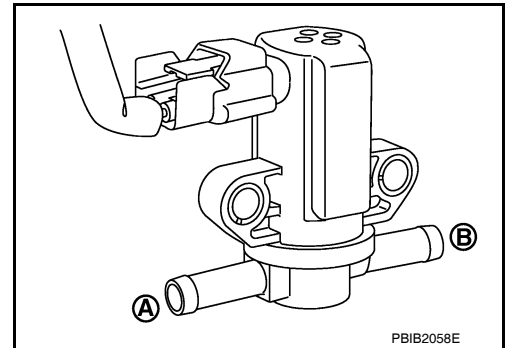
INFOID:000000006150661

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

④ With CONSULT-III

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

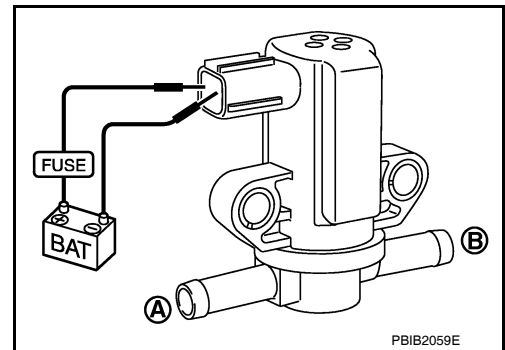
Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No



⊗ Without CONSULT-III

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	Yes
No supply	No



A
EC
C
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P

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[QR25DE]

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

Component Description

INFOID:000000006150663

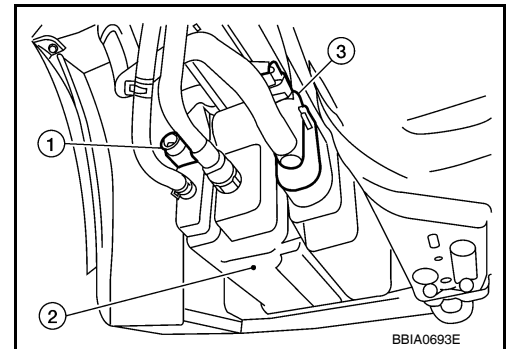
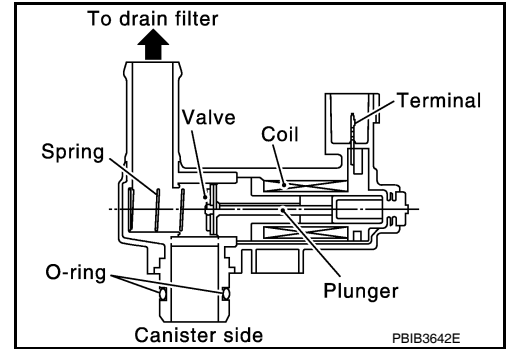
The EVAP canister vent control valve (3) is located on the EVAP canister (2) and is used to seal the canister vent.

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 diagnoses.

- This illustration is a view from under vehicle
- EVAP control system pressure sensor (1)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150664

Specification data are reference values.

Monitor item	Condition	Specification
VENT CONT/V	• Ignition switch: ON	OFF

On Board Diagnosis Logic

INFOID:000000006150665

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0447 0447	EVAP canister vent control valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	<ul style="list-style-type: none"> • Harness or connectors (EVAP canister vent control valve circuit is open or shorted.) • EVAP canister vent control valve • Drain filter

DTC Confirmation Procedure

INFOID:000000006150666

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11 V at idle.

1. Start engine and wait at least 8 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1460, "Diagnosis Procedure"](#).

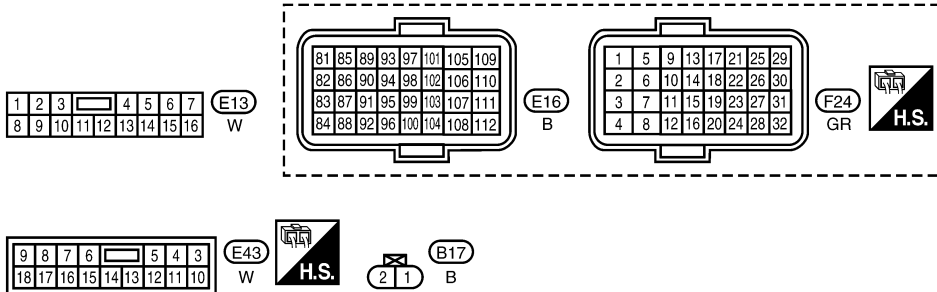
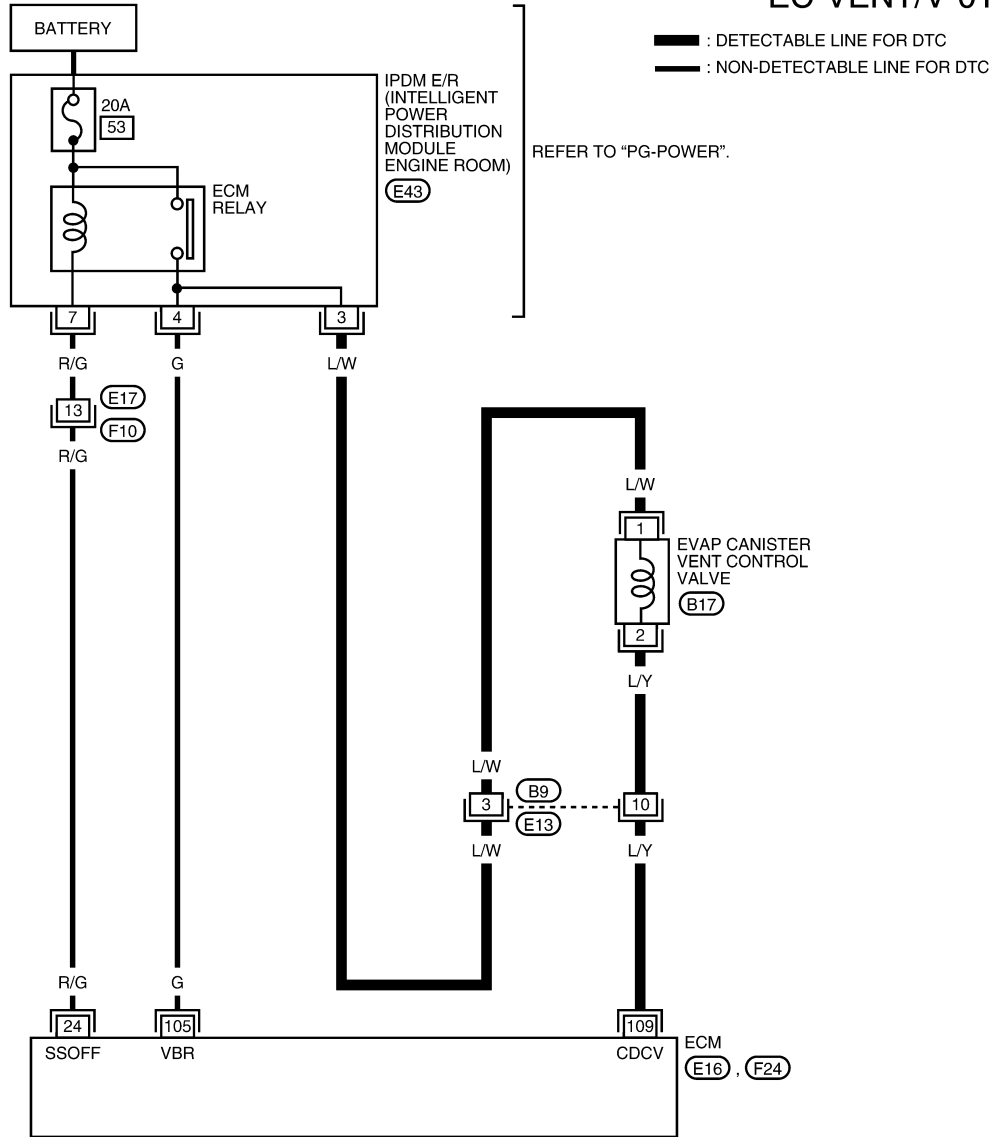
DTC P0447 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[QR25DE]

INFOID:000000006150667

Wiring Diagram



AABWA0267GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[QR25DE]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none">For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] <ul style="list-style-type: none">More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
109	L/Y	EVAP canister vent control valve	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006150668

1. INSPECTION START

1. Do you have CONSULT-III?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

Ⓟ **With CONSULT-III**

- Turn ignition switch OFF and then turn ON.
- Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-III.
- Touch "ON/OFF" on CONSULT-III screen.
- Check for operating sound of the valve.

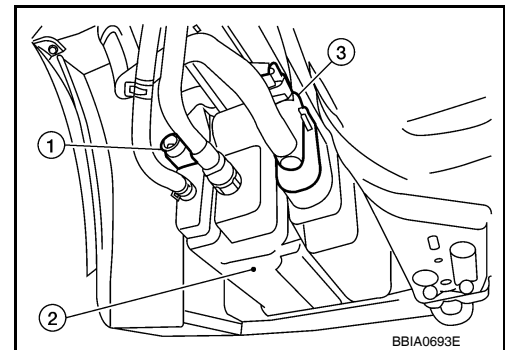
Clicking noise should be heard.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 3.

3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- Disconnect EVAP canister vent control valve (3) harness connector.
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
- Turn ignition switch ON.



DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

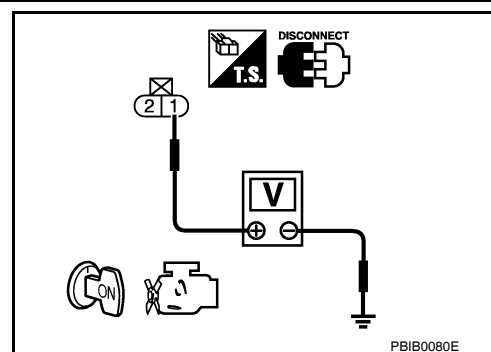
< SERVICE INFORMATION >

4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness for open or short between EVAP canister vent control valve and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 109 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> Repair open circuit or 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.

OK or NG

- OK >> GO TO 7.
- NG >> Clean the rubber tube using an air blower.

7. CHECK DRAIN FILTER

Refer to [EC-1436. "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace drain filter.

8. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1462. "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP canister vent control valve. Refer to [FL-14. "Removal and Installation"](#).

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

DTC P0447 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[QR25DE]

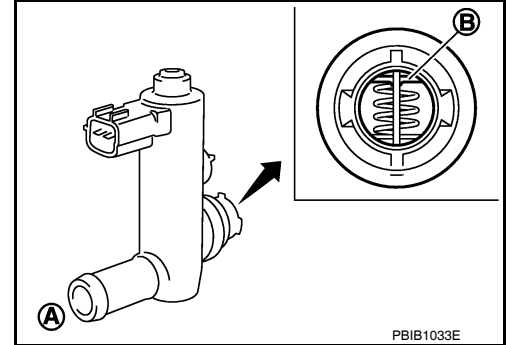
INFOID:000000006150669

Component Inspection

EVAP CANISTER VENT CONTROL VALVE

④ With CONSULT-III

1. Remove EVAP canister vent control valve from EVAP canister. Refer to [FL-14, "Removal and Installation"](#).
2. Check portion **B** of EVAP canister vent control valve for being rusted.
If NG, replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).
If OK, go to next step.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.
5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. 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.

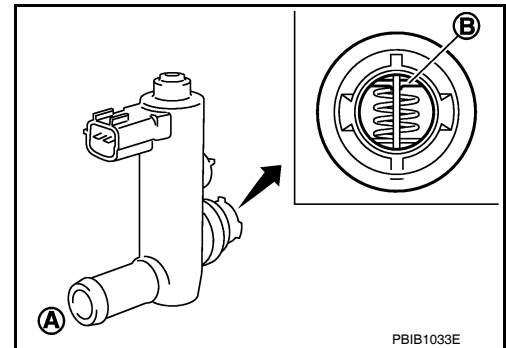
If NG, replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).

If OK, go to next step.

7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.

⊗ Without CONSULT-III

1. Remove EVAP canister vent control valve from EVAP canister. Refer to [FL-14, "Removal and Installation"](#).
2. Check portion **B** of EVAP canister vent control valve for being rusted.



3. Check air passage continuity and operation delay time under the following conditions.
Check that new O-ring is installed properly.

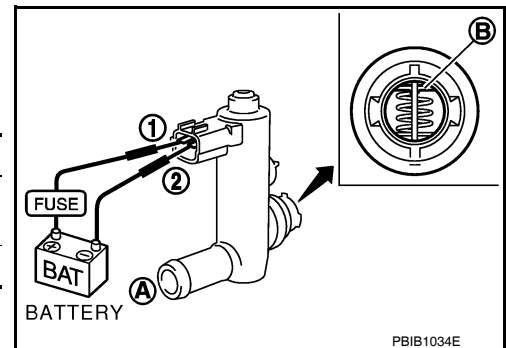
Condition	Air passage continuity between A and B
12 V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

If NG, replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).

If OK, go to next step.

4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
5. Perform step 3 again.



DTC P0448 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[QR25DE]

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

Component Description

INFOID:000000006150670

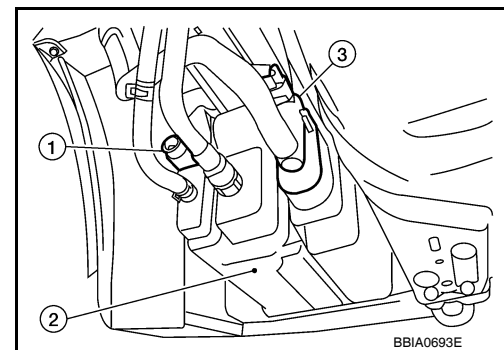
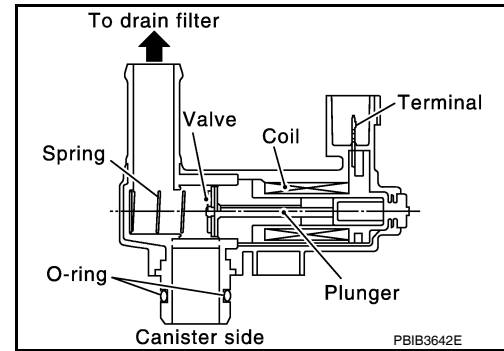
The EVAP canister vent control valve (3) is located on the EVAP canister (2) and is used to seal the canister vent.

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 diagnoses.

- This illustration is a view from under vehicle
- EVAP control system pressure sensor (1)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150671

Specification data are reference values.

Monitor item	Condition	Specification
VENT CONT/V	• Ignition switch: ON	OFF

On Board Diagnosis Logic

INFOID:000000006150672

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0448 0448	EVAP canister vent control valve close	EVAP canister vent control valve remains closed under specified driving conditions.	<ul style="list-style-type: none"> • EVAP canister vent control valve • EVAP control system pressure sensor and the circuit • Blocked rubber tube to EVAP canister vent control valve • Drain filter • EVAP canister is saturated with water

DTC Confirmation Procedure

INFOID:000000006150673

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-III

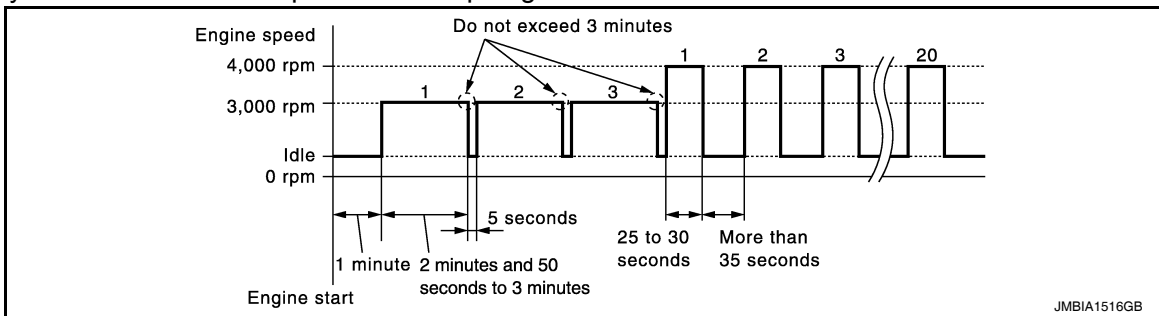
1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

< SERVICE INFORMATION >

4. Start engine and let it idle for at least 1 minute.
5. Repeat next procedures three times.
 - a. Increase the engine speed up to between 3,000 to 3,500 rpm and maintain that speed for 2 minutes and 50 seconds to 3 minutes.
Never exceed 3 minutes.
 - b. Fully released accelerator pedal and keep engine idle for approximately 5 seconds.
6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-1466, "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to the next step.
8. Repeat next procedure 20 times.
 - a. Quickly increase the engine speed up to between 4,000 to 4,500 rpm and maintain that speed for 25 to 30 seconds.
 - b. Fully released accelerator pedal and keep engine idle for at least 35 seconds.



9. Check 1st trip DTC.
10. If 1st trip DTC is detected, go to [EC-1466, "Diagnosis Procedure"](#).

 WITH GST

Follow the procedure "WITH CONSULT-III" above.

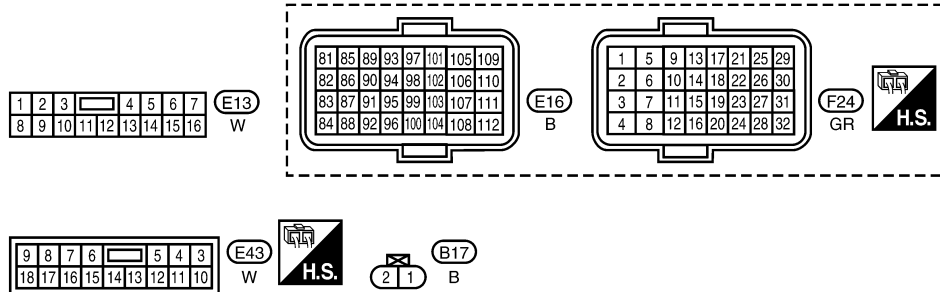
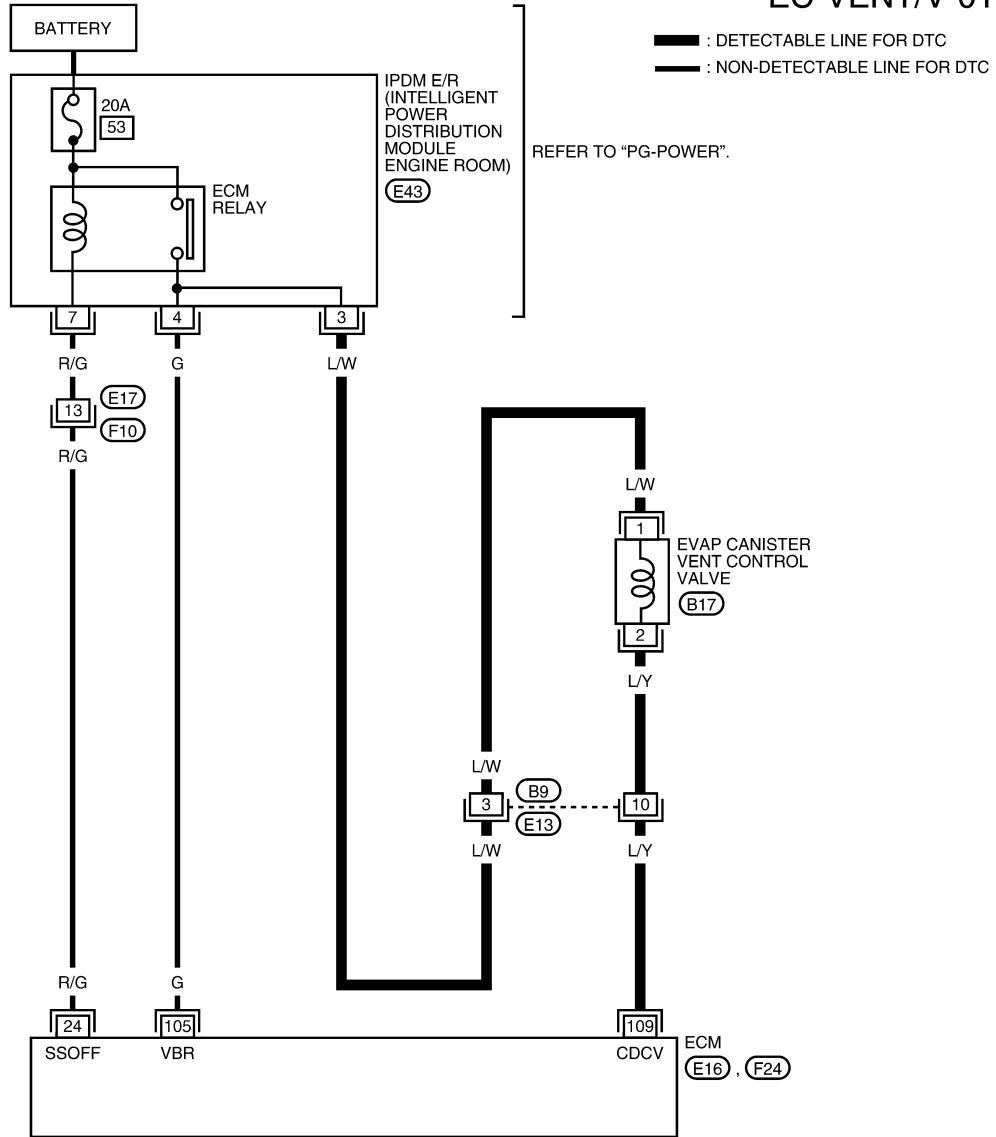
DTC P0448 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[QR25DE]

Wiring Diagram

INFOID:000000006150674



AABWA0267GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

< SERVICE INFORMATION >

[QR25DE]

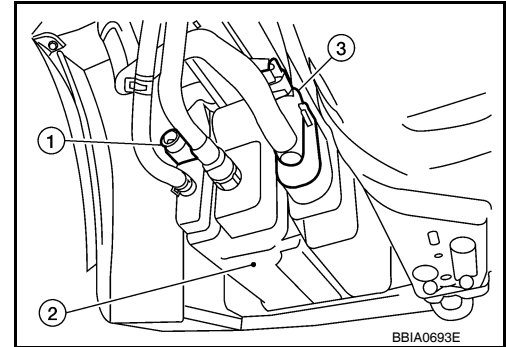
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none">For a few seconds after turning ignition switch OFF	0 - 1.0 V
			[Ignition switch: OFF] <ul style="list-style-type: none">More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
109	L/Y	EVAP canister vent control valve	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006150675

1. CHECK RUBBER TUBE

- Turn ignition switch OFF.
- Disconnect rubber tube connected to EVAP canister vent control valve (3).
- Check the rubber tube for clogging.
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)



OK or NG

- OK >> GO TO 2.
NG >> Clean rubber tube using an air blower.

2. CHECK DRAIN FILTER

Refer to [EC-1436, "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
NG >> Replace drain filter.

3. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1467, "Component Inspection"](#).

OK or NG

- OK >> GO TO 4.
NG >> Replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).

4. CHECK IF EVAP CANISTER SATURATED WITH WATER

- Remove EVAP canister with EVAP canister vent control valve attached. Refer to [FL-14, "Removal and Installation"](#).

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

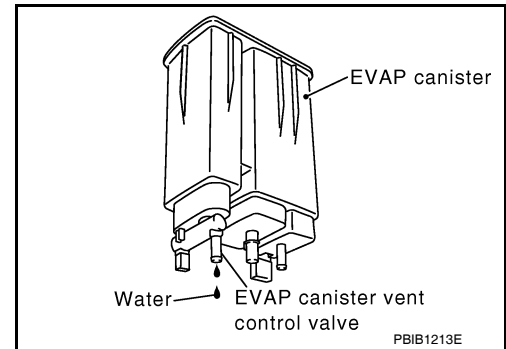
[QR25DE]

< SERVICE INFORMATION >

2. Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 5.
- No >> GO TO 7.



5. 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 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

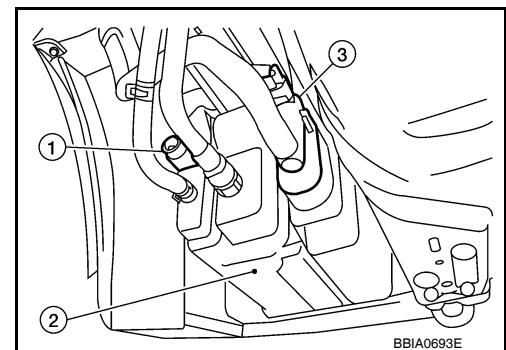
Check the following.

- 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-14, "Removal and Installation"](#).

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check that water is not inside connectors.



OK or NG

- OK >> GO TO 8.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1486, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150676

EVAP CANISTER VENT CONTROL VALVE

Ⓟ With CONSULT-III

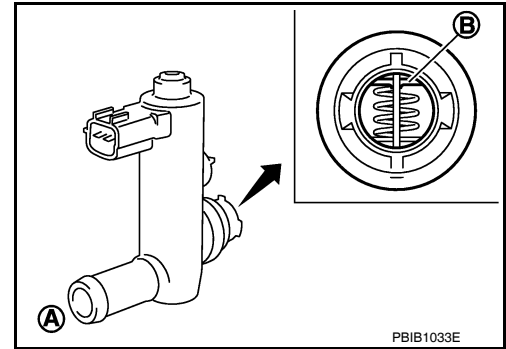
1. Remove EVAP canister vent control valve from EVAP canister. Refer to [FL-14, "Removal and Installation"](#).

DTC P0448 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

< SERVICE INFORMATION >

2. Check portion **B** of EVAP canister vent control valve for being rusted.
If NG, replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).
If OK, go to next step.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.
5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. Check air passage continuity and operation delay time.
Check that new O-ring is installed properly.



Condition (VENT CONT/V)	Air passage continuity between A and B
ON	No
OFF	Yes

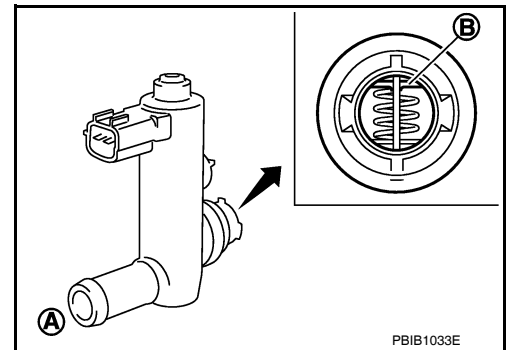
Operation takes less than 1 second.

If NG, go to next step.

7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.
If NG, replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).

⊗ Without CONSULT-III

1. Remove EVAP canister vent control valve from EVAP canister. Refer to [FL-14, "Removal and Installation"](#).
2. Check portion **B** of EVAP canister vent control valve for being rusted.



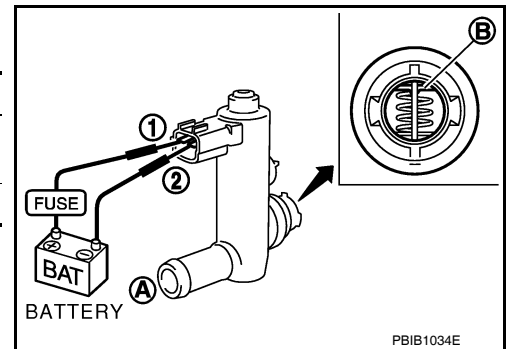
3. Check air passage continuity and operation delay time under the following conditions.
Check that new O-ring is installed properly.

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.

If NG, go to next step.

4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
5. Perform step 3 again.
If NG, replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).



DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[QR25DE]

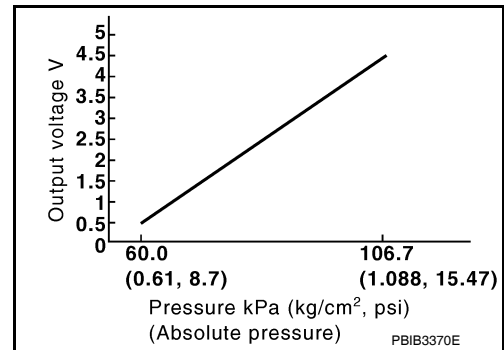
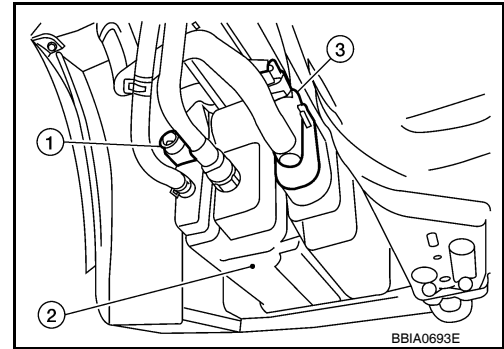
DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

Component Description

INFOID:000000006150677

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

- This illustration is a view from under vehicle
- EVAP canister (2)
- EVAP canister vent control valve (3)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150678

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	• Ignition switch: ON	1.8 - 4.8 V

On Board Diagnosis Logic

INFOID:000000006150679

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0451 0451	EVAP control system pressure sensor performance	ECM detects a sloshing signal from the EVAP control system pressure sensor	<ul style="list-style-type: none"> • Harness or connectors [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor

DTC Confirmation Procedure

INFOID:000000006150680

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Start engine and wait at least 40 seconds.

NOTE:

Do not depress accelerator pedal even slightly.

DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

< SERVICE INFORMATION >

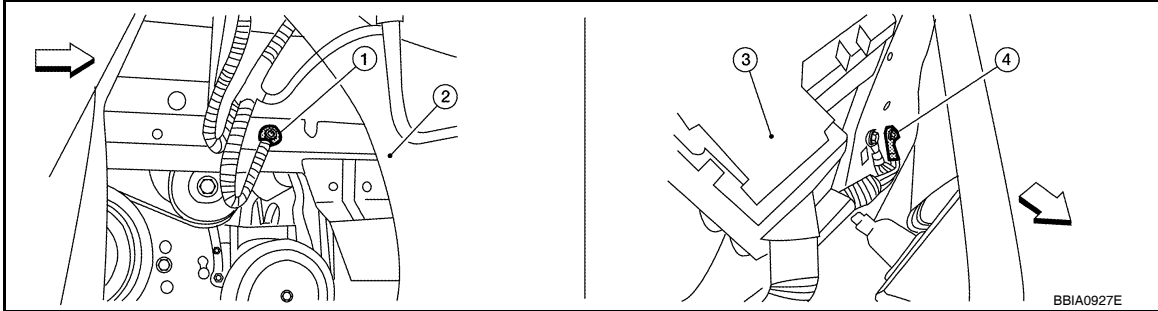
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1470, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150681

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

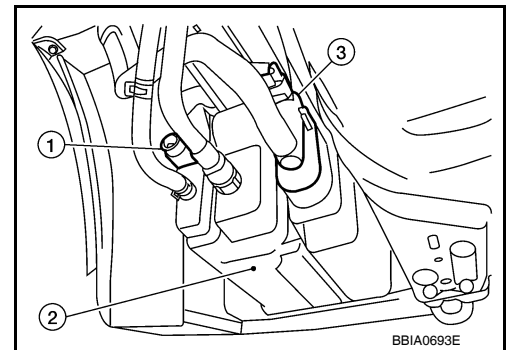
1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR FOR WATER

1. Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check that water is not inside connectors.



OK or NG

- OK >> GO TO 3.
NG >> Repair or replace harness connector.

3. CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
72	Refrigerant pressure sensor terminal 3	EC-1654, "Wiring Diagram"
76	Crankshaft position sensor (POS) terminal 1	EC-1416, "Wiring Diagram"
87	APP sensor terminal 5	EC-1595, "Wiring Diagram"
91	EVAP control system pressure sensor terminal 3	EC-1474, "Wiring Diagram"

OK or NG

- OK >> GO TO 4.
NG >> Repair short to ground or short to power in harness or connectors.

4. CHECK REFRIGERANT PRESSURE SENSOR

Refer to [MTC-28](#).

DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

< SERVICE INFORMATION >

OK or NG

- OK >> GO TO 5.
- NG >> Replace refrigerant pressure sensor. Refer to [MTC-92, "Removal and Installation for Refrigerant Pressure Sensor"](#).

5. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-1478, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace crankshaft position sensor (POS). Refer to [EM-189, "Disassembly and Assembly"](#).

6. CHECK APP SENSOR

Refer to [EC-1598, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> **INSPECTION END**

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1471, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

For wiring diagram, refer to [EC-1474, "Wiring Diagram"](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150682

EVAP CONTROL SYSTEM PRESSURE SENSOR

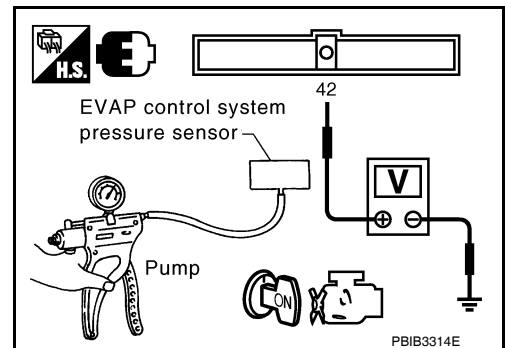
1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister. Refer to [FL-14, "Removal and Installation"](#).
Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 (EVAP control system pressure sensor signal) and ground under the following conditions.

Applied vacuum kPa (kg/cm ² , psi)	Voltage (V)
Not applied	1.8 - 4.8
-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/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², 14.69 psi).

4. If NG, replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).



DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[QR25DE]

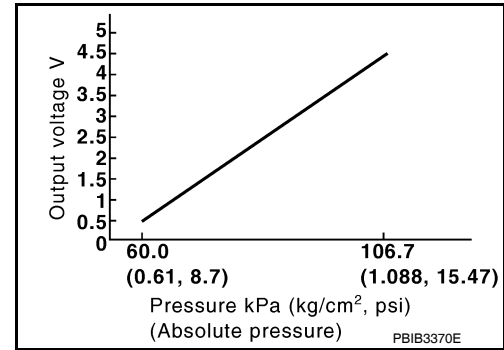
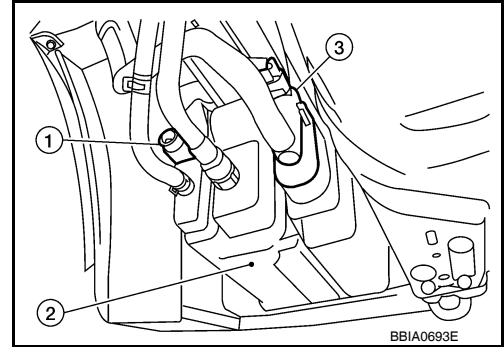
DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

Component Description

INFOID:000000006150683

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

- This illustration is a view from under vehicle
- EVAP canister (2)
- EVAP canister vent control valve (3)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150684

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	• Ignition switch: ON	1.8 - 4.8 V

On Board Diagnosis Logic

INFOID:000000006150685

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0452 0452	EVAP control system pressure sensor low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is open or sorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor

DTC Confirmation Procedure

INFOID:000000006150686

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

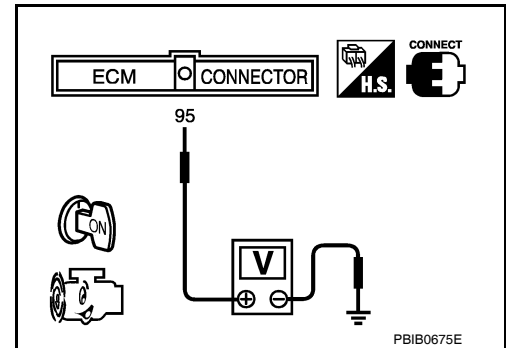
[QR25DE]

Ⓟ WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "DATA MONITOR" mode with CONSULT-III.
5. Check that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. Check 1st trip DTC.
8. If 1st trip DTC is detected, go to [EC-1475. "Diagnosis Procedure"](#).

Ⓢ WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 95 (Fuel tank temperature sensor signal) and ground is less than 4.2 V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select Service \$07 with GST.
6. If 1st trip DTC is detected, go to [EC-1475. "Diagnosis Procedure"](#).



DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

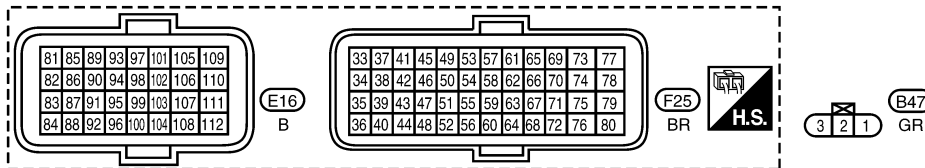
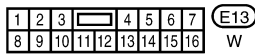
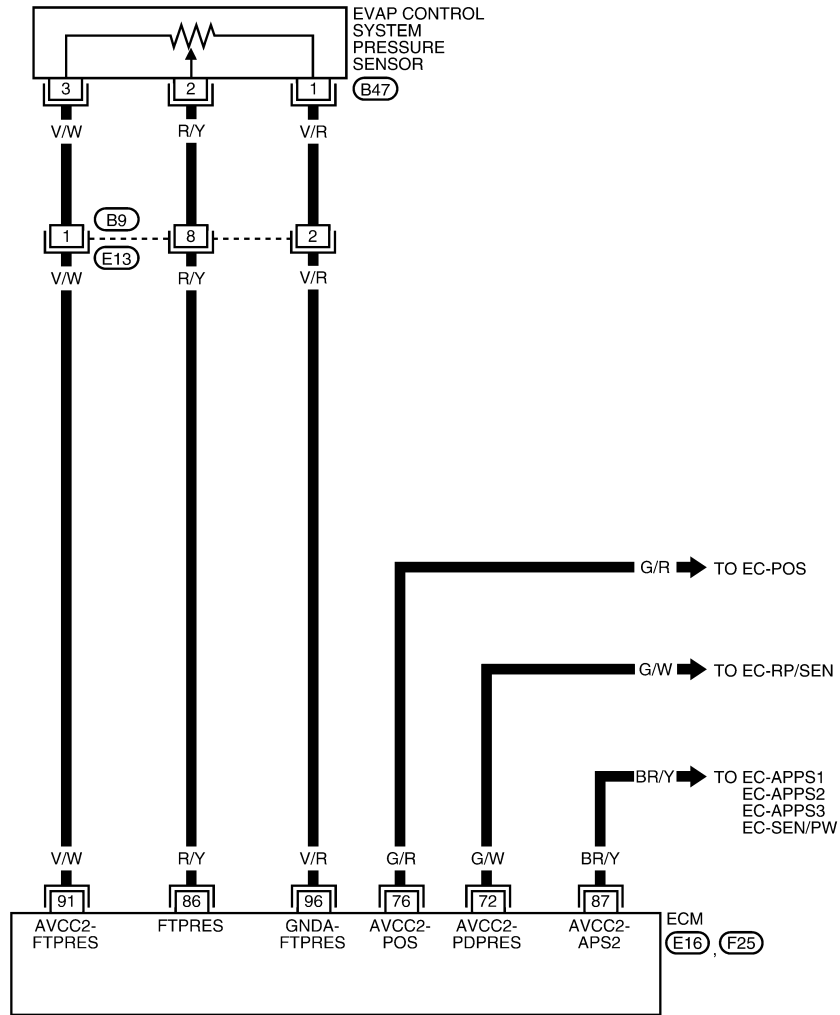
[QR25DE]

Wiring Diagram

INFOID:000000006150687

EC-PRE/SE-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0666GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[QR25DE]

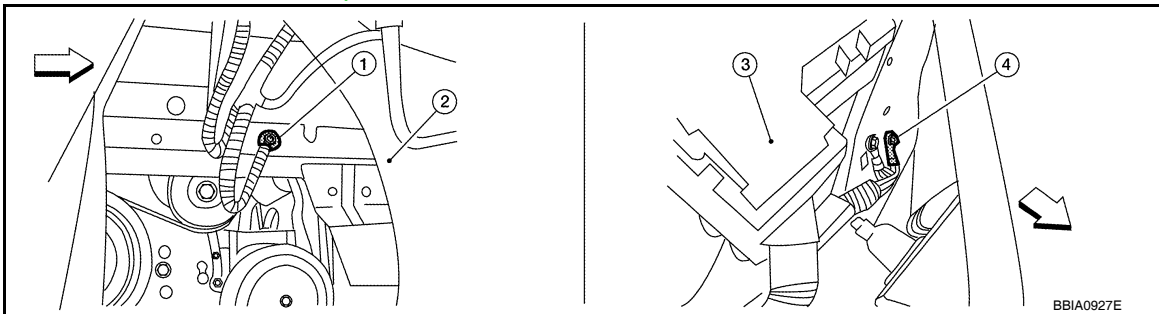
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
72	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
76	G/R	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
86	R/Y	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8 V
87	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
91	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
96	V/R	Sensor ground (EVAP control system pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006150688

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

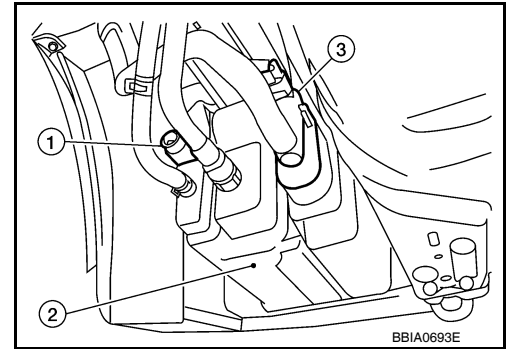
2. CHECK CONNECTOR

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

< SERVICE INFORMATION >

1. Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check that water is not inside connectors.



OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace harness connector.

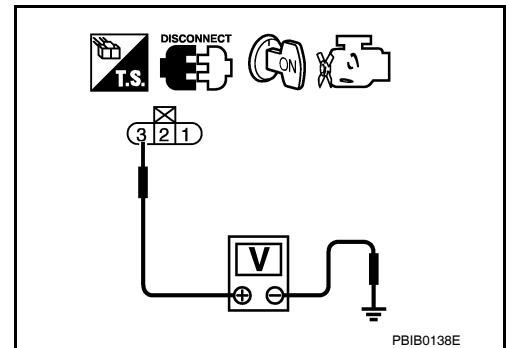
3.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 11.
- NG >> GO TO 4.



4.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 3 and ECM terminal 76. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness for open between EVAP control system pressure sensor and ECM

>> Repair open circuit.

6.CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
72	Refrigerant pressure sensor terminal 3	EC-1654, "Wiring Diagram"
76	Crankshaft position sensor (POS) terminal 1	EC-1416, "Wiring Diagram"
87	APP sensor terminal 5	EC-1595, "Wiring Diagram"
91	EVAP control system pressure sensor terminal 3	EC-1474, "Wiring Diagram"

OK or NG

- OK >> GO TO 7.
- NG >> Repair short to ground or short to power in harness or connectors.

7.CHECK REFRIGERANT PRESSURE SENSOR

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[QR25DE]

Refer to [MTC-28](#).

OK or NG

OK >> GO TO 8.

NG >> Replace refrigerant pressure sensor. Refer to [MTC-92, "Removal and Installation for Refrigerant Pressure Sensor"](#).

8. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-1478, "Component Inspection"](#).

OK or NG

OK >> GO TO 9.

NG >> Replace crankshaft position sensor (POS). Refer to [EM-189, "Disassembly and Assembly"](#).

9. CHECK APP SENSOR

Refer to [EC-1598, "Component Inspection"](#).

OK or NG

OK >> GO TO 16.

NG >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> **INSPECTION END**

11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 96. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 86 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 15.

NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13

DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

< SERVICE INFORMATION >

- Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1478, "Component Inspection"](#).

OK or NG

OK >> GO TO 16.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

16. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150689

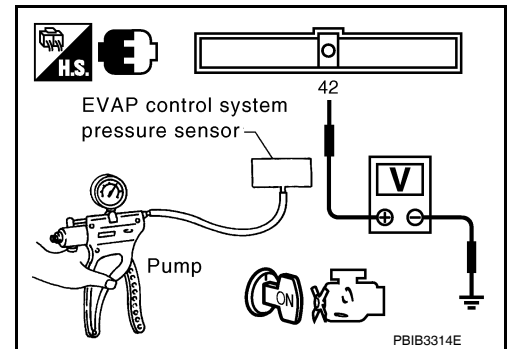
EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister. Refer to [FL-14, "Removal and Installation"](#).
Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 (EVAP control system pressure sensor signal) and ground under the following conditions.

Applied vacuum kPa (kg/cm ² , psi)	Voltage (V)
Not applied	1.8 - 4.8
-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/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², -).
4. If NG, replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).



DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[QR25DE]

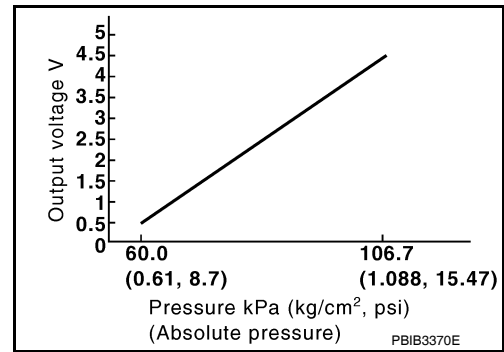
DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

Component Description

INFOID:000000006150690

The EVAP control system pressure sensor (1) detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.

- This illustration is a view from under vehicle
- EVAP canister (2)
- EVAP canister vent control valve (3)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150691

Specification data are reference values.

Monitor item	Condition	Specification
EVAP SYS PRES	• Ignition switch: ON	Approx. 1.8 - 4.8 V

On Board Diagnosis Logic

INFOID:000000006150692

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0453 0453	EVAP control system pressure sensor high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (EVAP control system pressure sensor circuit is open or sorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Accelerator pedal position sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) • EVAP control system pressure sensor • Crankshaft position sensor (POS) • Accelerator pedal position sensor • Refrigerant pressure sensor • EVAP canister vent control valve • EVAP canister • Drain filter • Rubber hose to EVAP canister vent control valve

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[QR25DE]

DTC Confirmation Procedure

INFOID:000000006150693

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

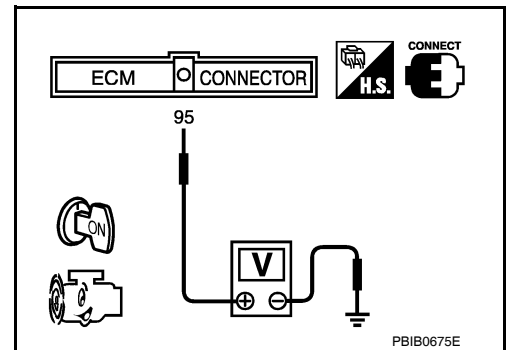
Always perform test at a temperature of 5°C (41°F) or more.

④ WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "DATA MONITOR" mode with CONSULT-III.
5. Check that "FUEL T/TMP SE" is more than 0°C (32°F).
6. Wait at least 10 seconds.
7. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-1482, "Diagnosis Procedure"](#).

⑤ WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 95 (Fuel tank temperature sensor signal) and ground is less than 4.2 V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Wait at least 10 seconds.
5. Select Service \$07 with GST.
If 1st trip DTC is detected, go to [EC-1482, "Diagnosis Procedure"](#).



DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

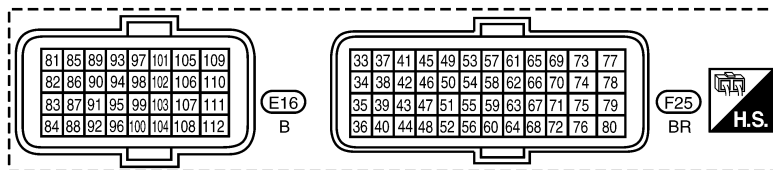
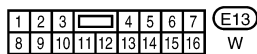
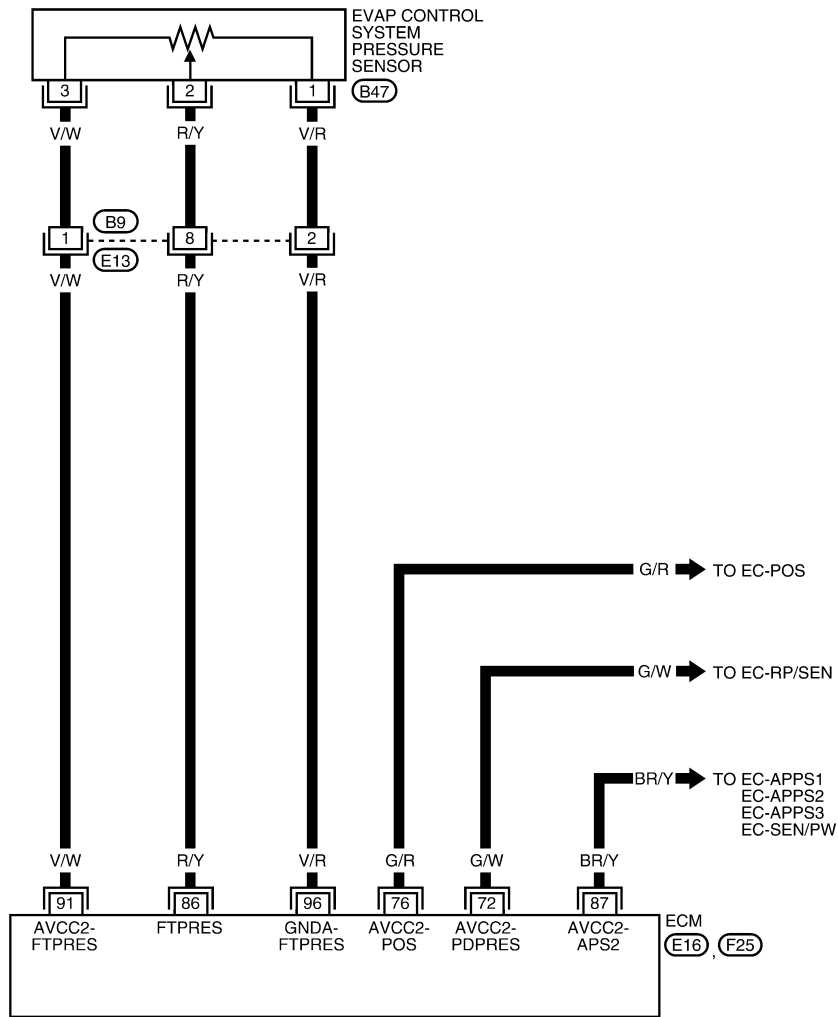
[QR25DE]

Wiring Diagram

INFOID:000000006150694

EC-PRE/SE-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[QR25DE]

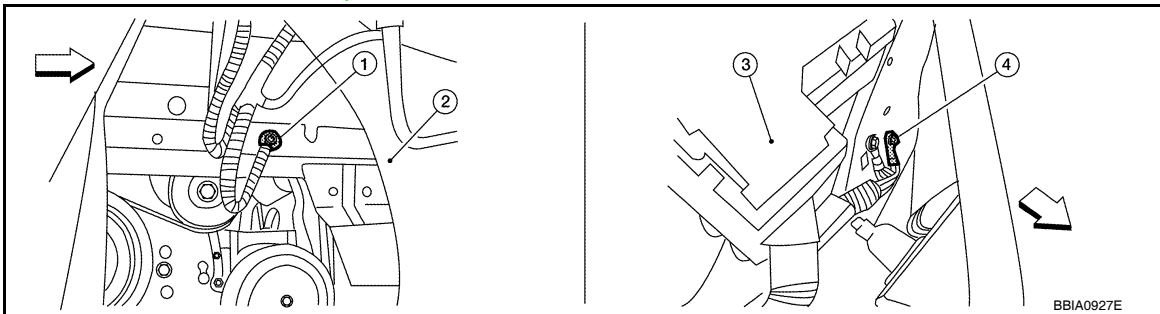
TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
72	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
76	G/R	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
86	R/Y	EVAP control system pressure sensor	[Ignition switch: ON]	Approximately 1.8 - 4.8 V
87	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
91	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
96	V/R	Sensor ground (EVAP control system pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006150695

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

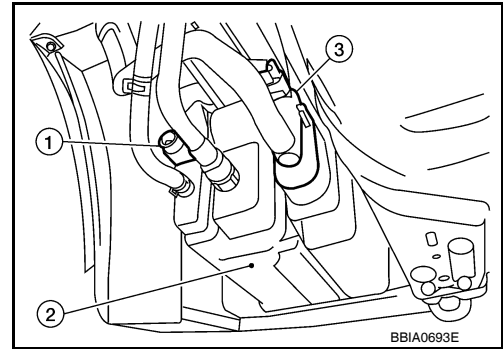
2. CHECK CONNECTOR

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

< SERVICE INFORMATION >

1. Disconnect EVAP control system pressure sensor (1) harness connector.
 - This illustration is a view from under vehicle
 - EVAP canister (2)
 - EVAP canister vent control valve (3)
2. Check that water is not inside connectors.



OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace harness connector.

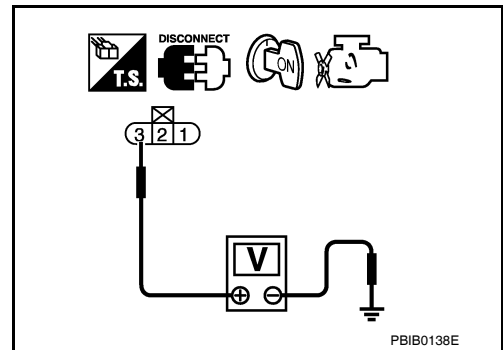
3.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 11.
- NG >> GO TO 4.



4.CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 3 and ECM terminal 91. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

5.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness for open between EVAP control system pressure sensor and ECM

>> Repair open circuit.

6.CHECK POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
72	Refrigerant pressure sensor terminal 3	EC-1654. "Wiring Diagram"
76	Crankshaft position sensor (POS) terminal 1	EC-1416. "Wiring Diagram"
87	APP sensor terminal 5	EC-1595. "Wiring Diagram"
91	EVAP control system pressure sensor terminal 3	EC-1474. "Wiring Diagram"

OK or NG

- OK >> GO TO 7.
- NG >> Repair short to ground or short to power in harness or connectors.

7.CHECK REFRIGERANT PRESSURE SENSOR

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

< SERVICE INFORMATION >

Refer to [MTC-28](#).

OK or NG

OK >> GO TO 8.

NG >> Replace refrigerant pressure sensor. Refer to [MTC-92, "Removal and Installation for Refrigerant Pressure Sensor"](#).

8. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-1478, "Component Inspection"](#).

OK or NG

OK >> GO TO 9.

NG >> Replace crankshaft position sensor (POS). Refer to [EM-189, "Disassembly and Assembly"](#).

9. CHECK APP SENSOR

Refer to [EC-1598, "Component Inspection"](#).

OK or NG

OK >> GO TO 22.

NG >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> **INSPECTION END**

11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 96. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 86 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 15.

NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B9, E13

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[QR25DE]

- Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK RUBBER TUBE

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging, vent and kinked.

OK or NG

OK >> GO TO 16.

NG >> Clean the rubber tube using an air blower, repair or replace rubber tube.

16. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1462, "Component Inspection"](#).

OK or NG

OK >> GO TO 17.

NG >> Replace EVAP canister vent control valve. Refer to [FL-14, "Removal and Installation"](#).

17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1486, "Component Inspection"](#).

OK or NG

OK >> GO TO 18.

NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

18. CHECK DRAIN FILTER

Refer to [EC-1436, "Component Inspection"](#).

OK or NG

OK >> GO TO 19.

NG >> Replace drain filter.

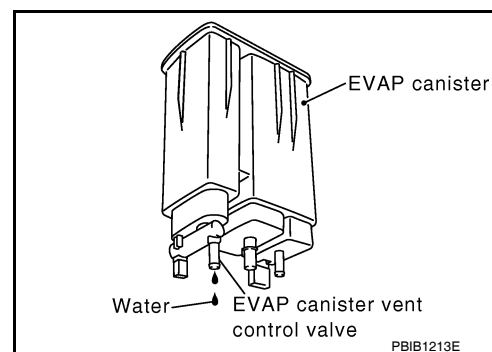
19. CHECK IF EVAP CANISTER IS SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached. Refer to [FL-14, "Removal and Installation"](#).
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 20.

No >> GO TO 21.



20. 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 1.9 kg (4.2 lb).

OK or NG

OK >> GO TO 22.

NG >> GO TO 21.

21. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and drain filter for clogging or poor connection

DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

< SERVICE INFORMATION >

[QR25DE]

>> Repair hose or replace EVAP canister. Refer to [FL-14, "Removal and Installation"](#).

22. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150696

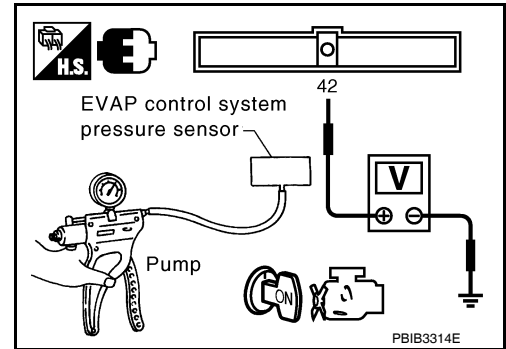
EVAP CONTROL PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister. Refer to [FL-14, "Removal and Installation"](#).
Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 42 (EVAP control system pressure sensor signal) and ground under the following conditions.

Applied vacuum kPa (kg/cm ² , psi)	Voltage (V)
Not applied	1.8 - 4.8
-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/cm², -13.53 psi) or pressure over 101.3 kPa (1.033 kg/cm², 14.69 psi).
4. If NG, replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).



DTC P0455 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

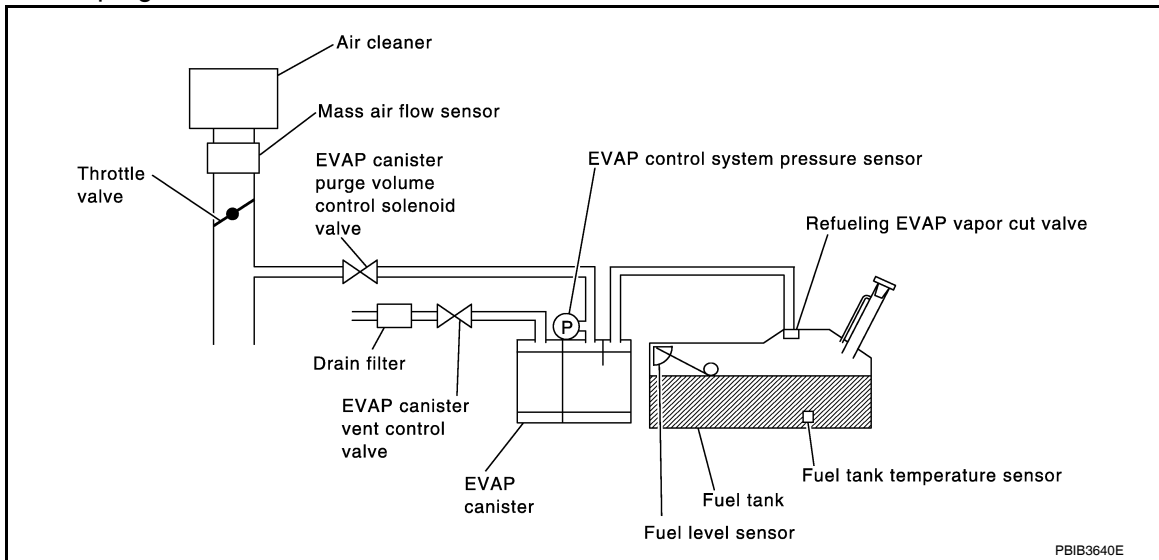
[QR25DE]

DTC P0455 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

INFOID:000000006150697

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in EVAP system between the fuel tank and EVAP canister purge volume control solenoid valve.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0455 0455	EVAP control system gross leak detected	<ul style="list-style-type: none"> EVAP control system has a very large leak such as fuel filler cap fell off. EVAP control system does not operate properly. 	<ul style="list-style-type: none"> Fuel filler cap remains open or fails to close. Incorrect fuel tank vacuum relief valve Incorrect fuel filler cap used Foreign matter caught in fuel filler cap Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve Foreign matter caught in EVAP canister vent control valve. EVAP canister or fuel tank leaks EVAP purge line (pipe and rubber tube) leaks EVAP purge line rubber tube bent. Loose or disconnected rubber tube EVAP canister vent control valve and the circuit Drain filter EVAP canister purge volume control solenoid valve and the circuit Fuel tank temperature sensor O-ring of EVAP canister vent control valve is missing or damaged. EVAP control system pressure sensor Refueling EVAP vapor cut valve ORVR system leaks

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.

DTC Confirmation Procedure

INFOID:000000006150698

CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

DTC P0455 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedure.

Ⓜ WITH CONSULT-III

1. Tighten fuel filler cap securely until reteaching sound is heard.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
5. Check that the following conditions are met.
COOLAN TEMP/S: 0 - 100°C (32 - 212°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
6. Select “EVP SML LEAK P0442/P1442” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-III.
Follow the instruction displayed.
NOTE:
If the engine speed cannot be maintained within the range displayed on the CONSULT-III screen, go to [EC-1177, "Basic Inspection"](#).
7. Check that “OK” is displayed.
If “NG” is displayed, select “SELF-DIAG RESULTS” mode with CONSULT-III and check that “EVAP GROSS LEAK [P0455]” is displayed. If it is displayed, refer to [EC-1488, "Diagnosis Procedure"](#).
If P0442 is displayed, perform Diagnostic Procedure for DTC P0442, [EC-1438, "Diagnosis Procedure"](#).

Ⓜ WITH GST

NOTE:

Be sure to read the explanation of Driving Pattern on [EC-1144, "Emission-related Diagnostic Information"](#) before driving vehicle.

1. Start engine.
 2. Drive vehicle according to Driving Pattern, [EC-1144, "Emission-related Diagnostic Information"](#).
 3. Stop vehicle.
 4. Turn ignition switch OFF, wait at least 10 seconds and then turn ignition switch ON.
 5. Select Service \$07 with GST.
- If P0441 is displayed on the screen, go to [EC-1433, "Diagnosis Procedure"](#).
 - If P0442 is displayed on the screen, go to [EC-1438, "Diagnosis Procedure"](#).
 - If P0455 is displayed on the screen, go to [EC-1488, "Diagnosis Procedure"](#).

Diagnosis Procedure

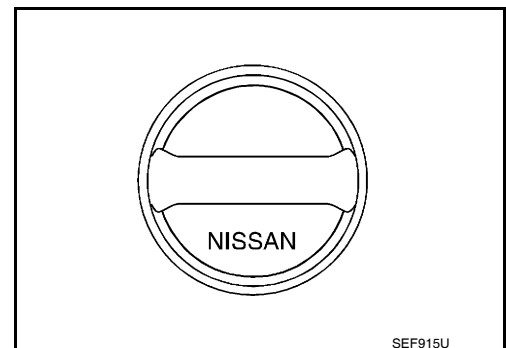
INFOID:000000006150699

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap. Refer to [FL-10, "Component"](#).



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

DTC P0455 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

- OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until rereaching sound is heard.

3.CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4.CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-1129, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one. Refer to [FL-10, "Component"](#).

5.CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection.

Refer to [EC-1127](#).

OK or NG

- OK >> GO TO 6.
NG >> Repair or reconnect the hose.

6.CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 7.

7.CHECK DRAIN FILTER

Refer to [EC-1492, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
NG >> Replace drain filter.

8.CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control is installed properly.
Refer to [FL-14, "Removal and Installation"](#).
- EVAP canister vent control valve.
Refer to [EC-1462, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14, "Removal and Installation"](#).

9.INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely. For the location of EVAP service port (1), refer to [EC-1127, "Description"](#).

DTC P0455 EVAP CONTROL SYSTEM

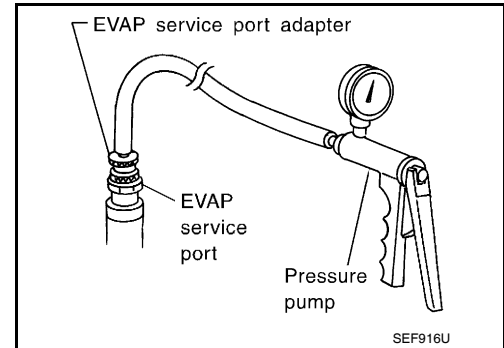
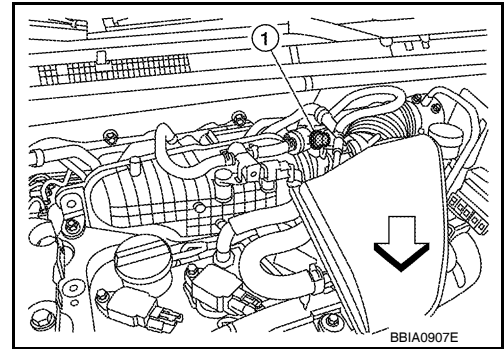
[QR25DE]

< SERVICE INFORMATION >

• ⇐: Vehicle front

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



With CONSULT-III>>GO TO 10.
Without CONSULT-III>>GO TO 11.

10. CHECK FOR EVAP LEAK

Ⓟ **With CONSULT-III**

1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-III.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

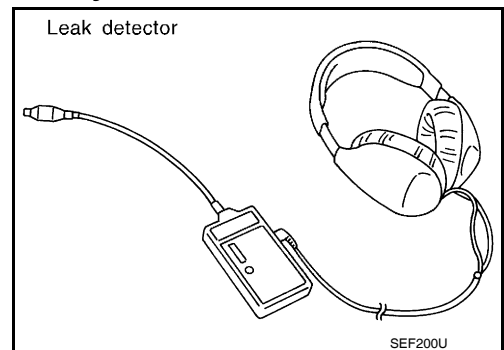
CAUTION:

- Never use compressed air or a high pressure pump.
- Never exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.
Refer to [EC-1127, "Description"](#).

OK or NG

- OK >> GO TO 12.
NG >> Repair or replace.



11. CHECK FOR EVAP LEAK

ⓧ **Without CONSULT-III**

1. Turn ignition switch OFF.

DTC P0455 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

- Apply 12 volts DC to EVAP canister vent control valve (3). The valve will close. (Continue to apply 12 volts until the end of test.)
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
- Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (0.013 to 0.028 kg/cm², 0.19 to 0.39 psi), then remove pump and EVAP service port adapter.

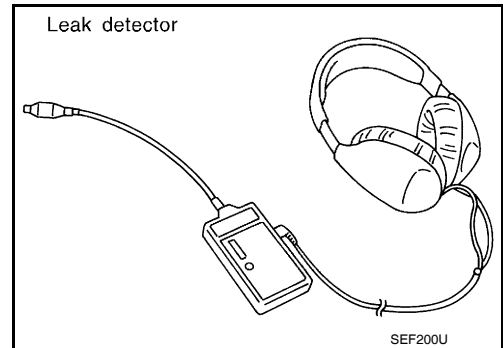
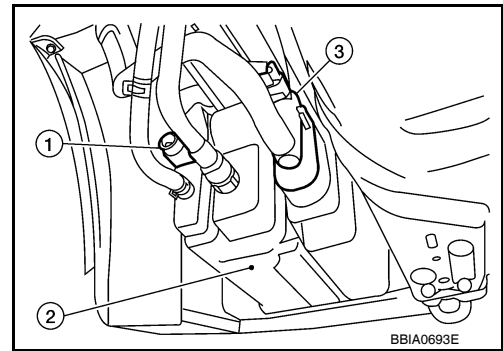
CAUTION:

- Never use compressed air or a high pressure pump.
- Never exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

- Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1127, "Description"](#).

OK or NG

- OK >> GO TO 13.
NG >> Repair or replace.



12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-III

- Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
- Start engine.
- Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
- Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
- Check vacuum hose for vacuum.

Vacuum should exist.

OK or NG

- OK >> GO TO 15.
NG >> GO TO 14.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-III

- Start engine and warm it up to normal operating temperature.
- Stop engine.
- Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
- Start engine and let it idle for at least 80 seconds.
- Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

Vacuum should exist.

OK or NG

- OK >> GO TO 16.
NG >> GO TO 14.

14. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-1204, "Vacuum Hose Drawing"](#).

OK or NG

- OK (With CONSULT-III) >> GO TO 15.
OK (Without CONSULT-III) >> GO TO 16.
NG >> Repair or reconnect the hose.

DTC P0455 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-III

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-III. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 17.
NG >> GO TO 16.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1457, "Component Inspection"](#).

OK or NG

- OK >> GO TO 17.
NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-135, "Removal and Installation"](#).

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-1395, "Component Inspection"](#).

OK or NG

- OK >> GO TO 18.
NG >> Replace fuel level sensor unit. Refer to [FL-6, "Removal and Installation"](#).

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1478, "Component Inspection"](#).

OK or NG

- OK >> GO TO 19.
NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

19. CHECK EVAP/ORVR LINE

Check refueling EVAP/ORVR line between EVAP canister and fuel tank for clogging, kinks, looseness and improper connection. For location, refer to [EC-1132](#).

OK or NG

- OK >> GO TO 20.
NG >> Repair or replace hoses and tubes. Refer to [FL-10, "Removal and Installation"](#).

20. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kinks, cracks, looseness and improper connection.

OK or NG

- OK >> GO TO 21.
NG >> Repair or replace hoses, tubes or filler neck tube. Refer to [FL-10, "Removal and Installation"](#).

21. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1135, "Component Inspection"](#).

OK or NG

- OK >> GO TO 22.
NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-10, "Removal and Installation"](#).

22. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150700

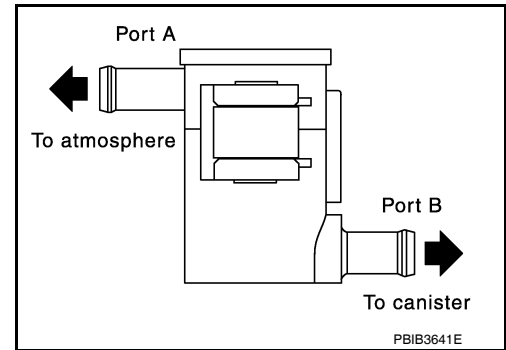
DRAIN FILTER

DTC P0455 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter.



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DTC P0456 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[QR25DE]

DTC P0456 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

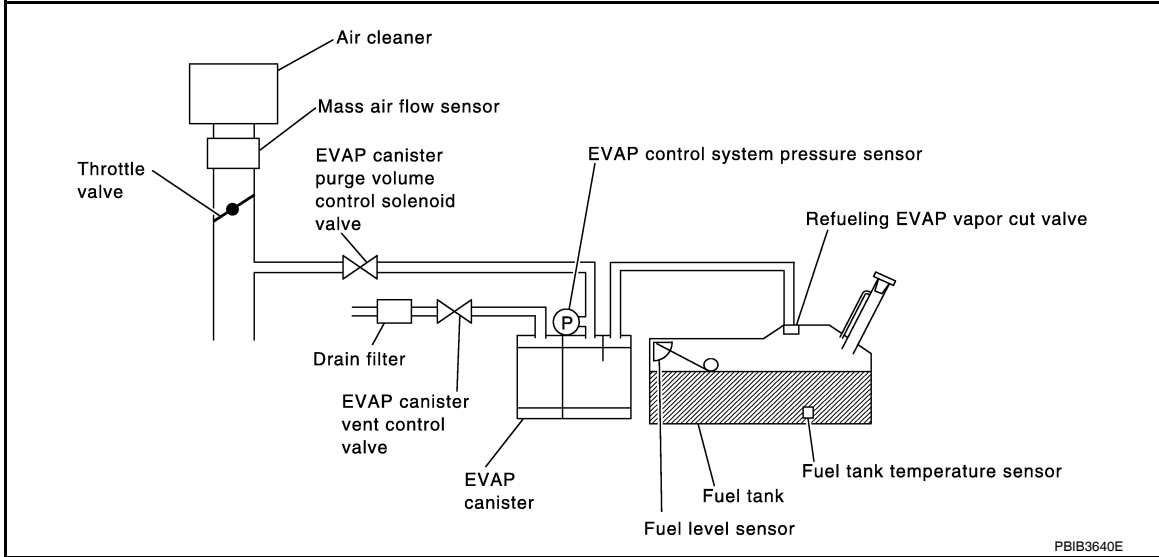
INFOID:000000006150701

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold vacuum in the same way as conventional EVAP small leak diagnosis.

If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.

If ECM judges that there are no leaks, the diagnosis will be OK.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0456 0456	Evaporative emission control system very small leak (negative pressure check)	<ul style="list-style-type: none"> EVAP system has a very small leak. EVAP system does not operate properly. 	<ul style="list-style-type: none"> Incorrect fuel tank vacuum relief valve Incorrect fuel filler cap used Fuel filler cap remains open or fails to close. Foreign matter caught in fuel filler cap Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. Foreign matter caught in EVAP canister vent control valve EVAP canister or fuel tank leaks EVAP purge line (pipe and rubber tube) leaks EVAP purge line rubber tube bent Loose or disconnected rubber tube EVAP canister vent control valve and the circuit EVAP canister purge volume control solenoid valve and the circuit Fuel tank temperature sensor Drain filter O-ring of EVAP canister vent control valve is missing or damaged EVAP canister is saturated with water EVAP control system pressure sensor Refueling EVAP vapor cut valve ORVR system leaks Fuel level sensor and the circuit Foreign matter caught in EVAP canister purge volume control solenoid valve

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.

DTC P0456 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[QR25DE]

DTC Confirmation Procedure

INFOID:000000006150702

NOTE:

- If DTC P0456 is displayed with P0442, first perform trouble diagnosis for DTC P0456.
- After repair, check that the hoses and clips are installed properly.
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Open engine hood before conducting following procedure.
- If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.
 - Fuel filler cap is removed.
 - Refilled or drained the fuel.
 - EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

Ⓜ WITH CONSULT-III

1. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-III.
2. Check that the following conditions are met.
 - FUEL LEVEL SE: 0.25 - 1.4 V**
 - COOLAN TEMP/S: 0 - 32°C (32 - 90°F)**
 - FUEL T/TMP SE: 0 - 35°C (32 - 95°F)**
 - INT/A TEMP SE: More than 0°C (32°F)**If NG, turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle), or refill/drain fuel until the output voltage of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select "EVP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-III.
Follow the instruction displayed.
6. Check that "OK" is displayed.
If "NG" is displayed, refer to [EC-1496, "Diagnosis Procedure"](#).

NOTE:

If the engine speed cannot be maintained within the range displayed on CONSULT-III screen, go to [EC-1177, "Basic Inspection"](#).

Overall Function Check

INFOID:000000006150703

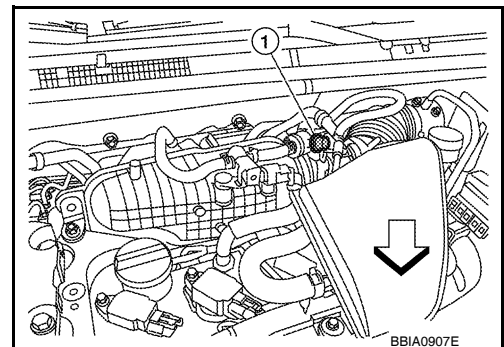
Ⓜ WITH GST

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a 1st trip DTC might not be confirmed.

CAUTION:

- Never use compressed air, doing so may damage the EVAP system.
- Never start engine.
- Never exceeded 4.12 kPa (0.042 kg/cm², 0.6 psi).

1. Attach the EVAP service port (1) adapter securely to the EVAP service port.
 - ⇐: Vehicle front



DTC P0456 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

2. Set the pressure pump and a hose.
3. Also set the pressure pump with pressure gauge to the EVAP service port adapter.
4. Turn ignition switch ON.
5. Connect GST and select Service \$08.
6. Using Service \$08 control the EVAP canister vent control valve (close).
7. Apply pressure and check that the following conditions are satisfied.

Pressure to be applied: 2.7 kPa (0.028 kg/cm², 0.39 psi)

Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and

the pressure should not be dropped more than 0.4 kPa (0.0041 kg/cm², 0.06 psi).

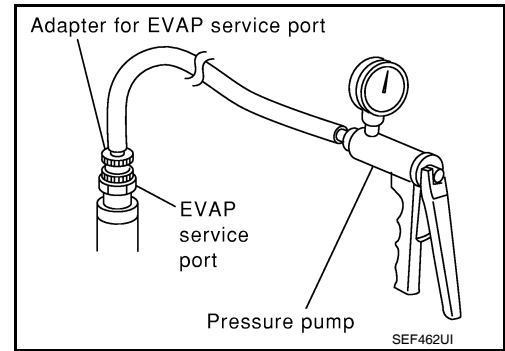
If NG, go to [EC-1496, "Diagnosis Procedure"](#).

If OK, go to next step.

8. Disconnect GST.
9. Start engine and warm it up to normal operating temperature.
10. Turn ignition switch OFF and wait at least 10 seconds.
11. Restart engine and let it idle for 90 seconds.
12. Keep engine speed at 2,000 rpm for 30 seconds.
13. Turn ignition switch OFF.

NOTE:

For more information, refer to GST Instruction Manual.



Diagnosis Procedure

INFOID:000000006150704

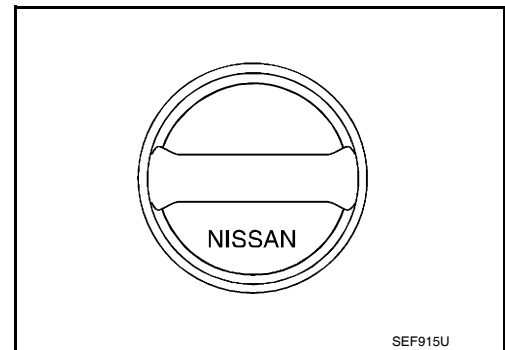
1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

OK >> GO TO 2.

NG >> Replace with genuine NISSAN fuel filler cap. Refer to [FL-10, "Component"](#).



2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

OK >> GO TO 3.

NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until ratcheting sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-1129, "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace fuel filler cap with a genuine one. Refer to [FL-10, "Component"](#).

DTC P0456 EVAP CONTROL SYSTEM

< SERVICE INFORMATION >

[QR25DE]

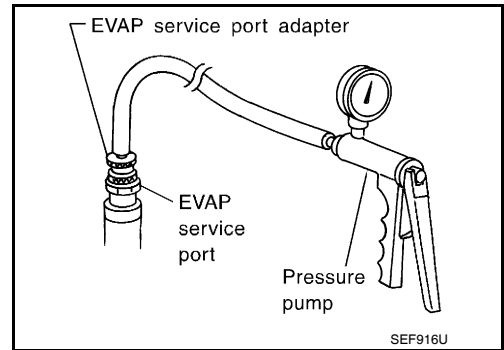
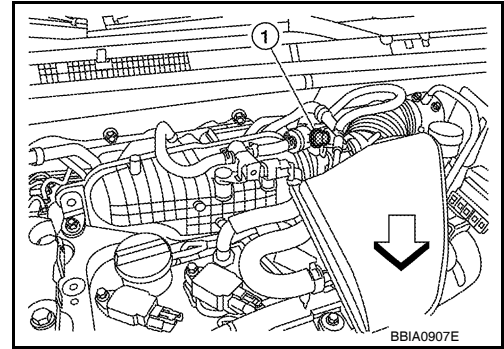
5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port (1) adapter and pressure pump to EVAP service port securely. For the location of EVAP service port, refer to [EC-1127, "Description"](#).

- ⇐: Vehicle front

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



With CONSULT-III>>GO TO 6.
Without CONSULT-III>>GO TO 7.

6. CHECK FOR EVAP LEAK

With CONSULT-III

1. Turn ignition switch ON.
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-III.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

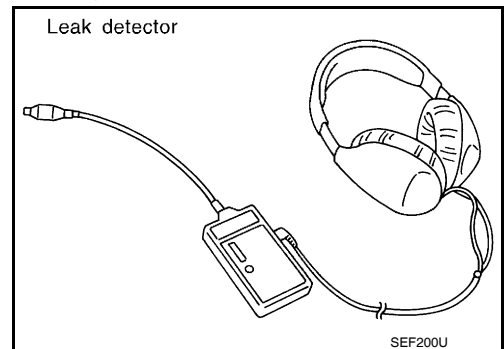
CAUTION:

- **Never use compressed air or a high pressure pump.**
- **Never exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.**

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.
Refer to [EC-1127, "Description"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace.



7. CHECK FOR EVAP LEAK

Without CONSULT-III

1. Turn ignition switch OFF.

DTC P0456 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

- Apply 12 volts DC to EVAP canister vent control valve (3). The valve will close. (Continue to apply 12 volts until the end of test.)
 - This illustration is a view from under vehicle
 - EVAP control system pressure sensor (1)
 - EVAP canister (2)
- Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (0.0133 to 0.028 kg/cm², 0.19 to 0.39 psi), then remove pump and EVAP service port adapter.

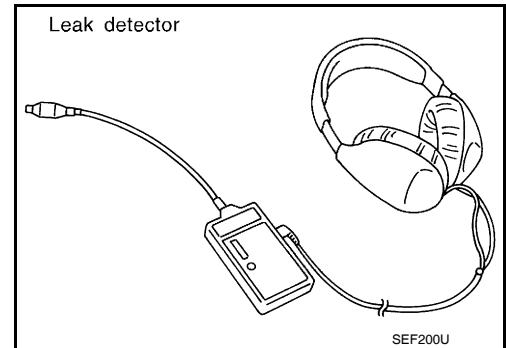
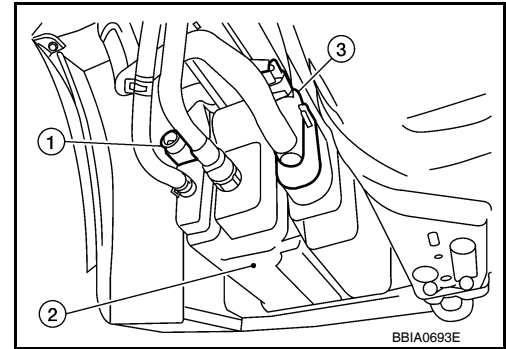
CAUTION:

- Never use compressed air or a high pressure pump.
- Never exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

- Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1127, "Description"](#).

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace.



8. CHECK DRAIN FILTER

Refer to [EC-1500, "Component Inspection"](#).

OK or NG

- OK >> GO TO 9.
NG >> Replace drain filter.

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control valve is installed properly. Refer to [FL-14, "Removal and Installation"](#).
- EVAP canister vent control valve. Refer to [EC-1462, "Component Inspection"](#).

OK or NG

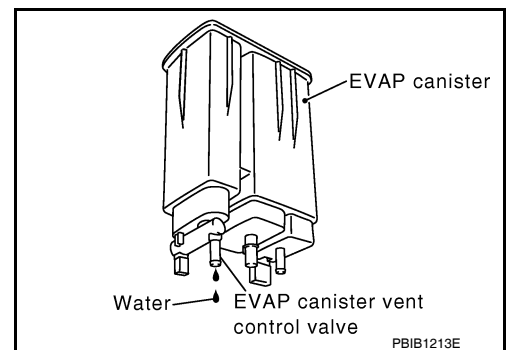
- OK >> GO TO 10.
NG >> Repair or replace EVAP canister vent control valve and O-ring. Refer to [FL-14, "Removal and Installation"](#).

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 [FL-14, "Removal and Installation"](#).
- Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 11.
No (With CONSULT-III)>>GO TO 13.
No (Without CONSULT-III)>>GO TO 14.



11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

DTC P0456 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

The weight should be less than 1.9 kg (4.2 lb).

OK or NG

- OK (With CONSULT-III)>>GO TO 13.
- OK (Without CONSULT-III)>>GO TO 14.
- NG >> 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-14, "Removal and Installation"](#).

13.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

 **With CONSULT-III**

1. Disconnect vacuum hose connected to EVAP service port and EVAP canister purge volume control solenoid valve from EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-III screen to increase "PURG VOL CONT/V" opening to 100%.
5. Check vacuum hose for vacuum.

Vacuum should exist.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

14.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

 **Without CONSULT-III**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose connected to EVAP service port and EVAP canister purge volume control solenoid valve from 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.

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 15.

15.CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-1204, "Vacuum Hose Drawing"](#).

OK or NG

- OK >> GO TO 16.
- NG >> Repair or reconnect the hose.

16.CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1457, "Component Inspection"](#).

OK or NG

- OK >> GO TO 17.
- NG >> Replace EVAP canister purge volume control solenoid valve. Refer to [EM-135, "Removal and Installation"](#).

17.CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-1395, "Component Inspection"](#).

OK or NG

DTC P0456 EVAP CONTROL SYSTEM

[QR25DE]

< SERVICE INFORMATION >

- OK >> GO TO 18.
NG >> Replace fuel level sensor unit. Refer to [FL-6, "Removal and Installation"](#).

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1478, "Component Inspection"](#).

OK or NG

- OK >> GO TO 19.
NG >> Replace EVAP control system pressure sensor. Refer to [FL-14, "Removal and Installation"](#).

19. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-1127, "Description"](#).

OK or NG

- OK >> GO TO 20.
NG >> Repair or reconnect the hose.

20. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 21.

21. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kinks, looseness and improper connection. For location, refer to [EC-1132](#).

OK or NG

- OK >> GO TO 22.
NG >> Repair or replace hoses and tubes. Refer to [FL-10, "Removal and Installation"](#).

22. CHECK RECIRCULATION LINE

Check recirculation line between filler neck tube and fuel tank for clogging, kinks, cracks, looseness and improper connection.

OK or NG

- OK >> GO TO 23.
NG >> Repair or replace hose, tube or filler neck tube. Refer to [FL-10, "Removal and Installation"](#).

23. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1135, "Component Inspection"](#).

OK or NG

- OK >> GO TO 24.
NG >> Replace refueling EVAP vapor cut valve with fuel tank. Refer to [FL-10, "Removal and Installation"](#).

24. CHECK FUEL LEVEL SENSOR

Refer to [FL-6](#).

OK or NG

- OK >> GO TO 25.
NG >> Replace fuel level sensor unit. Refer to [FL-6, "Removal and Installation"](#).

25. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150705

DRAIN FILTER

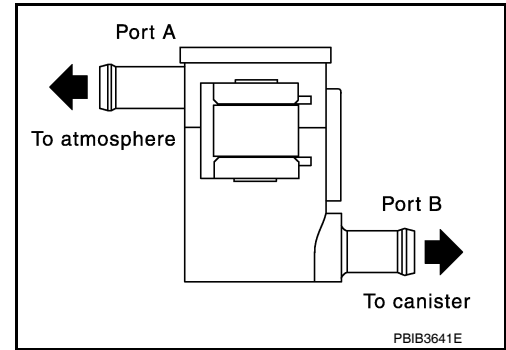
1. Check visually for insect nests in the drain filter air inlet.
2. Check visually for cracks or flaws in the appearance.

DTC P0456 EVAP CONTROL SYSTEM

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3. Check visually for cracks or flaws in the hose.
4. Blow air into port A and check that it flows freely out of port B.
5. Block port B.
6. Blow air into port A and check that there is no leakage.
7. If NG, replace drain filter.



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DTC P0460 FUEL LEVEL SENSOR

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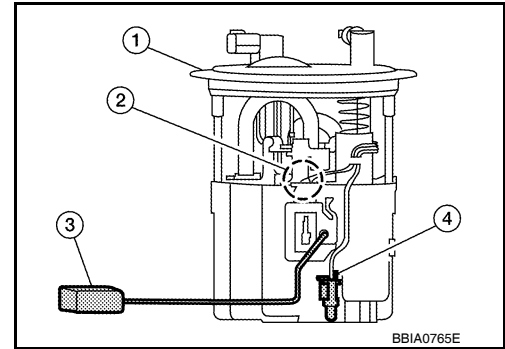
DTC P0460 FUEL LEVEL SENSOR

Component Description

INFOID:000000006150706

The fuel level sensor (3) 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 through CAN communication line. It consists of two parts, one is mechanical float and the other is variable resistor.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel tank temperature sensor (4)



On Board Diagnosis Logic

INFOID:000000006150707

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 [EC-1519](#).

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0460 0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Fuel level sensor circuit is open or shorted)• Combination meter• Fuel level sensor

DTC Confirmation Procedure

INFOID:000000006150708

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Start engine and wait maximum of 2 consecutive minutes.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1502, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150709

1. CHECK FUEL GAUGE OPERATION

Refer to [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

OK or NG

OK >> GO TO 2.

NG >> Follow the instruction of [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to [DI-19, "Fuel Level Sensor Signal Inspection"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning parts.

DTC P0460 FUEL LEVEL SENSOR

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3.CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

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DTC P0461 FUEL LEVEL SENSOR

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DTC P0461 FUEL LEVEL SENSOR

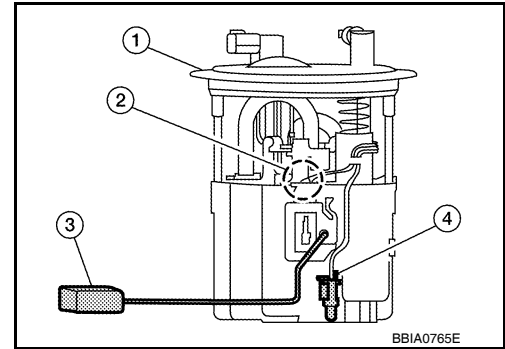
Component Description

INFOID:000000006150711

The fuel level sensor (3) 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 through 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 level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel tank temperature sensor (4)



On Board Diagnosis Logic

INFOID:000000006150712

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 [EC-1519](#).

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven. Driving long distances naturally affect fuel gauge level.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461 0461	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 distance.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Fuel level sensor circuit is open or shorted)• Combination meter• Fuel level sensor

Overall Function Check

INFOID:000000006150713

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

WARNING:

When performing following procedure, be sure to observe the handling of the fuel.

Refer to [FL-10](#).

TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

WITH CONSULT-III

NOTE:

Start from step 10, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-1185, "Fuel Pressure Check"](#).
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-III.
7. Check "FUEL LEVEL SE" output voltage and note it.
8. Select "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-III.
9. Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
10. Check "FUEL LEVEL SE" output voltage and note it.
11. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).

DTC P0461 FUEL LEVEL SENSOR

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< SERVICE INFORMATION >

12. Check "FUEL LEVEL SE" output voltage and note it.
13. Confirm whether the voltage changes more than 0.03 V during step 7 to 10 and 10 to 12.
If NG, go to [EC-1505. "Diagnosis Procedure"](#).

 WITH GST

NOTE:

Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-1185. "Fuel Pressure Check"](#).
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 ON.
6. Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
7. Confirm that the fuel gauge indication varies.
8. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
9. Confirm that the fuel gauge indication varies.
10. If NG, go to [EC-1505. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150714

1. CHECK FUEL GAUGE OPERATION

Refer to [DI-14. "Self-Diagnosis Mode of Combination Meter"](#).

OK or NG

OK >> GO TO 2.

NG >> Follow the instruction of [DI-14. "Self-Diagnosis Mode of Combination Meter"](#).

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to [DI-19. "Fuel Level Sensor Signal Inspection"](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning parts.

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

DTC P0462, P0463 FUEL LEVEL SENSOR

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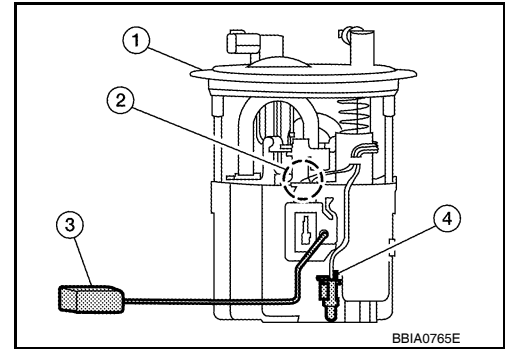
DTC P0462, P0463 FUEL LEVEL SENSOR

Component Description

INFOID:000000006150716

The fuel level sensor (3) 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 through 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 level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel tank temperature sensor (4)



On Board Diagnosis Logic

INFOID:000000006150717

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 [EC-1519](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Fuel level sensor circuit is open or shorted)• Combination meter• Fuel level sensor
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

INFOID:000000006150718

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at ignition switch ON.

1. Turn ignition switch ON and wait at least 5 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1506, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150719

1. CHECK FUEL GAUGE OPERATION

Refer to [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

OK or NG

- OK >> GO TO 2.
- NG >> Follow the instruction of [DI-14, "Self-Diagnosis Mode of Combination Meter"](#).

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to [DI-19, "Fuel Level Sensor Signal Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace malfunctioning parts.

DTC P0462, P0463 FUEL LEVEL SENSOR

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3. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

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DTC P0500 VSS

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DTC P0500 VSS

Description

INFOID:000000006150721

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-1519](#).

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.

On Board Diagnosis Logic

INFOID:000000006150722

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 following status continuously for 5 seconds or more: The difference between a vehicle speed calculated by a secondary speed sensor transmitted from TCM to ECM via CAN communication and the vehicle speed indicated on the combination meter exceeds 15km/h (10 MPH).	<ul style="list-style-type: none">• Harness or connector (The CAN communication line is open or shorted.)• Combination meter• ABS actuator and electric unit (control unit)• Wheel sensor• TCM• Secondary speed sensor

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode.

Detected item	Engine operating condition in fail-safe mode
Vehicle speed sensor	When the fail-safe system for vehicle speed sensor is activated, the cooling fan operates (High) while engine is running.

DTC Confirmation Procedure

INFOID:000000006150723

1.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.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Start engine.
2. Shift the selector lever to D range and wait at least for 2 seconds.
3. 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 [EC-1508, "Diagnosis Procedure"](#)

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006150725

1.CHECK DTC WITH TCM

Check DTC with TCM. Refer to [CVT-47, "CONSULT-III Function \(TRANSMISSION\)"](#).

DTC P0500 VSS

[QR25DE]

< SERVICE INFORMATION >

Is the inspection result normal?

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 [BRC-20, "CONSULT-III Function \(ABS\)"](#) (ABS models) or [BRC-58, "CONSULT-III Function \(ABS\)"](#) (VDC models).

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 [DI-15, "CONSULT-III Function \(METER/M&A\)"](#).

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 [CVT-78, "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-25, "Wheel Sensor System"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [EC-1236, "Diagnosis Procedure"](#).

NO >> Replace or replace error-detected parts.

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DTC P0506 ISC SYSTEM

Description

INFOID:000000006150726

NOTE:

If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

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 ECM calculates the actual engine speed from signals of crankshaft position sensor (POS) and camshaft position sensor (PHASE).

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.).

On Board Diagnosis Logic

INFOID:000000006150727

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0506 0506	Idle speed control system RPM lower than expected	The idle speed is less than the target idle speed by 100 rpm or more.	<ul style="list-style-type: none"> • Electric throttle control actuator • Intake air leak

DTC Confirmation Procedure

INFOID:000000006150728

NOTE:

- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform [EC-1183, "Idle Air Volume Learning"](#), before conducting DTC Confirmation Procedure. For the target idle speed, refer to the [EC-1660](#).**

TESTING CONDITION:

- **Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.**
- **Always perform the test at a temperature above -10°C (14°F).**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and run it for at least 1 minute at idle speed.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-1510, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150729

1. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 2.
NG >> Discover air leak location and repair.

2. REPLACE ECM

1. Stop engine.
2. Replace ECM.
3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [BL-171, "ECM Re-communicating Function"](#).
4. Perform [EC-1183, "VIN Registration"](#).
5. Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).
6. Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).
7. Perform [EC-1183, "Idle Air Volume Learning"](#).

DTC P0506 ISC SYSTEM

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DTC P0507 ISC SYSTEM

Description

INFOID:000000006150730

NOTE:

If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

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 ECM calculates the actual engine speed from signals of camshaft position sensor (POS) and camshaft position sensor (PHASE).

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.).

On Board Diagnosis Logic

INFOID:000000006150731

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0507 0507	Idle speed control system RPM higher than expected	The idle speed is more than the target idle speed by 200 rpm or more.	<ul style="list-style-type: none"> • Electric throttle control actuator • Intake air leak • PCV system

DTC Confirmation Procedure

INFOID:000000006150732

NOTE:

- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform [EC-1183, "Idle Air Volume Learning"](#), before conducting DTC Confirmation Procedure. For the target idle speed, refer to the [EC-1660](#).**

TESTING CONDITION:

- **Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.**
- **Always perform the test at a temperature above -10°C (14°F).**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and run it for at least 1 minute at idle speed.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-1512, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150733

1.CHECK PCV HOSE CONNECTION

Confirm that PCV hose is connected correctly.

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace.

2.CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 3.
- NG >> Discover air leak location and repair.

3.REPLACE ECM

1. Stop engine.
2. Replace ECM.

DTC P0507 ISC SYSTEM

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3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).
4. Perform [EC-1183, "VIN Registration"](#).
5. Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).
6. Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).
7. Perform [EC-1183, "Idle Air Volume Learning"](#).

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DTC P0603 ECM POWER SUPPLY

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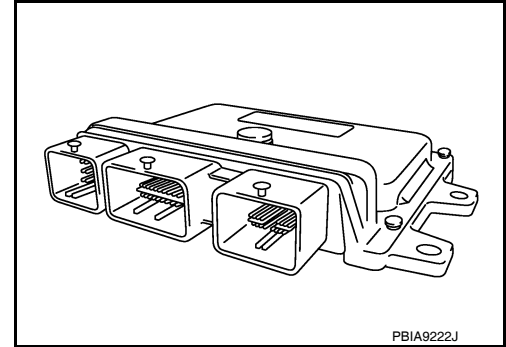
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DTC P0603 ECM POWER SUPPLY

Component Description

INFOID:000000006150734

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.



On Board Diagnosis Logic

INFOID:000000006150735

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0603 0603	ECM power supply circuit	ECM back-up RAM system does not function properly.	<ul style="list-style-type: none">• Harness or connectors [The ECM power supply (back-up) circuit is open or shorted.]• ECM

DTC Confirmation Procedure

INFOID:000000006150736

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON and wait at least 10 seconds.
2. Turn ignition switch OFF and wait at least 5 minutes.
3. Turn ignition switch ON and wait at least 10 seconds.
4. Repeat steps 2 and 3 for five times.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-1516. "Diagnosis Procedure"](#).

DTC P0603 ECM POWER SUPPLY

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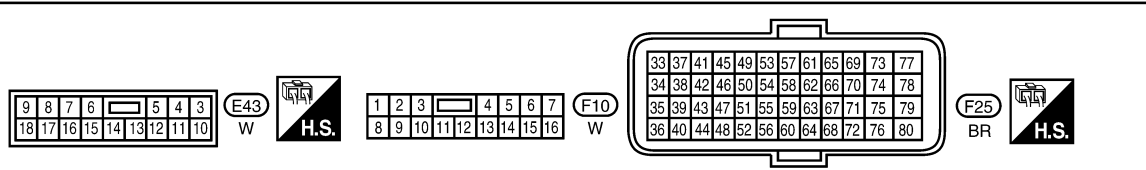
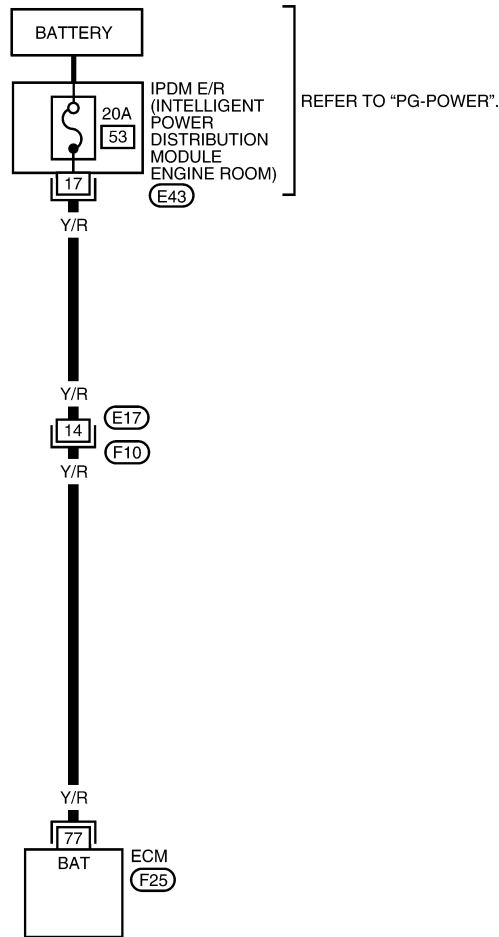
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Wiring Diagram

INFOID:000000006150737

EC-ECM/PW-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



AABWA0272GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0603 ECM POWER SUPPLY

[QR25DE]

< SERVICE INFORMATION >

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
77	Y/R	Power supply for ECM (Back-up)	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006150738

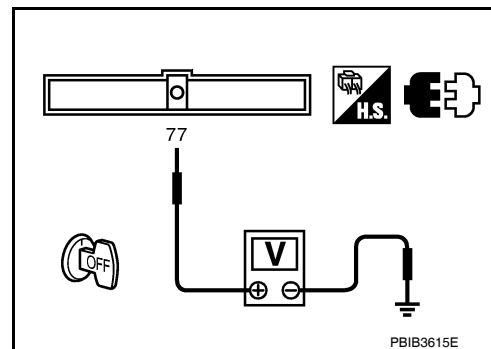
1. CHECK ECM POWER SUPPLY

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- 20 A fuse
- Harness for open or short between ECM and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace harness or connectors.

4. PERFORM DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. **Perform DTC Confirmation Procedure.**
See [EC-1514, "DTC Confirmation Procedure"](#).
3. Is the 1st trip DTC P0603 displayed again?

Yes or No

- Yes >> GO TO 5.
No >> **INSPECTION END**

5. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-170](#).
3. Perform [EC-1183, "VIN Registration"](#).
4. Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-1183, "Idle Air Volume Learning"](#).

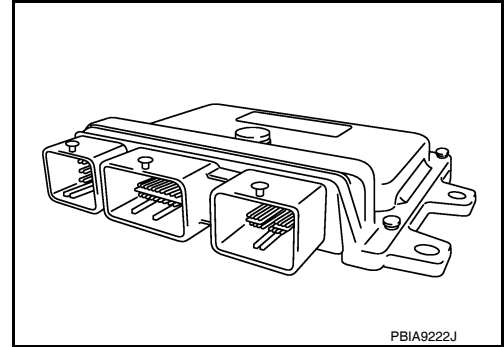
>> **INSPECTION END**

DTC P0605 ECM

Component Description

INFOID:000000006150739

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



On Board Diagnosis Logic

INFOID:000000006150740

This self-diagnosis has one or two trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	• ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

FAIL-SAFE MODE

ECM enters fail-safe mode when malfunction A is detected.

Detected items	Engine operation condition in fail-safe mode
Malfunction A	<ul style="list-style-type: none"> ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. ECM deactivates ASCD operation.

DTC Confirmation Procedure

INFOID:000000006150741

Perform **PROCEDURE FOR MALFUNCTION A** first. If the 1st trip DTC cannot be confirmed, perform **PROCEDURE FOR MALFUNCTION B**. If there is no malfunction on **PROCEDURE FOR MALFUNCTION B**, perform **PROCEDURE FOR MALFUNCTION C**.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

- Turn ignition switch ON.
- Check 1st trip DTC.
- If 1st trip DTC is detected, go to [EC-1518. "Diagnosis Procedure"](#).

PROCEDURE FOR MALFUNCTION B

- Turn ignition switch ON and wait at least 1 second.
- Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
- Check 1st trip DTC.
- If 1st trip DTC is detected, go to [EC-1518. "Diagnosis Procedure"](#).

PROCEDURE FOR MALFUNCTION C

- Turn ignition switch ON and wait at least 1 second.
- Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
- Repeat step 2 for 32 times.

< SERVICE INFORMATION >

4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-1518, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150742

1.INSPECTION START

1. Erase DTC.
2. **Perform DTC Confirmation Procedure.**
See [EC-1517, "DTC Confirmation Procedure"](#).
3. Is the 1st trip DTC P0605 displayed again?

Yes or No

- Yes >> GO TO 2.
No >> **INSPECTION END**

2.REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS(NATS) system and registration of all NVIS(NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).
3. Perform [EC-1183, "VIN Registration"](#).
4. Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-1183, "Idle Air Volume Learning"](#).

>> **INSPECTION END**

DTC P0607 ECM

Description

INFOID:000000006150743

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.

On Board Diagnosis Logic

INFOID:000000006150744

The MIL will not illuminate for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0607 0607	CAN communication bus	When detecting error during the initial diagnosis of CAN controller of ECM.	• ECM

DTC Confirmation Procedure

INFOID:000000006150745

1. Turn ignition switch ON.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1519, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150746

1.INSPECTION START

1. Erase DTC.
2. **Perform DTC Confirmation Procedure.**
See [EC-1519, "DTC Confirmation Procedure"](#).
3. Is the 1st trip DTC P0607 displayed again?

Yes or No

Yes >> GO TO 2.

No >> **INSPECTION END**

2.REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [EC-1183, "VIN Registration"](#).
3. Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).
4. Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).
5. Perform [EC-1183, "Idle Air Volume Learning"](#).

>> **INSPECTION END**

DTC P0643 SENSOR POWER SUPPLY

< SERVICE INFORMATION >

[QR25DE]

DTC P0643 SENSOR POWER SUPPLY

On Board Diagnosis Logic

INFOID:000000006150747

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0643 0643	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	<ul style="list-style-type: none">• Harness or connectors (APP sensor 1 circuit is shorted.) (Throttle position sensor circuit is shorted.) [Camshaft position sensor (PHASE) circuit is shorted.]• Accelerator pedal position sensor (APP sensor 1)• Throttle position sensor (TP sensor 1 and 2)• Camshaft position sensor (PHASE)

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL illuminates.

Engine operation condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006150748

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1522. "Diagnosis Procedure"](#).

DTC P0643 SENSOR POWER SUPPLY

< SERVICE INFORMATION >

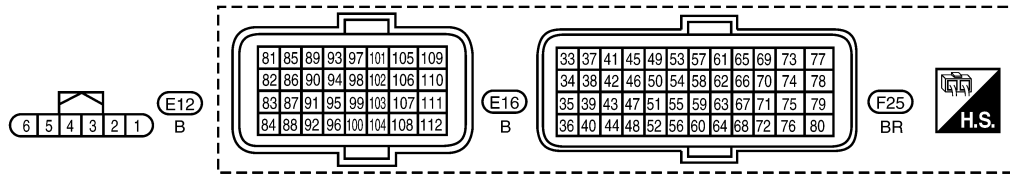
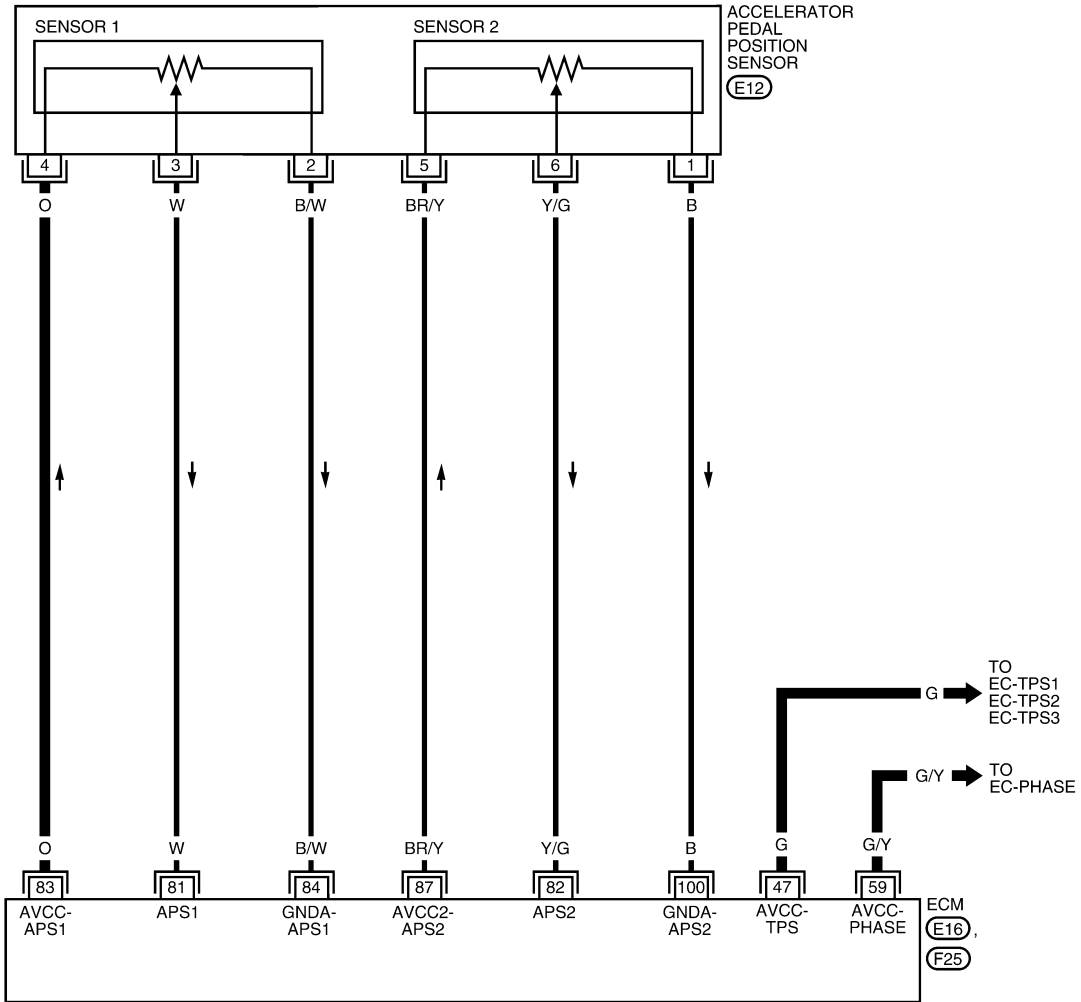
[QR25DE]

Wiring Diagram

INFOID:000000006150749

EC-SEN/PW-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



AABWA0268GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0643 SENSOR POWER SUPPLY

< SERVICE INFORMATION >

[QR25DE]

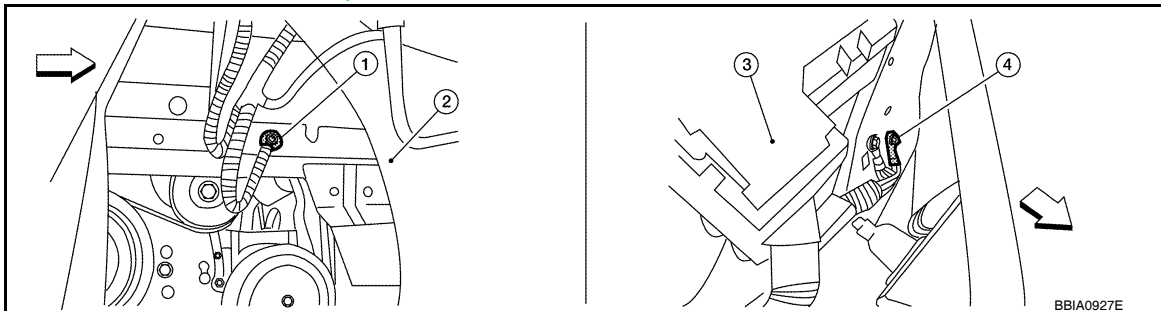
TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	G	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V
59	G/Y	Sensor power supply [Camshaft position sensor (PHASE)]	[Ignition switch: ON]	Approximately 5 V
81	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
82	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
83	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
84	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
87	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
100	B	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006150750

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



↔: Vehicle front

- | | | |
|---|----------------|------------------------------|
| 1. Body ground E9 (view with front wheel RH and fender protector RH removed.) | 2. Washer tank | 3. Fuse and fusible link box |
| 4. Body ground E15 | | |

OK or NG

OK >> GO TO 2.

DTC P0643 SENSOR POWER SUPPLY

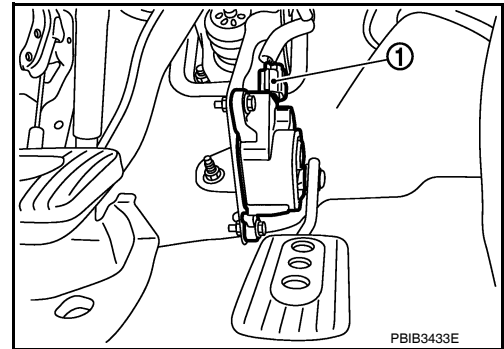
[QR25DE]

< SERVICE INFORMATION >

NG >> Repair or replace ground connections.

2. CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

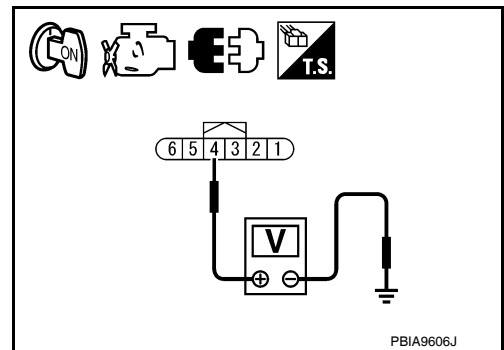


3. Check voltage between APP sensor terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK SENSOR POWER SUPPLY CIRCUITS

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Throttle position sensor terminal 1	EC-1601. "Wiring Diagram"
59	Camshaft position sensor (PHASE) terminal 1	EC-1422. "Wiring Diagram"
83	APP sensor terminal 4	EC-1521. "Wiring Diagram"

OK or NG

- OK >> GO TO 4.
NG >> Repair short to ground or short to power in harness or connectors.

4. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-1425. "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
NG >> Replace camshaft position sensor (PHASE). Refer to [EM-153. "Removal and Installation"](#).

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-1604. "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-135. "Removal and Installation"](#).

>> **INSPECTION END**

7. CHECK APP SENSOR

DTC P0643 SENSOR POWER SUPPLY

[QR25DE]

< SERVICE INFORMATION >

Refer to [EC-1611, "Component Inspection"](#).

OK or NG

OK >> GO TO 9.

NG >> GO TO 8.

8.REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> **INSPECTION END**

9.CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

DTC P0850 PNP SWITCH

< SERVICE INFORMATION >

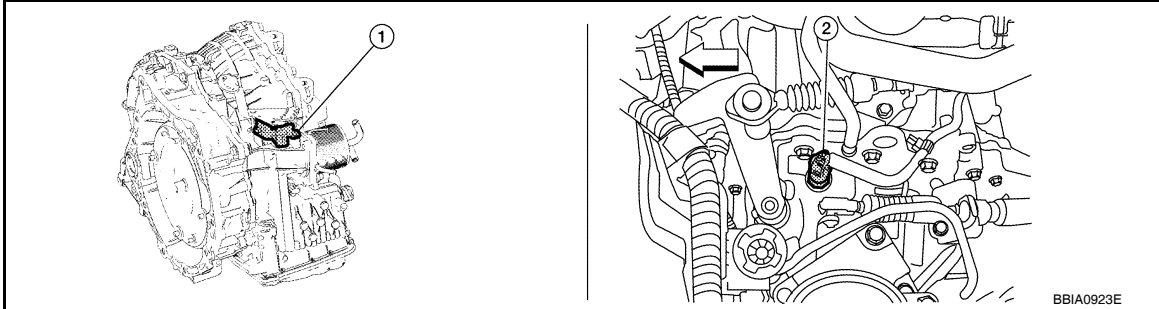
[QR25DE]

DTC P0850 PNP SWITCH

Component Description

INFOID:000000006150751

When the shift lever position is Neutral, park/neutral position (PNP) switch is ON. (M/T models)
 When the shift lever position is P or N, transmission range switch is ON. (CVT models)
 ECM detects the position because the continuity of the line (the ON signal) exists.



1. Transmission range switch (CVT models)
2. PNP switch (M/T models) (view with air cleaner assembly removed.)

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150752

Specification data are reference values.

Monitor item	Condition	Specification
P/N POSI SW	• Ignition switch: ON Selector lever: P or N (CVT), Neutral (M/T)	ON
	Selector lever: Except above	OFF

On Board Diagnosis Logic

INFOID:000000006150753

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0850 0850	Park/neutral position switch	The signal of the park/neutral position (PNP) does not change during driving after the engine is started.	<ul style="list-style-type: none"> • Harness or connectors [Park/neutral position (PNP) signal circuit is open or shorted.] • Park/neutral position (PNP) switch (M/T) • Transmission range switch (CVT)

DTC Confirmation Procedure

INFOID:000000006150754

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

ⓐ WITH CONSULT-III

1. Turn ignition switch ON.
2. Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT-III. Then check the "P/N POSI SW" signal under the following conditions.

Position (Selector lever)	Known-good signal
N or P position (CVT) Neutral position (M/T)	ON
Except above	OFF

If NG, go to [EC-1528, "Diagnosis Procedure"](#).

DTC P0850 PNP SWITCH

[QR25DE]

< SERVICE INFORMATION >

If OK, go to following step.

3. Select "DATA MONITOR" mode with CONSULT-III.
4. Start engine and warm it up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	More than 1,300 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	2.1 - 31.8 msec
VHCL SPEED SE	More than 64km/h (29 MPH)
Selector lever	Suitable position

6. Check 1st trip DTC.
7. If 1st trip DTC is detected, go to [EC-1528. "Diagnosis Procedure"](#).

Overall Function Check

INFOID:000000006150755

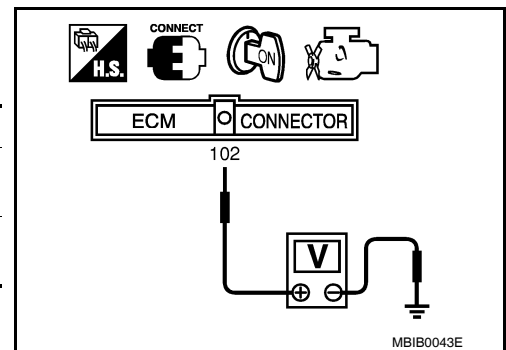
Use this procedure to check the overall function of the park/neutral position (PNP) signal circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 102 (PNP signal) and ground under the following conditions.

Condition (Selector lever)	Voltage (Known-good data)
P or N position (CVT) Neutral position (M/T)	Approx. 0 V
Except above	BATTERY VOLTAGE (11 - 14 V)

3. If NG, go to [EC-1528. "Diagnosis Procedure"](#).



DTC P0850 PNP SWITCH

< SERVICE INFORMATION >

[QR25DE]

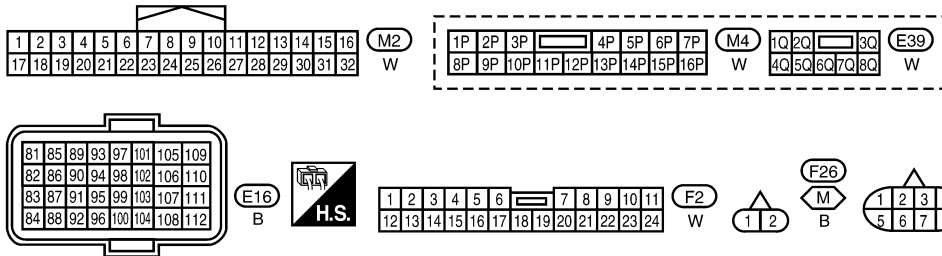
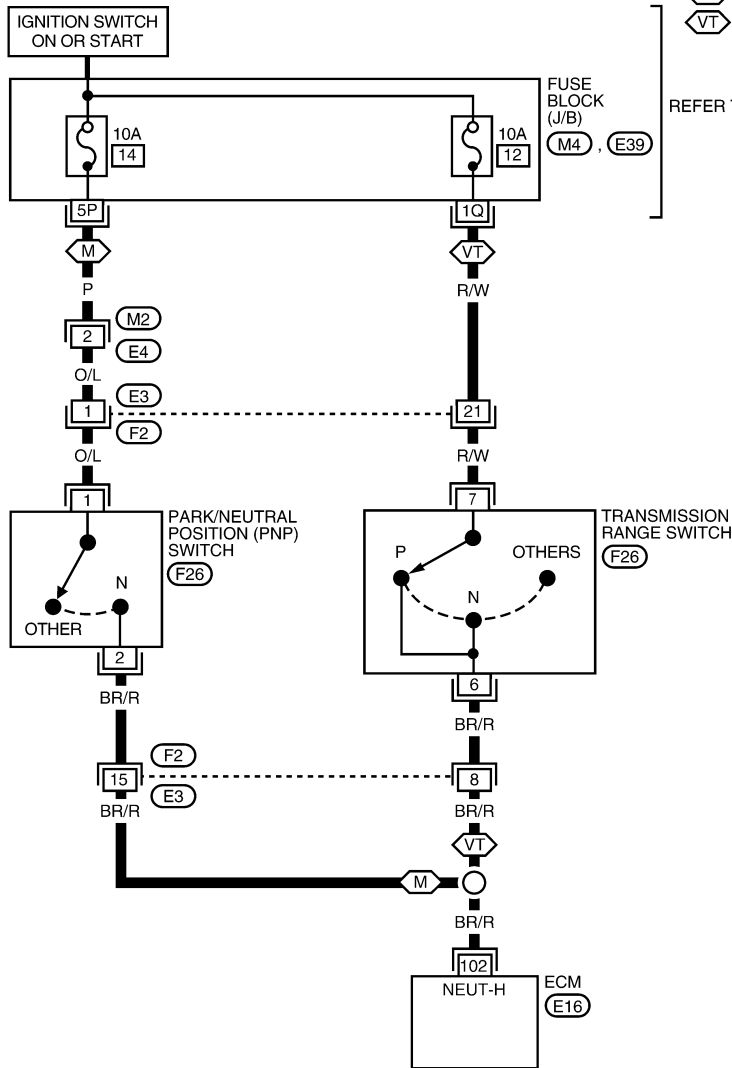
Wiring Diagram

INFOID:000000006150756

EC-TR/SW-01

- : DETECTABLE LINE FOR DTC
- - -** : NON-DETECTABLE LINE FOR DTC
- (M)** : WITH M/T
- (VT)** : WITH CVT

REFER TO "PG-POWER".



ABBWA0667GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P0850 PNP SWITCH

< SERVICE INFORMATION >

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	BR/R	PNP signal	[Ignition switch: ON] <ul style="list-style-type: none">• Selector lever: P or N (CVT), Neutral (M/T)	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON] <ul style="list-style-type: none">• Except above	Approximately 0 V

Diagnosis Procedure

INFOID:000000006150757

M/T MODELS

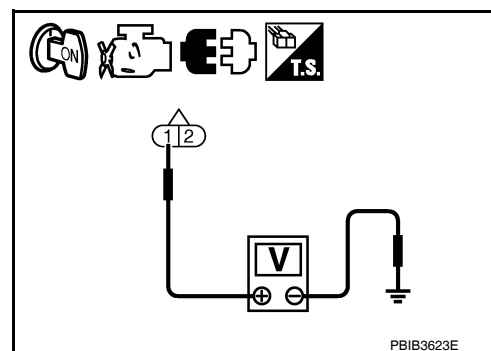
1. CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect PNP switch harness connector.
3. Turn ignition switch ON.
4. Check voltage between PNP switch terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M2, E4
- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between PNP switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between PNP switch terminal 2 and ECM terminal 102.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F2, E3
- Harness for open or short between PNP switch and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK PNP SWITCH

DTC P0850 PNP SWITCH

[QR25DE]

< SERVICE INFORMATION >

Refer to [MT-15](#).

OK or NG

OK >> GO TO 6.

NG >> Replace PNP switch. Refer to [MT-71](#), "Disassembly and Assembly".

6.CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

CVT MODELS

1.CHECK TRANSMISSION RANGE SWITCH POWER SUPPLY CIRCUIT

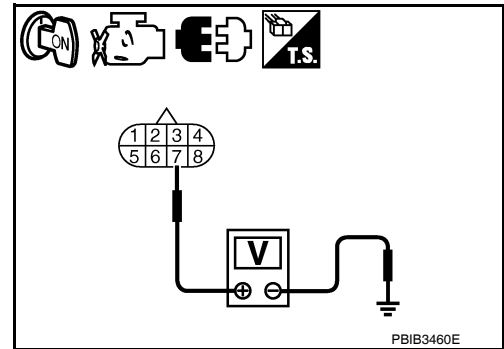
1. Turn ignition switch OFF.
2. Disconnect transmission range switch harness connector.
3. Turn ignition switch ON.
4. Check voltage between transmission range switch terminal 7 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 3.

NG >> GO TO 2.



2.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between transmission range switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

3.CHECK PNP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between transmission range switch terminal 6 and ECM terminal 102. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.

4.DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F2, E3
- Harness for open or short between transmission range switch and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK TRANSMISSION RANGE SWITCH

Refer to [CVT-61](#).

OK or NG

DTC P0850 PNP SWITCH

[QR25DE]

< SERVICE INFORMATION >

OK >> GO TO 6.

NG >> Replace transmission range switch. Refer to [CVT-185, "Transmission Range Switch"](#).

6.CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

DTC P1148, P1168 CLOSED LOOP CONTROL

< SERVICE INFORMATION >

[QR25DE]

DTC P1148, P1168 CLOSED LOOP CONTROL

On Board Diagnosis Logic

INFOID:000000006150758

This self-diagnosis has the one trip detection logic.

A

EC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1148 1148 (Bank 1)	Closed loop control function	The closed loop control function for bank 1 does not operate even when vehicle is being driven in the specified condition.	<ul style="list-style-type: none">• Harness or connectors [Air fuel ratio (A/F) sensor 1 circuit is open or shorted.]• Air fuel ratio (A/F) sensor 1• Air fuel ratio (A/F) sensor 1 heater
P1168 1168 (Bank 2)		The closed loop control function for bank 2 does not operate even when vehicle is being driven in the specified condition.	

C

D

NOTE:

DTC P1148 or P1168 is displayed with another DTC for air fuel ratio (A/F) sensor 1. Perform the trouble diagnosis for the corresponding DTC.

E

F

G

H

I

J

K

L

M

N

O

P

DTC P1212 TCS COMMUNICATION LINE

< SERVICE INFORMATION >

[QR25DE]

DTC P1212 TCS COMMUNICATION LINE

Description

INFOID:000000006150759

NOTE:

- If DTC P1212 is displayed with DTC U1001, first perform the trouble diagnosis for DTC U1001. Refer to [EC-1247](#).
- If DTC P1212 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1519](#).

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.

On Board Diagnosis Logic

INFOID:000000006150760

Freeze frame data is not stored in the ECM for this self-diagnosis.

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212 1212	TCS communication line	ECM can not receive the information from “ABS actuator and electric unit (control unit)” continuously.	<ul style="list-style-type: none">• Harness or connectors (The CAN communication line is open or shorted.)• ABS actuator and electric unit (control unit)• Dead (Weak) battery

DTC Confirmation Procedure

INFOID:000000006150761

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5 V at idle.

1. Start engine and let it idle for at least 10 seconds.
2. Check 1st trip DTC.
3. If 1st trip DTC is detected, go to [EC-1532, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150762

Go to [BRC-45](#).

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[QR25DE]

DTC P1217 ENGINE OVER TEMPERATURE

System Description

INFOID:000000006150763

SYSTEM DESCRIPTION

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 [EC-1519](#).

Cooling Fan Control

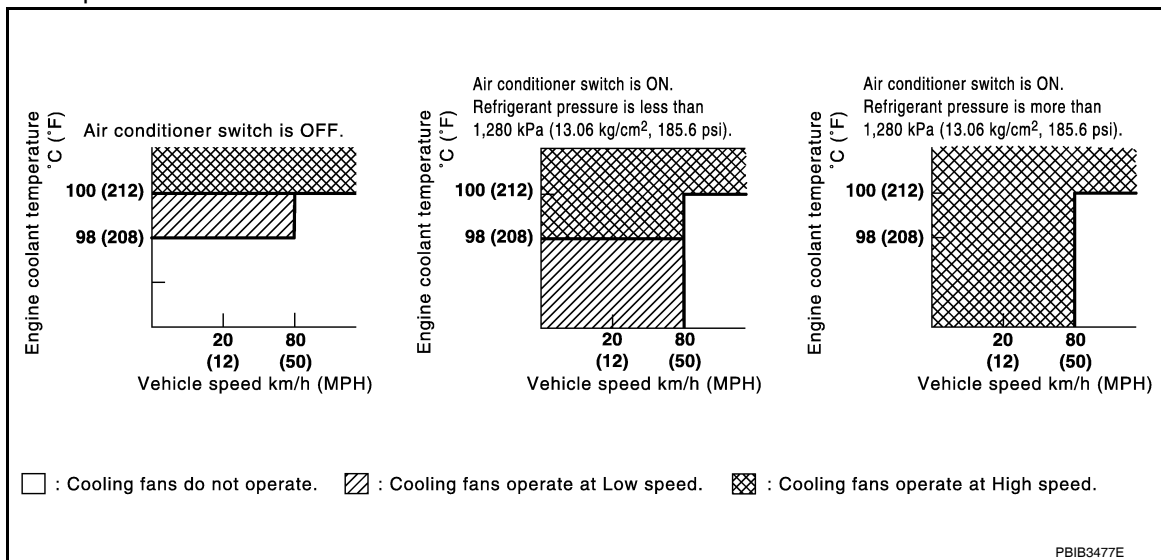
Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	Cooling fan control	<ul style="list-style-type: none"> • IPDM E/R (Cooling fan relays-1, -2 and -3) • Cooling fan relays-4 and -5
Battery	Battery voltage*1		
Combination meter	Vehicle speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner ON signal*2		
Refrigerant pressure sensor	Refrigerant pressure		

*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to ECM through CAN communication line.

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

Cooling Fan Operation



Cooling Fan Relay Operation

The ECM controls cooling fan relays through CAN communication line.

Cooling fan speed	Cooling fan relay				
	1	2	3	4	5
Stop (OFF)	OFF	OFF	OFF	OFF	OFF
Low (LOW)	OFF	OFF	OFF	ON	OFF
High (HI)	ON	ON	ON	OFF	ON

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150764

Specification data are reference values.

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[QR25DE]

Monitor item	Condition		Specification
AIR COND SIG	• Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
COOLING FAN	• Engine: After warming up, idle the engine • Air conditioner switch: OFF	Engine coolant temperature is 97°C (207°F) or less	OFF
		Engine coolant temperature is between 98°C (208°F) and 99°C (210°F)	LOW
		Engine coolant temperature is 100°C (212°F) or more	HIGH

On Board Diagnosis Logic

INFOID:000000006150765

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.

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 1217	Engine over temperature (Overheat)	<ul style="list-style-type: none"> • Cooling fan does not operate properly (Overheat). • Cooling fan system does not operate properly (Overheat). • Engine coolant was not added to the system using the proper filling method. • Engine coolant is not within the specified range. 	<ul style="list-style-type: none"> • Harness or connectors (Cooling fan circuit is open or shorted.) • Cooling fan motor • IPDM E/R (Cooling fan relays-1, -2 and -3) • Cooling fan relays-4 and -5 • Radiator hose • Radiator • Reservoir tank • Radiator cap • Water pump • Thermostat <p>For more information, refer to EC-1543, "Main 12 Causes of Overheating".</p>

CAUTION:

When a malfunction is indicated, always replace the coolant. Refer to [MA-31, "ENGINE COOLANT : Changing Engine Coolant"](#). Also, replace the engine oil. Refer to [MA-36, "ENGINE OIL : Changing Engine Oil"](#).

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 [MA-16, "Engine Cooling System"](#).
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

Overall Function Check

INFOID:000000006150766

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the reservoir tank or the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

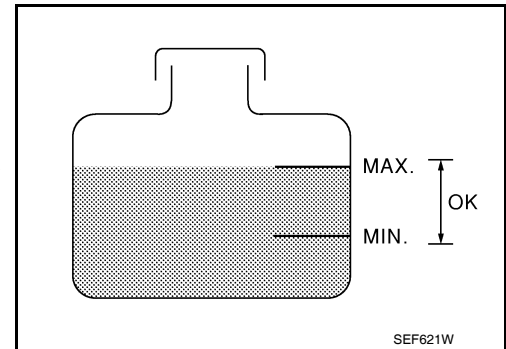
 WITH CONSULT-III

DTC P1217 ENGINE OVER TEMPERATURE

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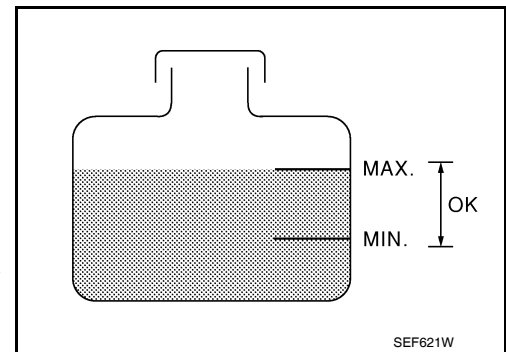
< SERVICE INFORMATION >

1. Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-1538, "Diagnosis Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-1538, "Diagnosis Procedure"](#).
3. Turn ignition switch ON.
4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III.
5. If the results are NG, go to [EC-1538, "Diagnosis Procedure"](#).



WITH GST

1. Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-1538, "Diagnosis Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-1538, "Diagnosis Procedure"](#).
3. Perform IPDM E/R auto active test and check cooling fan motor operation. Refer to [PG-21, "Auto Active Test"](#).
4. If NG, go to [EC-1538, "Diagnosis Procedure"](#).



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DTC P1217 ENGINE OVER TEMPERATURE




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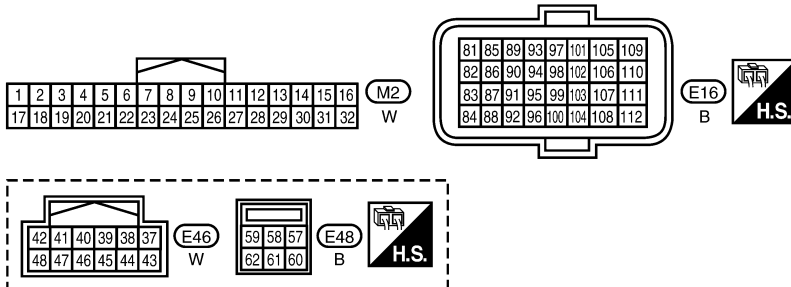
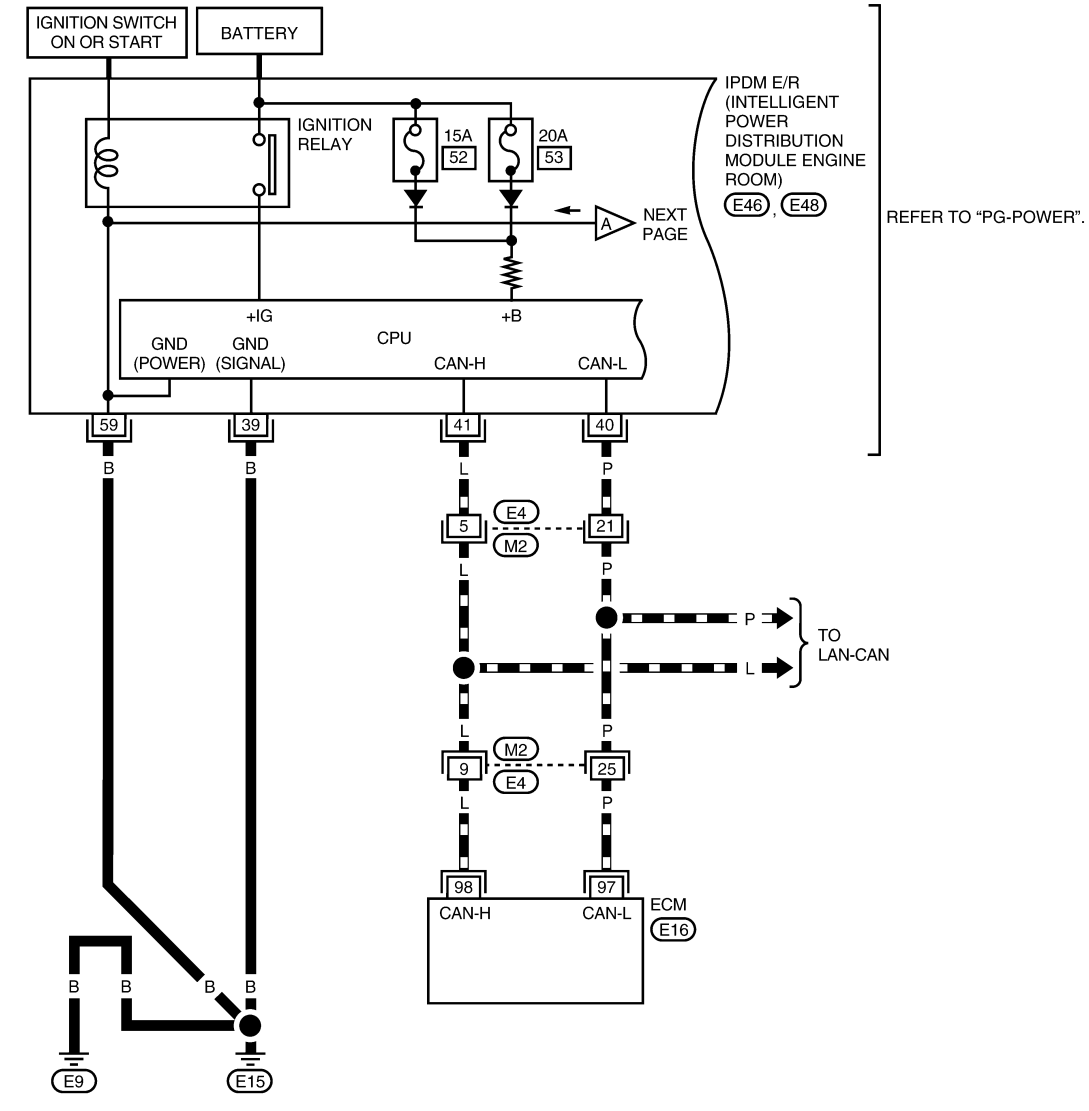
[QR25DE]

INFOID:000000006150767

Wiring Diagram

EC-COOL/F-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



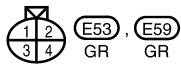
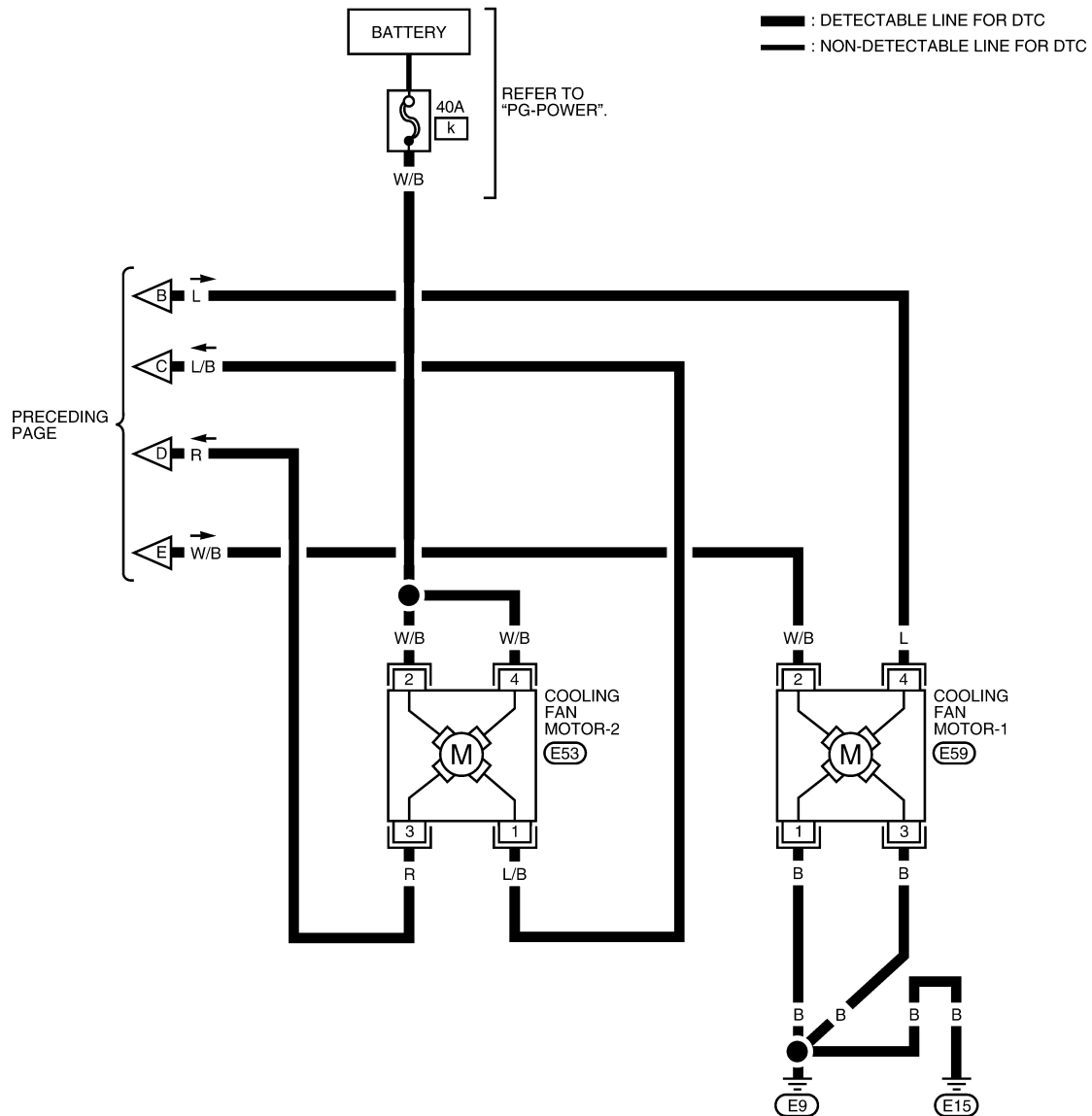
BBWA3047E

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[QR25DE]

EC-COOL/F-03



BBWA3049E

INFOID:000000006150768

Diagnosis Procedure

1. INSPECTION START

Do you have CONSULT-III?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

DTC P1217 ENGINE OVER TEMPERATURE

[QR25DE]

< SERVICE INFORMATION >

2. CHECK COOLING FAN OPERATION

With CONSULT-III

1. Turn ignition switch ON.
2. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-III.
3. Check that cooling fans-1 and -2 operates at each speed (LOW/HI).

OK or NG

OK >> GO TO 4.

NG >> Check cooling fan control circuit. (Refer to "PROCEDURE A".)

3. CHECK COOLING FAN OPERATION

Without CONSULT-III

1. Perform IPDM E/R auto active test and check cooling fan motor operation.
Refer to [PG-21, "Auto Active Test"](#).
2. Check that cooling fans-1 and -2 operates at each speed (Low/High).

OK or NG

OK >> GO TO 4.

NG >> Check cooling fan control circuit. (Refer to "PROCEDURE A".)

4. CHECK COOLING SYSTEM FOR LEAK

Refer to [CO-39](#).

OK or NG

OK >> GO TO 5.

NG >> Check the following for leak.

- Hose
- Radiator
- Water pump

5. CHECK RADIATOR CAP

Refer to [CO-44](#).

OK or NG

OK >> GO TO 6.

NG >> Replace radiator cap. Refer to [CO-44, "Component"](#).

6. CHECK COMPONENT PARTS

Check the following.

- Thermostat. (Refer to [CO-48](#).)
- Engine coolant temperature sensor. (Refer to [EC-1298, "Component Inspection"](#).)

OK or NG

OK >> GO TO 7.

NG >> Replace malfunctioning component parts.

7. CHECK MAIN 13 CAUSES

If the cause cannot be isolated, go to [EC-1543, "Main 12 Causes of Overheating"](#).

>> **INSPECTION END**

PROCEDURE A

1. CHECK IPDM E/R POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E44.

DTC P1217 ENGINE OVER TEMPERATURE

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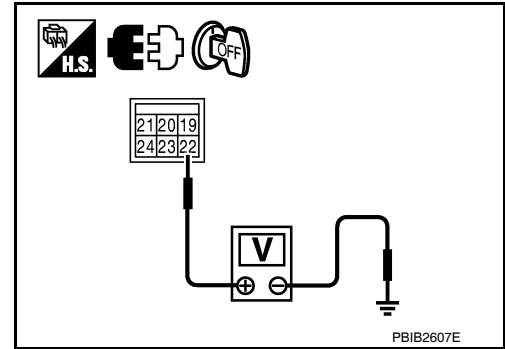
< SERVICE INFORMATION >

3. Check voltage between IPDM E/R terminal 22 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

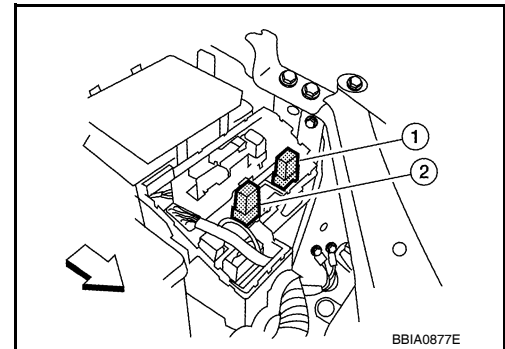
Check the following.

- 40 A fusible link
- Harness for open or short between IPDM E/R and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK COOLING FAN RELAYS POWER SUPPLY CIRCUIT

1. Disconnect cooling fan relays-4 (2) and -5 (1).
- ⇐: Vehicle front

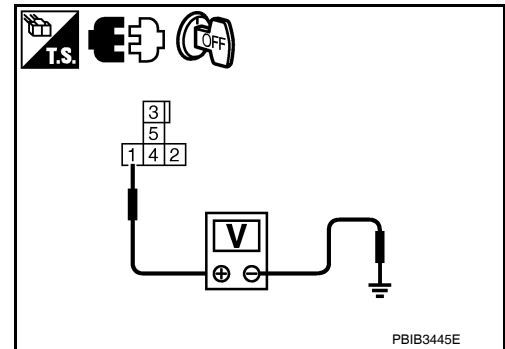


2. Check voltage between cooling fan relays-4, -5 terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- 40 A fusible link
- Harness for open or short between cooling fan relays-4, -5 and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

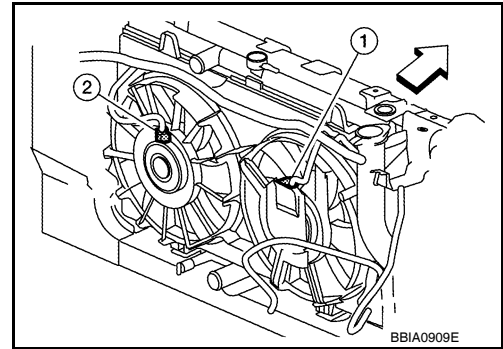
5. CHECK COOLING FAN MOTORS POWER SUPPLY CIRCUIT

DTC P1217 ENGINE OVER TEMPERATURE

[QR25DE]

< SERVICE INFORMATION >

1. Disconnect cooling fan motor-2 (2) harness connector.
 - ⇐: Vehicle front
 - Cooling fan motor-1 (1)

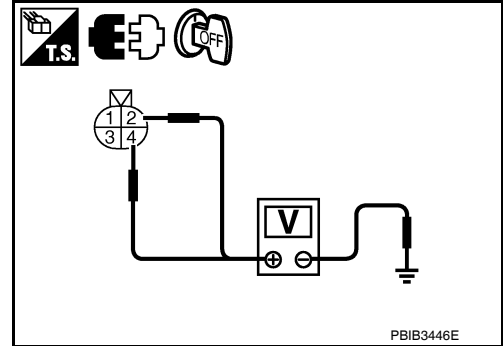


2. Check voltage between cooling fan motor-2 terminal 2, 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.



6. DETECT MALFUNCTIONING PART

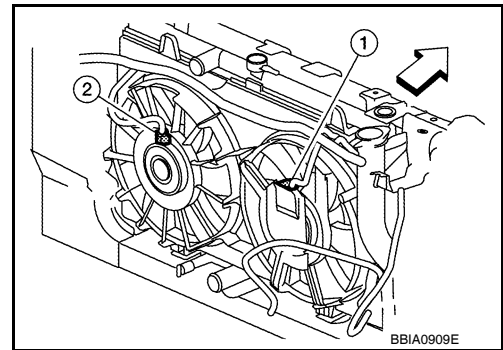
Check the following.

- 40 A fusible link
- Harness for open or short between cooling fan motor-2 and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK COOLING FAN MOTORS CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connectors E43, E44 and E46.
3. Disconnect cooling fan motor-1 (1) harness connector.
 - ⇐: Vehicle front
 - Cooling fan motor-2 (2)
4. Check harness continuity between the following;
 - cooling fan relay-4 terminal 2 and IPDM E/R terminal 45,
 - cooling fan relay-4 terminal 5 and IPDM E/R terminal 23,
 - cooling fan relay-5 terminal 2 and IPDM E/R terminal 6,
 - cooling fan relay-5 terminal 5 and ground,
 - cooling fan relay-4 terminal 3 and cooling fan motor-1 terminal 2,
 - cooling fan motor-1 terminal 2 and IPDM E/R terminal 24,
 - cooling fan motor-1 terminal 4 and IPDM E/R terminal 20,
 - cooling fan motor-1 terminal 1, 3 and ground.IPDM E/R terminal 39, 59 and ground.
 - cooling fan relay-4 terminal 5 and cooling fan motor-2 terminal 1,
 - cooling fan relay-5 terminal 3 and cooling fan motor-2 terminal 3,Refer to Wiring Diagram.



Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

DTC P1217 ENGINE OVER TEMPERATURE

[QR25DE]

< SERVICE INFORMATION >

Check the following.

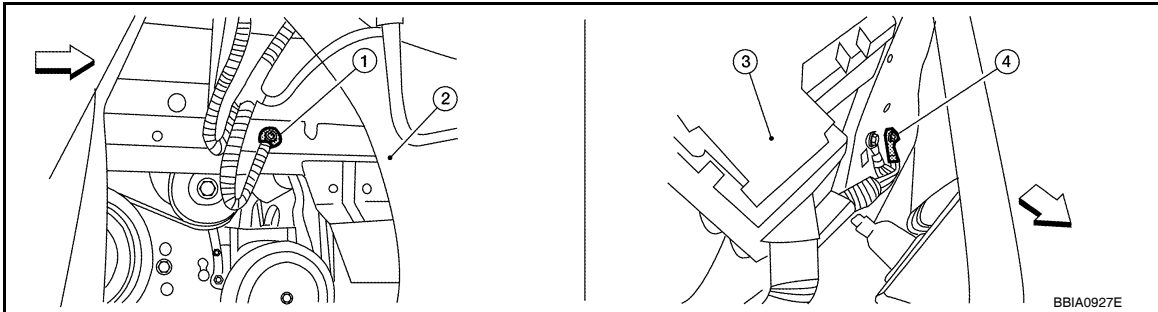
- Harness for open or short between cooling fan relay-4 and IPDM E/R
- Harness for open or short between cooling fan relay-5 and IPDM E/R
- Harness for open or short between cooling fan relay-4 and cooling fan motor-1
- Harness for open or short between cooling fan relay-4 and cooling fan motor-2
- Harness for open or short between cooling fan relay-5 and cooling fan motor-2
- Harness for open or short between cooling fan relay-5 and ground
- Harness for open or short between cooling fan motor-1 and ground
- Harness for open or short between IPDM E/R and ground

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK GROUND CONNECTIONS

Loosen and retighten ground screw on the body.

Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 10.
- NG >> Repair or replace ground connections.

10. CHECK COOLING FAN RELAYS-4 AND -5

Refer to [EC-1543, "Component Inspection"](#).

OK or NG

- OK >> GO TO 11.
- NG >> Replace malfunctioning cooling fan relay. For the relay number, refer to [EC-1536, "Wiring Diagram"](#). For the relay layout, refer to [PG-38, "Harness Layout"](#).

11. CHECK COOLING FAN MOTORS-1 AND -2

Refer to [EC-1543, "Component Inspection"](#).

OK or NG

- OK >> GO TO 12.
- NG >> Replace malfunctioning cooling fan motor. Refer to [CO-46, "Removal and Installation"](#).

12. CHECK INTERMITTENT INCIDENT

Perform [EC-1236](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-18](#).
- NG >> Repair or replace harness or connector.

DTC P1217 ENGINE OVER TEMPERATURE

< SERVICE INFORMATION >

[QR25DE]

Main 12 Causes of Overheating

INFOID:000000006150769

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> Blocked radiator Blocked condenser Blocked radiator grille Blocked bumper 	• Visual	No blocking	—
	2	• Coolant mixture	• Coolant tester	MA-16, "Engine Cooling System" .	
	3	• Coolant level	• Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	CO-39, "Inspection" .
	4	• Radiator cap	• Pressure tester	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	CO-39, "Inspection" .
ON*2	5	• Coolant leaks	• Visual	No leaks	CO-39, "Inspection" .
ON*2	6	• Thermostat	• Touch the upper and lower radiator hoses	Both hoses should be hot	CO-51 .
ON*1	7	• Cooling fan	• CONSULT-III	Operating	(EC-1538, "Diagnosis Procedure") .
OFF	8	• Combustion gas leak	• Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	• Coolant temperature gauge	• Visual	Gauge less than 3/4 when driving	—
		• Coolant overflow to reservoir tank	• Visual	No overflow during driving and idling	MA-31, "ENGINE COOLANT : Changing Engine Coolant" .
OFF*4	10	• Coolant return from reservoir tank to radiator	• Visual	Should be initial level in reservoir tank	CO-39, "Inspection" .
OFF	11	• Cylinder head	• Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	EM-175 .
	12	• Cylinder block and pistons	• Visual	No scuffing on cylinder walls or piston	EM-189 .

*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-33](#).

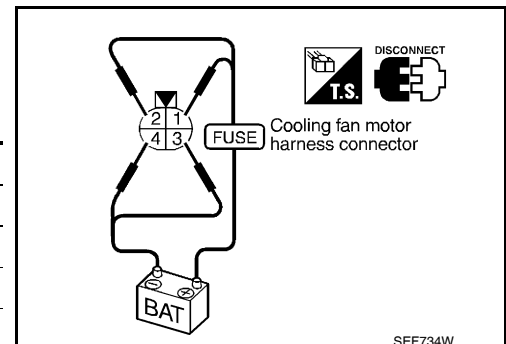
Component Inspection

INFOID:000000006150770

COOLING FAN MOTORS-1 AND -2

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

Cooling fan speed	Cooling fan motor terminals	
	(+)	(-)
Low (LO)	1	3 and 4
	2	3 and 4
High (HI)	1 and 2	3 and 4



Cooling fan motor should operate.

If NG, replace cooling fan motor. Refer to [CO-46, "Removal and Installation"](#).

DTC P1217 ENGINE OVER TEMPERATURE

[QR25DE]

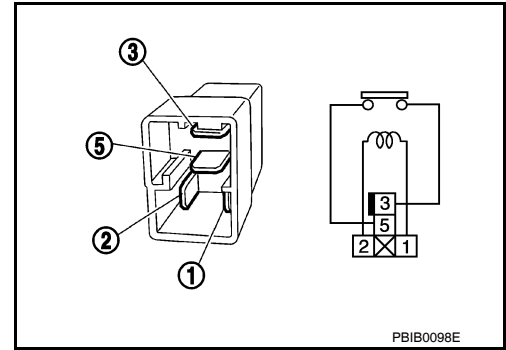
< SERVICE INFORMATION >

COOLING FAN RELAYS-4 AND -5

Check continuity between terminals 3 and 4.

Conditions	Continuity
12 V direct current supply between terminal 1 and 2	Yes
No current supply	No

If NG, replace cooling fan relay. For the relay number, refer to [EC-1536. "Wiring Diagram"](#). For the relay layout, refer to [PG-38. "Harness Layout"](#).



DTC P1225 TP SENSOR

< SERVICE INFORMATION >

[QR25DE]

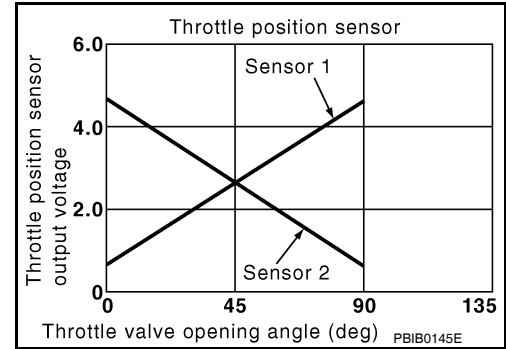
DTC P1225 TP SENSOR

Component Description

INFOID:000000006150771

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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. The ECM judges the current opening angle of the throttle valve from these signals and controls the throttle valve opening signal in response to driving conditions via the throttle control motor.



On Board Diagnosis Logic

INFOID:000000006150772

The MIL will not illuminate for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance	Closed throttle position learning value is excessively low.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

INFOID:000000006150773

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Check 1st trip DTC.
4. If 1st trip DTC is detected, go to [EC-1545. "Diagnosis Procedure"](#).

Diagnosis Procedure

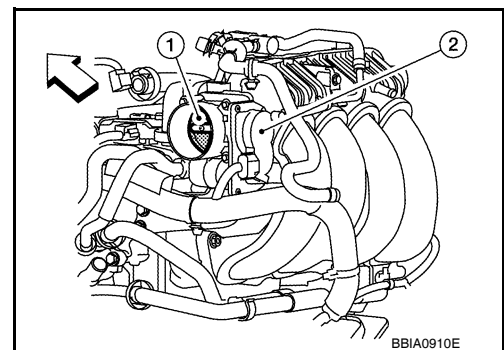
INFOID:000000006150774

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct. Refer to [EM-133. "Removal and Installation"](#).
3. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - ↖: Vehicle front
 - Electric throttle control actuator (2)

OK or NG

- OK >> GO TO 2.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EC-1183. "Throttle Valve Closed Position Learning"](#).



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-135. "Removal and Installation"](#).

>> INSPECTION END

DTC P1226 TP SENSOR

< SERVICE INFORMATION >

[QR25DE]

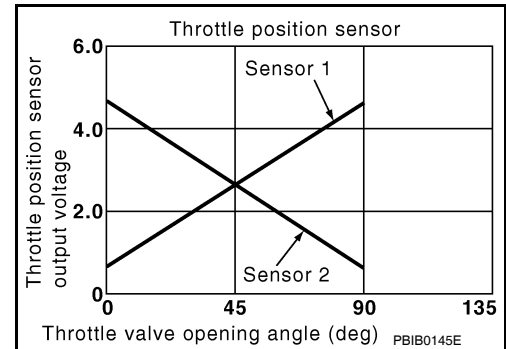
DTC P1226 TP SENSOR

Component Description

INFOID:000000006150776

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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. The ECM judges the current opening angle of the throttle valve from these signals and controls the throttle valve opening signal in response to driving conditions via the throttle control motor.



On Board Diagnosis Logic

INFOID:000000006150777

The MIL will not illuminate for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance	Closed throttle position learning is not performed successfully, repeatedly.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

INFOID:000000006150778

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10 V at idle.

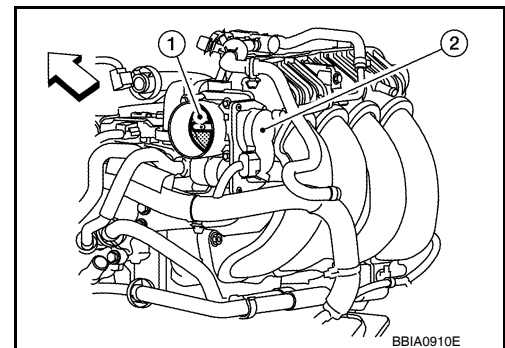
1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Repeat steps 1 and 2 for 32 times.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-1546, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006150779

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct. Refer to [EM-133, "Removal and Installation"](#).
3. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - Vehicle front
 - Electric throttle control actuator (2)



OK or NG

- OK >> GO TO 2.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EC-1183, "Throttle Valve Closed Position Learning"](#).

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-135, "Removal and Installation"](#).

>> INSPECTION END

DTC P1421 COLD START CONTROL

< SERVICE INFORMATION >

[QR25DE]

DTC P1421 COLD START CONTROL

Description

INFOID:000000006150781

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.

On Board Diagnosis Logic

INFOID:000000006150782

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1421 1421	Cold start emission reduction strategy monitoring	ECM does not control ignition timing and engine idle speed properly when engine is started with pre-warming up condition.	<ul style="list-style-type: none">Lack of intake air volumeFuel injection systemECM

DTC Confirmation Procedure

INFOID:000000006150783

NOTE:

- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- If DTC P1421 is displayed with other DTC, first perform the trouble diagnosis for other DTC.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

Ⓟ WITH CONSULT-III

- Turn ignition switch OFF and wait at least 10 seconds.
- Turn ignition switch ON.
- Select "DATA MONITOR" mode with CONSULT-III.
- Check that the "COOLAN TEMP/S" indication is between 4°C (39°F) and 36°C (97°F).
If "COOLAN TEMP/S" indication is within the specified value, go to the following step.
If "COOLAN TEMP/S" indication is out of the specified value, cool engine down or warm engine up and go to step 1.
- Start engine and let it idle for 5 minutes.
- Check 1st trip DTC.
- If 1st trip DTC is detected, go to [EC-1547, "Diagnosis Procedure"](#).

Ⓢ WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

INFOID:000000006150784

1.PERFORM IDLE AIR VOLUME LEARNING

Perform [EC-1183, "Idle Air Volume Learning"](#).

Is Idle Air Volume Learning carried out successfully?

Yes or No

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

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning part

3.CHECK FUEL INJECTION SYSTEM FUNCTION

Perform [EC-1375, "DTC Confirmation Procedure"](#) for DTC P0171, P0174.

DTC P1421 COLD START CONTROL

[QR25DE]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 4.

NG >> Go to [EC-1380, "Diagnosis Procedure"](#) for DTC P0171, P0174.

4. PERFORM DTC CONFIRMATION PROCEDURE

1. Erase DTC.
2. **Perform DTC Confirmation Procedure.**
See [EC-1547, "DTC Confirmation Procedure"](#).
3. Is the 1st trip DTC P1421 displayed again?

Yes or No

Yes >> GO TO 5.

No >> **INSPECTION END**

5. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to [BL-171, "ECM Re-communicating Function"](#).
3. Perform [EC-1183, "VIN Registration"](#).
4. Perform [EC-1183, "Accelerator Pedal Released Position Learning"](#).
5. Perform [EC-1183, "Throttle Valve Closed Position Learning"](#).
6. Perform [EC-1183, "Idle Air Volume Learning"](#).

>> **INSPECTION END**

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

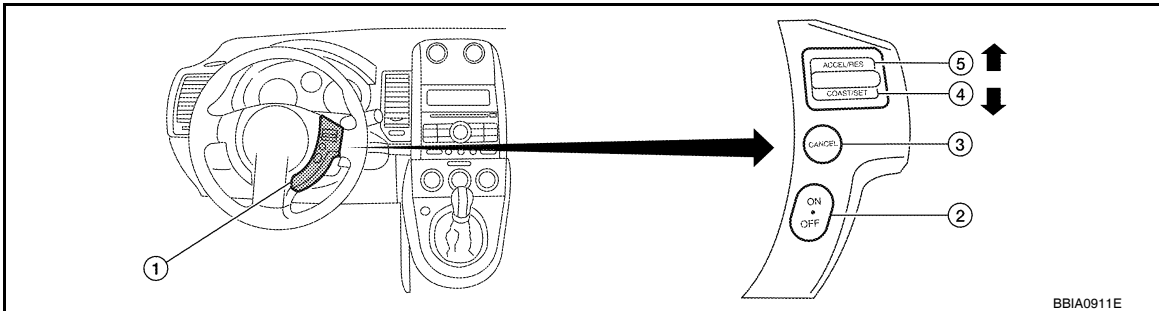
[QR25DE]

DTC P1564 ASCD STEERING SWITCH

Component Description

INFOID:000000006150785

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.



1. ASCD steering switch
2. MAIN switch
3. CANCEL switch
4. SET/COAST switch
5. RESUME/ACCELERATE switch

Refer to [EC-1124](#) for the ASCD function.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150786

Specification data are reference values.

Monitor item	Condition	Specification	
MAIN SW	• Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	• Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	• Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	• Ignition switch: ON	SET/COAST switch: Pressed	ON

On Board Diagnosis Logic

INFOID:000000006150787

- This self-diagnosis has the one trip detection logic.
- The MIL will not illuminate for this self-diagnosis.

NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605.

Refer to [EC-1517](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1564 1564	ASCD steering switch	<ul style="list-style-type: none"> • An excessively high voltage signal from the ASCD steering switch is sent to ECM. • ECM detects that input signal from the ASCD steering switch is out of the specified range. • ECM detects that the ASCD steering switch is stuck ON. 	<ul style="list-style-type: none"> • Harness or connectors (ASCD switch circuit is open or shorted.) • ASCD steering switch • ECM

DTC Confirmation Procedure

INFOID:000000006150788

NOTE:

DTC P1564 ASCD STEERING SWITCH

[QR25DE]

< SERVICE INFORMATION >

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON.
2. Wait at least 10 seconds.
3. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
4. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Check DTC.
8. If DTC is detected, go to [EC-1552, "Diagnosis Procedure"](#).

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

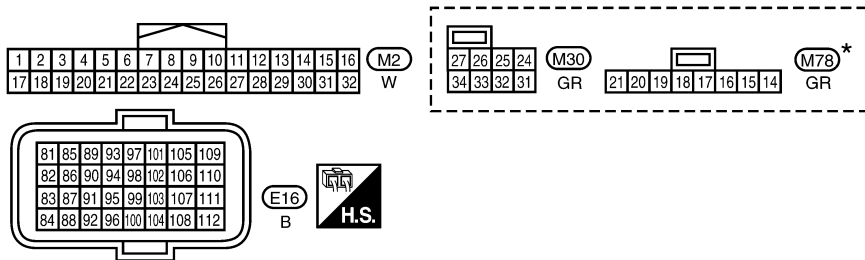
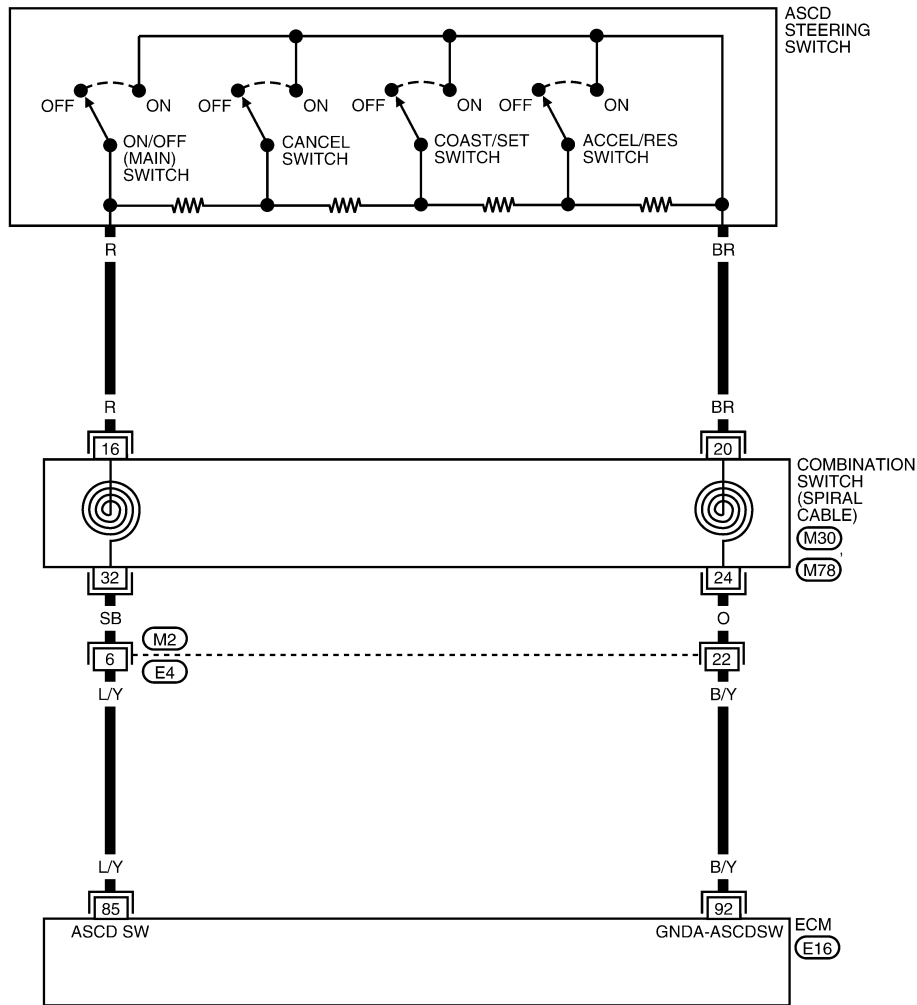
[QR25DE]

Wiring Diagram

INFOID:000000006150789

EC-ASC/SW-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

ABBWA0668GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P1564 ASCD STEERING SWITCH

< SERVICE INFORMATION >

[QR25DE]

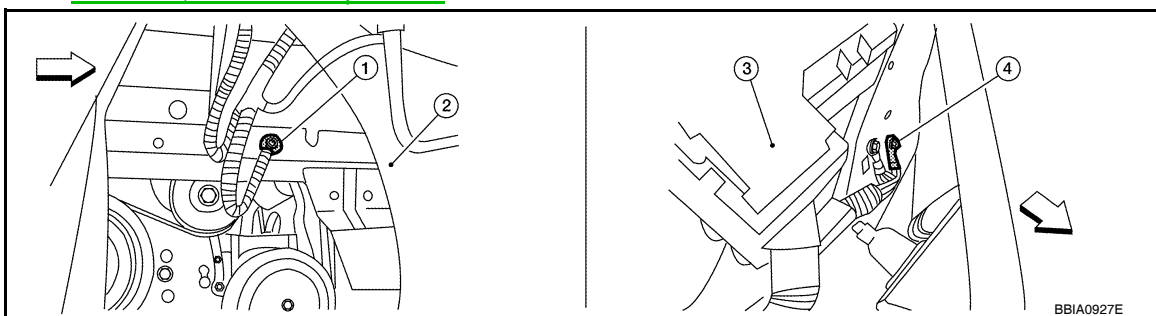
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
85	L/Y	ASCD steering switch	[Ignition switch: ON] • ASCD steering switch: OFF	Approximately 4 V
			[Ignition switch: ON] • MAIN switch: Pressed	Approximately 0 V
			[Ignition switch: ON] • CANCEL switch: Pressed	Approximately 1 V
			[Ignition switch: ON] • RESUME/ACCELERATE switch: Pressed	Approximately 3 V
			[Ignition switch: ON] • SET/COAST switch: Pressed	Approximately 2 V
92	B/Y	Sensor ground	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006150790

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



↔: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK ASCD STEERING SWITCH CIRCUIT

Ⓟ With CONSULT-III

1. Turn ignition switch ON.
2. Select "MAIN SW", "RESUME/ACC SW", "SET SW and "CANCEL SW" in "DATA MONITOR" mode with CONSULT-III.
3. Check each item indication under the following conditions.

Switch	Monitor item	Condition	Indication
MAIN switch	MAIN SW	Pressed	ON
		Released	OFF
CANCEL switch	CANCEL SW	Pressed	ON
		Released	OFF

DTC P1564 ASCD STEERING SWITCH

[QR25DE]

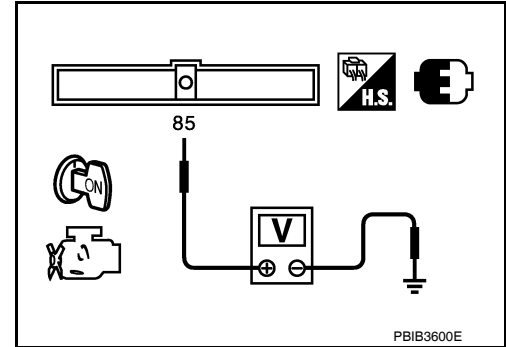
< SERVICE INFORMATION >

Switch	Monitor item	Condition	Indication
RESUME/ACCELERATE switch	RESUME/ACC SW	Pressed	ON
		Released	OFF
SET/COAST switch	SET SW	Pressed	ON
		Released	OFF

⊗ Without CONSULT-III

- Turn ignition switch ON.
- Check voltage between ECM terminal 85 and ground with pressing each button.

Switch	Condition	Voltage (V)
MAIN switch	Pressed	Approx. 0
	Released	Approx. 4.0
CANCEL switch	Pressed	Approx. 1.0
	Released	Approx. 4.0
RESUME/ACCELERATE switch	Pressed	Approx. 3.0
	Released	Approx. 4.0
SET/COAST switch	Pressed	Approx. 2.0
	Released	Approx. 4.0



OK or NG

- OK >> GO TO 8.
 NG >> GO TO 3.

3. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect combination switch harness connector M78.
- Disconnect ECM harness connector.
- Check harness continuity between combination switch terminal 20 (unit side) and ECM terminal 92. Refer to Wiring Diagram.

Continuity should exist.

- Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M2, E4
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- Check harness continuity between ECM terminal 85 and combination switch terminal 16. Refer to Wiring Diagram.

Continuity should exist.

- Also check harness for short to ground and short to power.

OK or NG

DTC P1564 ASCD STEERING SWITCH

[QR25DE]

< SERVICE INFORMATION >

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M2, E4
- Combination switch (spiral cable)
- Harness for open and short between ECM and combination switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD STEERING SWITCH

Refer to [EC-1554. "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace ASCD steering switch. Refer to [PS-7. "Removal and Installation"](#).

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

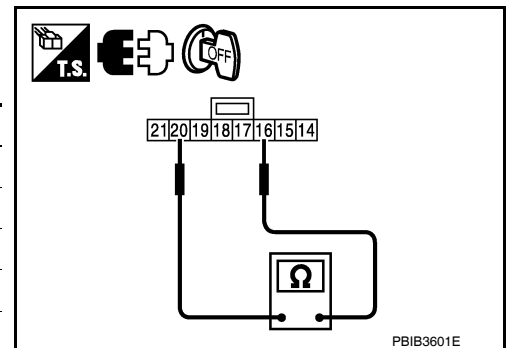
Component Inspection

INFOID:000000006150791

ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector M78.
2. Check continuity between combination switch (spiral cable) terminals 16 and 20 with pushing each switch.

Switch	Condition	Resistance [Ω]
MAIN switch	Pressed	Approx. 0
	Released	Approx. 4,000
CANCEL switch	Pressed	Approx. 250
	Released	Approx. 4,000
RESUME/ACCELERATE switch	Pressed	Approx. 1,480
	Released	Approx. 4,000
SET/COAST switch	Pressed	Approx. 660
	Released	Approx. 4,000



If NG, replace ASCD steering switch. Refer to [PS-7. "Removal and Installation"](#).

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

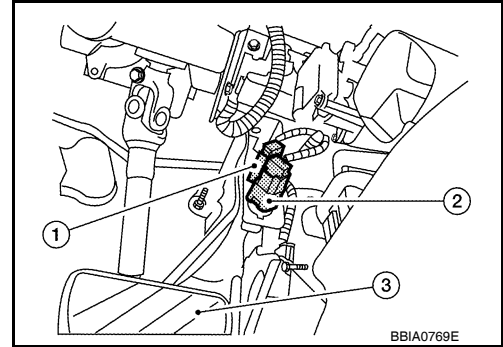
[QR25DE]

DTC P1572 ASCD BRAKE SWITCH

Component Description

INFOID:000000006150792

When the brake pedal is depressed, ASCD brake switch (1) is turned OFF and stop lamp switch (2) is turned ON. ECM detects the state of the brake pedal (3) by those two types of input (ON/OFF signal). Refer to [EC-1124](#) for the ASCD function.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150793

Specification data are reference values.

Monitor item	Condition	Specification
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	• Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)
		• Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)
BRAKE SW2 (Stop lamp switch)	• Ignition switch: ON	Brake pedal: Fully released
		Brake pedal: Slightly depressed

On Board Diagnosis Logic

INFOID:000000006150794

- This self-diagnosis has the one trip detection logic.
- The MIL will not illuminate for this self-diagnosis.

NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1517](#).
- 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 is turned 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
P1572 1572	ASCD brake switch	A) When the vehicle speed is above 30km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to ECM at the same time.	<ul style="list-style-type: none"> • Harness or connectors (Stop lamp switch circuit is shorted.) • Harness or connectors (ASCD brake switch circuit is shorted.) • Harness or connectors (ASCD clutch switch circuit is shorted.) (M/T)
		B) ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is being driven	<ul style="list-style-type: none"> • Stop lamp switch • ASCD brake switch • ASCD clutch switch (M/T) • Incorrect stop lamp switch installation • Incorrect ASCD brake switch installation • Incorrect ASCD clutch switch installation (M/T) • ECM

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[QR25DE]

DTC Confirmation Procedure

INFOID:000000006150795

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- The procedure for malfunction B is not described. It takes the extremely long time to complete the procedure for malfunction B. By performing the procedure for malfunction A, the condition that causes malfunction B can be detected.

TESTING CONDITION:

Steps 4 and 5 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

Ⓟ WITH CONSULT-III

1. Start engine.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Press MAIN switch and check that CRUISE indicator illuminates.
4. Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position

5. Check 1st trip DTC.
If 1st trip DTC is detected, go to [EC-1558, "Diagnosis Procedure"](#).
If 1st trip DTC is not detected, go to the following step.
6. Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than 5 seconds so as not to come off from the above-mentioned vehicle speed.

7. Check 1st trip DTC.
8. If 1st trip DTC is detected, go to [EC-1558, "Diagnosis Procedure"](#).

Ⓟ WITH GST

Follow the procedure "WITH CONSULT-III" above.

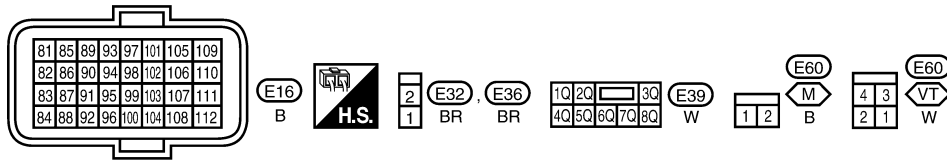
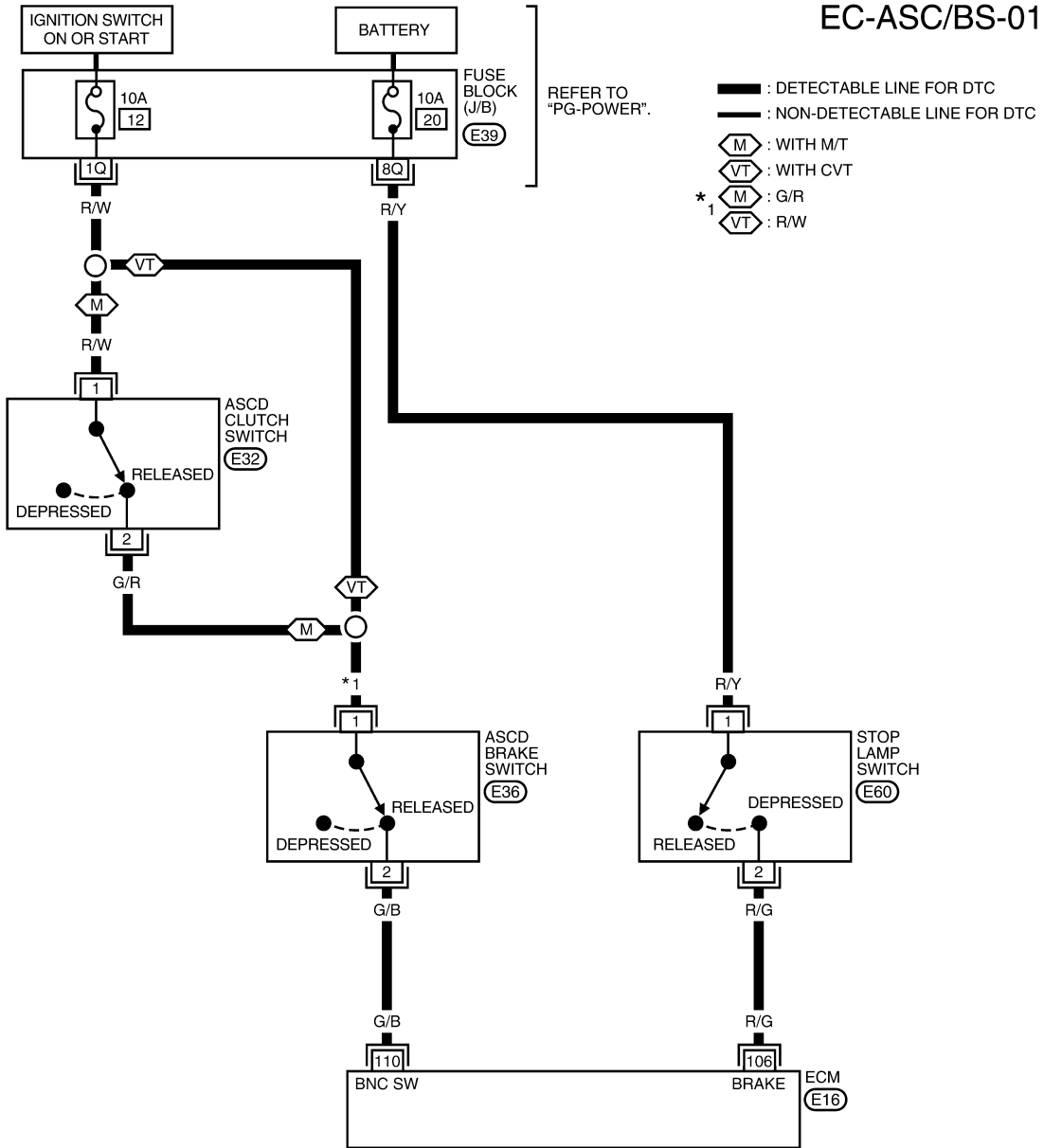
DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[QR25DE]

Wiring Diagram

INFOID:000000006150796



BBWA3051E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
106	R/G	Stop lamp switch	[Ignition switch: ON] • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)
110	G/B	ASCD brake switch	• Brake pedal: Slightly depressed (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14 V)
			• Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0 V

Diagnosis Procedure

INFOID:000000006150797

1. CHECK OVERALL FUNCTION-I

④ With CONSULT-III

1. Turn ignition switch ON.
2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-III.
3. Check "BRAKE SW1" indication under the following conditions.

M/T models

Condition	Indication
Clutch pedal and/or brake pedal: Slightly depressed	OFF
Clutch pedal and brake pedal: Fully released	ON

CVT models

Condition	Indication
Brake pedal: Slightly depressed	OFF
Brake pedal: Fully released	ON

⊗ Without CONSULT-III

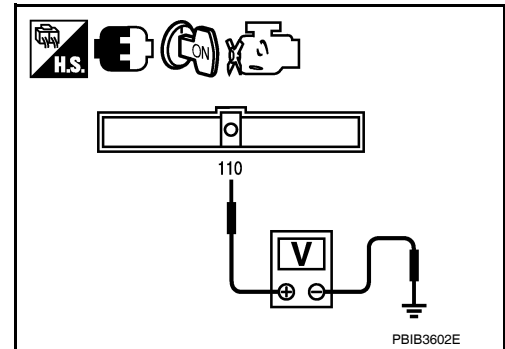
1. Turn ignition switch ON.
2. Check voltage between ECM terminal 110 and ground under the following conditions.

M/T models

Condition	Voltage
Clutch pedal and/or brake pedal: Slightly depressed	Approximately 0 V
Clutch pedal and brake pedal: Fully released	Battery voltage

CVT models

Condition	Voltage
Brake pedal: Slightly depressed	Approximately 0 V
Brake pedal: Fully released	Battery voltage



OK or NG

- OK >> GO TO 2.
- NG >> GO TO 3.

2. CHECK OVERALL FUNCTION-II

④ With CONSULT-III

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

DTC P1572 ASCD BRAKE SWITCH

< SERVICE INFORMATION >

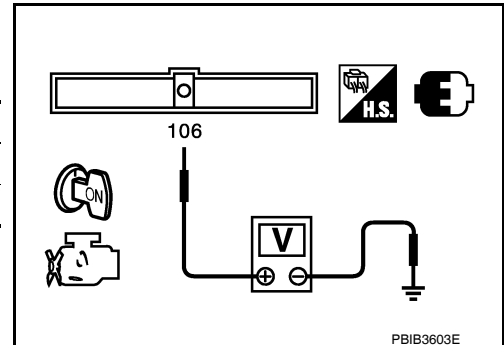
[QR25DE]

Condition	Indication
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON

⊗ Without CONSULT-III

Check voltage between ECM terminal 106 and ground under the following conditions.

Condition	Voltage
Brake pedal: Fully released	Approximately 0 V
Brake pedal: Slightly depressed	Battery voltage

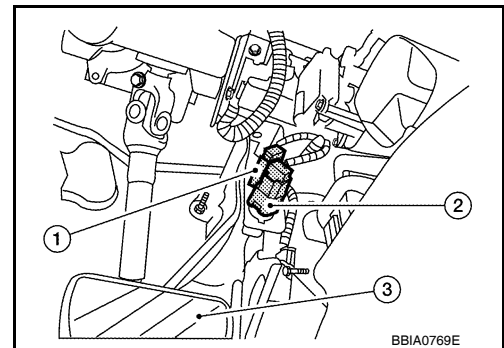


OK or NG

- OK >> GO TO 15.
- NG >> GO TO 11.

3. CHECK ASCD BRAKE SWITCH POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch (1) harness connector.
 - Stop lamp switch (2)
 - Brake pedal (3)
3. Turn ignition switch ON.

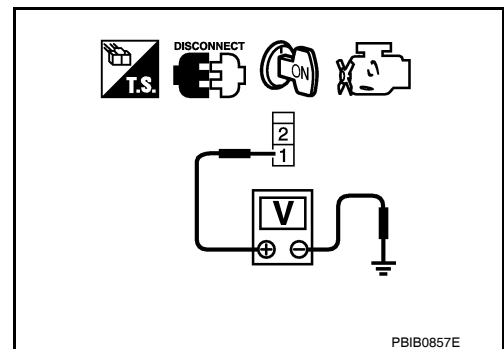


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 8.
- NG (M/T models)>>GO TO 4.
- NG (CVT models)>>GO TO 6.



4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

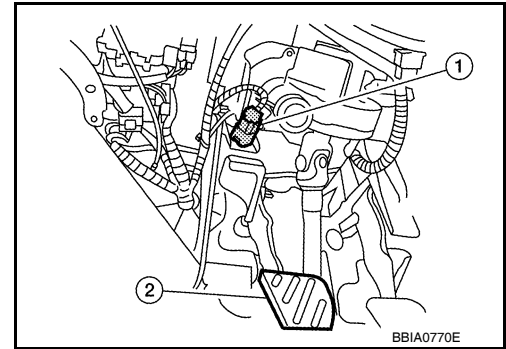
1. Turn ignition switch OFF.

DTC P1572 ASCD BRAKE SWITCH

[QR25DE]

< SERVICE INFORMATION >

2. Disconnect ASCD clutch switch (1) harness connector.
 - Clutch pedal (2)
3. Turn ignition switch ON.

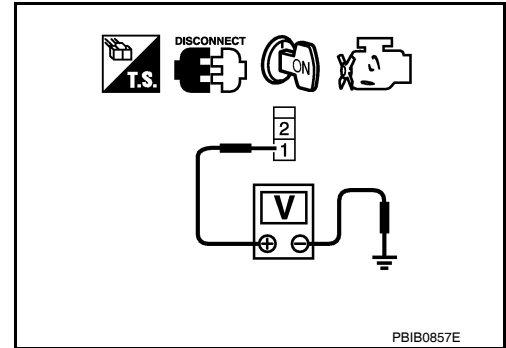


4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between ASCD clutch switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 1 and ASCD clutch switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 10.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 110 and ASCD brake switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

DTC P1572 ASCD BRAKE SWITCH

[QR25DE]

< SERVICE INFORMATION >

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK ASCD BRAKE SWITCH

Refer to [EC-1562, "Component Inspection"](#).

OK or NG

- OK >> GO TO 15.
- NG >> Replace ASCD brake switch. Refer to [BR-8, "Removal and Installation"](#).

10. CHECK ASCD CLUTCH SWITCH

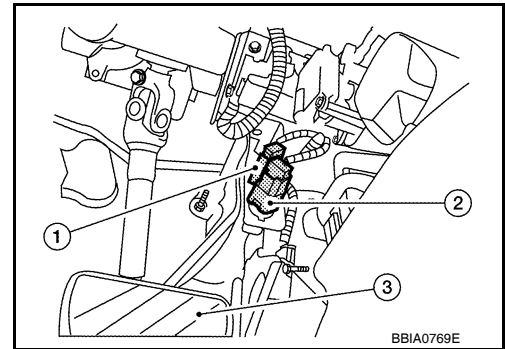
Refer to [EC-1562, "Component Inspection"](#)

OK or NG

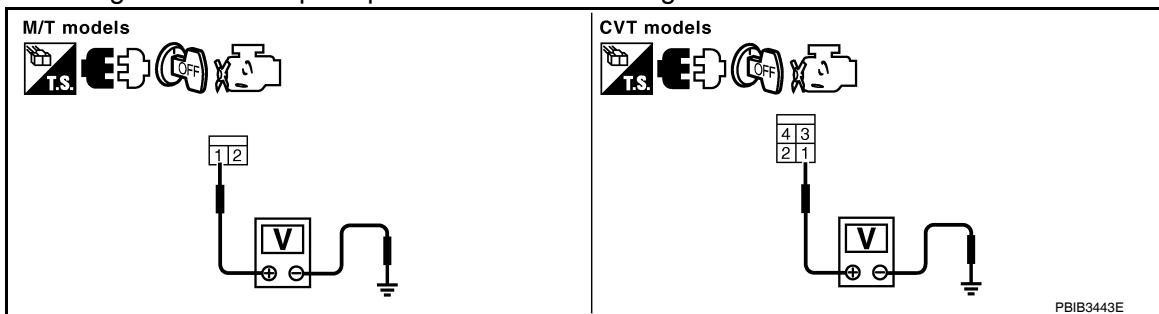
- OK >> GO TO 15.
- NG >> Replace ASCD clutch switch. Refer to [CL-7, "Removal and Installation"](#).

11. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch (2) harness connector.
 - ASCD brake switch (1)
 - Brake pedal (3)



3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -III or tester.



Voltage: Battery voltage

OK or NG

- OK >> GO TO 13.
- NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 106 and stop lamp switch terminal 2.
Refer to Wiring Diagram.

DTC P1572 ASCD BRAKE SWITCH

[QR25DE]

< SERVICE INFORMATION >

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK STOP LAMP SWITCH

Refer to [EC-1562, "Component Inspection"](#)

OK or NG

OK >> GO TO 15.

NG >> Replace stop lamp switch. Refer to [BR-8, "Removal and Installation"](#).

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

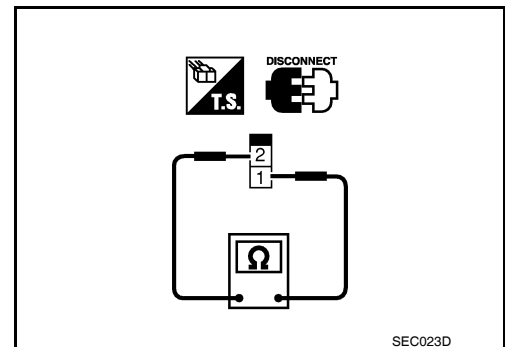
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ASCD BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Brake pedal: Fully released.	Should exist.
Brake pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-7](#), and perform step 3 again.

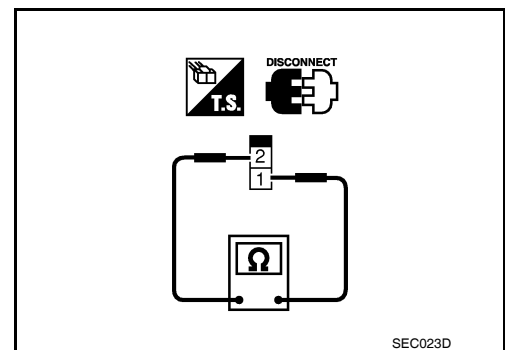


ASCD CLUTCH SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Clutch pedal: Fully released.	Should exist.
Clutch pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-6](#), and perform step 3 again.



STOP LAMP SWITCH

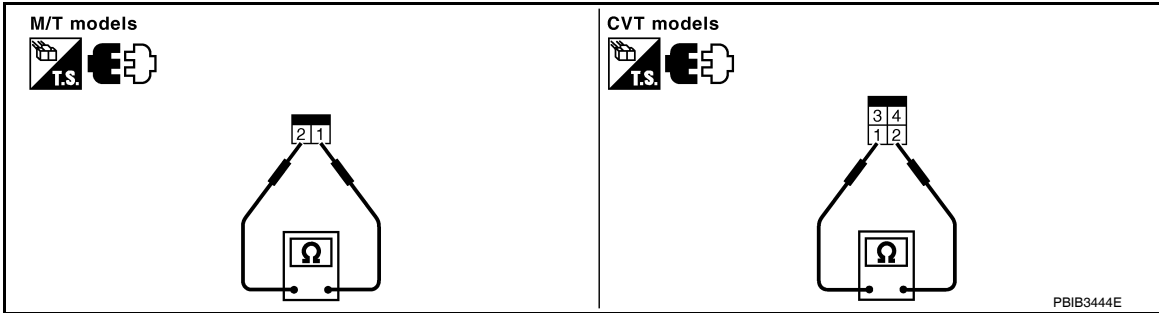
1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.

DTC P1572 ASCD BRAKE SWITCH

[QR25DE]

< SERVICE INFORMATION >

3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-7](#), and perform step 3 again.

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DTC P1574 ASCD VEHICLE SPEED SENSOR

< SERVICE INFORMATION >

[QR25DE]

DTC P1574 ASCD VEHICLE SPEED SENSOR

Component Description

INFOID:000000006150799

The ECM receives two vehicle speed sensor 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 [EC-1124](#) for ASCD functions.

On Board Diagnosis Logic

INFOID:000000006150800

- This self-diagnosis has the one trip detection logic.
- The MIL will not illuminate for this self-diagnosis.

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 [EC-1508](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1517](#).
- If DTC P1574 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1519](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1574 1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted.)• Harness or connectors (Combination meter circuit is open or shorted.)• TCM (CVT models)• Combination meter• ECM

DTC Confirmation Procedure

INFOID:000000006150801

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Step 3 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT-III

1. Start engine.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Drive the vehicle at more than 40 km/h (25MPH).
4. Check DTC.
5. If DTC is detected, go to [EC-1564, "Diagnosis Procedure"](#).

WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

INFOID:000000006150802

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [CVT-25](#).

OK or NG

- OK >> GO TO 2.
- NG >> Perform trouble shooting relevant to DTC indicated.

DTC P1574 ASCD VEHICLE SPEED SENSOR

< SERVICE INFORMATION >

[QR25DE]

2.CHECK DTC WITH "ABS ACTUATOR AND ELECTRIC UNIT"

Refer to [BRC-10](#).

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

3.CHECK COMBINATION METER

Check combination meter function.

Refer to [DI-6](#).

>> **INSPECTION END**

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DTC P1715 INPUT SPEED SENSOR

< SERVICE INFORMATION >

[QR25DE]

DTC P1715 INPUT SPEED SENSOR

Description

INFOID:000000006150803

ECM receives input speed signal from TCM through CAN communication line. ECM uses this signal for engine control.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150804

Specification data are reference values.

Monitor item	Condition	Specification
I/P PULLY SPD	• Vehicle speed: More than 20 km/h (12 MPH)	Almost the same speed as the tachometer indication

On Board Diagnosis Logic

INFOID:000000006150805

The MIL will not illuminate for this self-diagnosis.

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 [EC-1415](#).
- If DTC P1715 is displayed with DTC P0340 first perform the trouble diagnosis for DTC P0340. Refer to [EC-1421](#).
- If DTC P1715 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1517](#).
- If DTC P1715 is displayed with DTC P0607, first perform the trouble diagnosis for DTC P0607. Refer to [EC-1519](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1715 1715	Input speed sensor (TCM output)	Input speed signal is different from the theoretical value calculated by ECM from output shaft revolution signal and engine rpm signal.	<ul style="list-style-type: none">• Harness or connectors (CAN communication line is open or shorted)• Harness or connectors (Input speed sensor circuit is open or shorted)• TCM

DTC Confirmation Procedure

INFOID:000000006150806

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

Ⓟ WITH CONSULT-III

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-III.
3. Start engine.
4. Drive vehicle at a speed of more than 50 km/h (31 MPH) for at least 5 seconds.
5. Check 1st trip DTC.
6. If 1st trip DTC is detected, go to [EC-1566. "Diagnosis Procedure"](#).

Ⓟ WITH GST

Follow the procedure "WITH CONSULT-III" above.

Diagnosis Procedure

INFOID:000000006150807

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to [CVT-25](#).

OK or NG

DTC P1715 INPUT SPEED SENSOR

[QR25DE]

< SERVICE INFORMATION >

- OK >> GO TO 2.
- NG >> Perform trouble shooting relevant to DTC indicated.

A

2.REPLACE TCM

Replace TCM. Refer to [CVT-28](#).

EC

>> INSPECTION END

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DTC P1805 BRAKE SWITCH

< SERVICE INFORMATION >

[QR25DE]

DTC P1805 BRAKE SWITCH

Description

INFOID:000000006150808

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is being driven.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150809

Specification data are reference values.

monitor item	condition		specification
BRAKE SW	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

INFOID:000000006150810

The MIL will not illuminate for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for extremely long time while the vehicle is being driven.	<ul style="list-style-type: none">• Harness or connectors (Stop lamp switch circuit is open or shorted.)• Stop lamp switch

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters in fail-safe mode.

Engine operation condition in fail-safe mode	
ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.	
Vehicle condition	Driving condition
Engine: Idling	Normal
Accelerating	Poor acceleration

DTC Confirmation Procedure

INFOID:000000006150811

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-III.
4. Check 1st trip DTC.
5. If 1st trip DTC is detected, go to [EC-1570. "Diagnosis Procedure"](#).

DTC P1805 BRAKE SWITCH





< SERVICE INFORMATION >

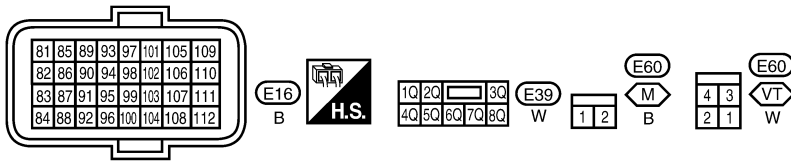
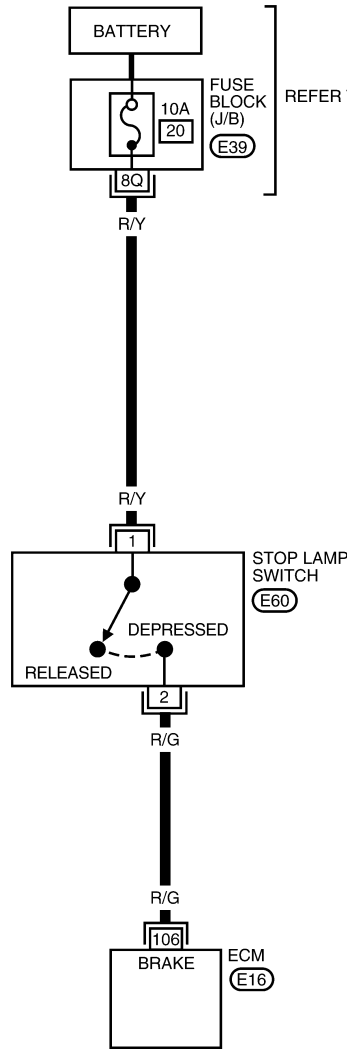
[QR25DE]

Wiring Diagram

INFOID:000000006150812

EC-BRK/SW-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH M/T
-  : WITH CVT



BBWA3052E

Specification data are reference values and are measured between each terminal and ground.

DTC P1805 BRAKE SWITCH

< SERVICE INFORMATION >

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
106	R/G	Stop lamp switch	[Ignition switch: OFF] • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006150813

1. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

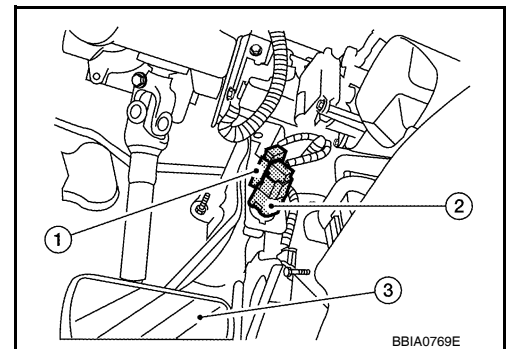
Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

OK or NG

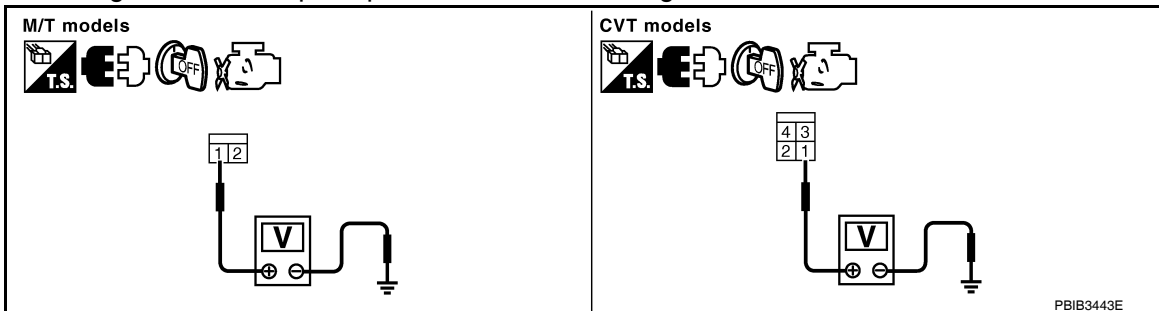
- OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch (2) harness connector.
 - ASCD brake switch (1)
 - Brake pedal (3)



2. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-III or tester.



Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- 10 A fuse
- Harness for open and short between stop lamp switch and battery

DTC P1805 BRAKE SWITCH

< SERVICE INFORMATION >

[QR25DE]

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect stop lamp switch harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between stop lamp switch terminal 2 and ECM terminal 106.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness connectors.

5. CHECK STOP LAMP SWITCH

Refer to [EC-1571, "Component Inspection"](#).

OK or NG

OK >> GO TO 6.

NG >> Replace stop lamp switch. Refer to [BR-8, "Removal and Installation"](#).

6. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

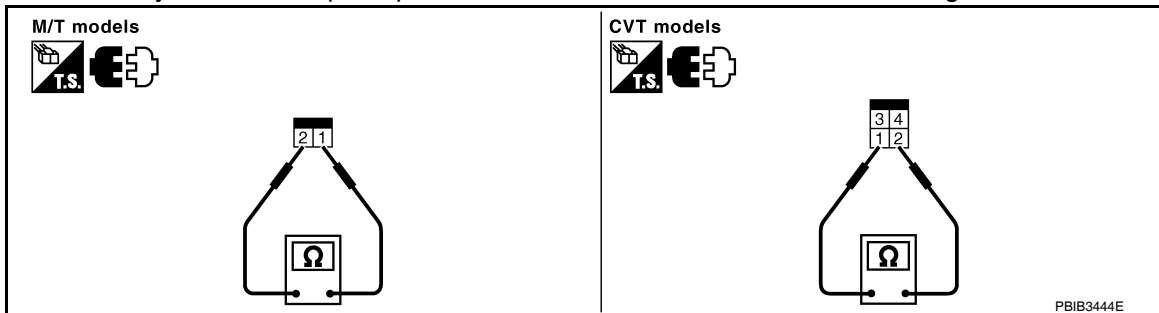
>> **INSPECTION END**

Component Inspection

INFOID:000000006150814

STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-7](#), and perform step 3 again.

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

< SERVICE INFORMATION >

[QR25DE]

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

Component Description

INFOID:000000006150815

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is controlled ON/OFF by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150816

Specification data are reference values.

Monitor item	Condition	Specification
THRTL RELAY	• Ignition switch: ON	ON

On Board Diagnosis Logic

INFOID:000000006150817

These self-diagnoses have one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2100 2100	Throttle control motor relay circuit open	ECM detects that the voltage of power source for throttle control motor is excessively low.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is open)• Throttle control motor relay
P2103 2103	Throttle control motor relay circuit short	ECM detects the throttle control motor relay is stuck ON.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor relay circuit is shorted)• Throttle control motor relay

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL illuminates.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006150818

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR DTC P2100

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.
4. If DTC is detected, go to [EC-1574, "Diagnosis Procedure"](#).

PROCEDURE FOR DTC P2103

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Turn ignition switch ON and wait at least 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1574, "Diagnosis Procedure"](#).

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

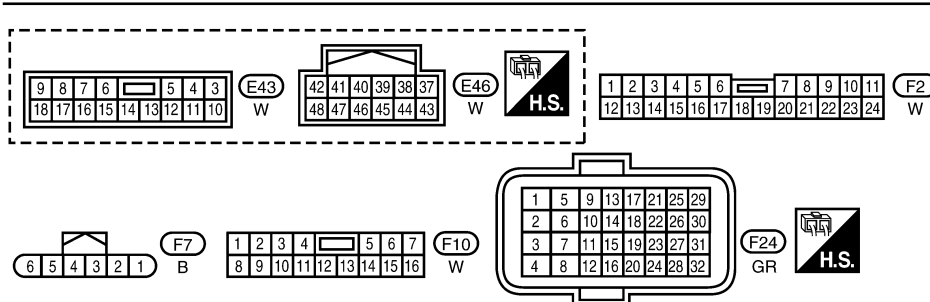
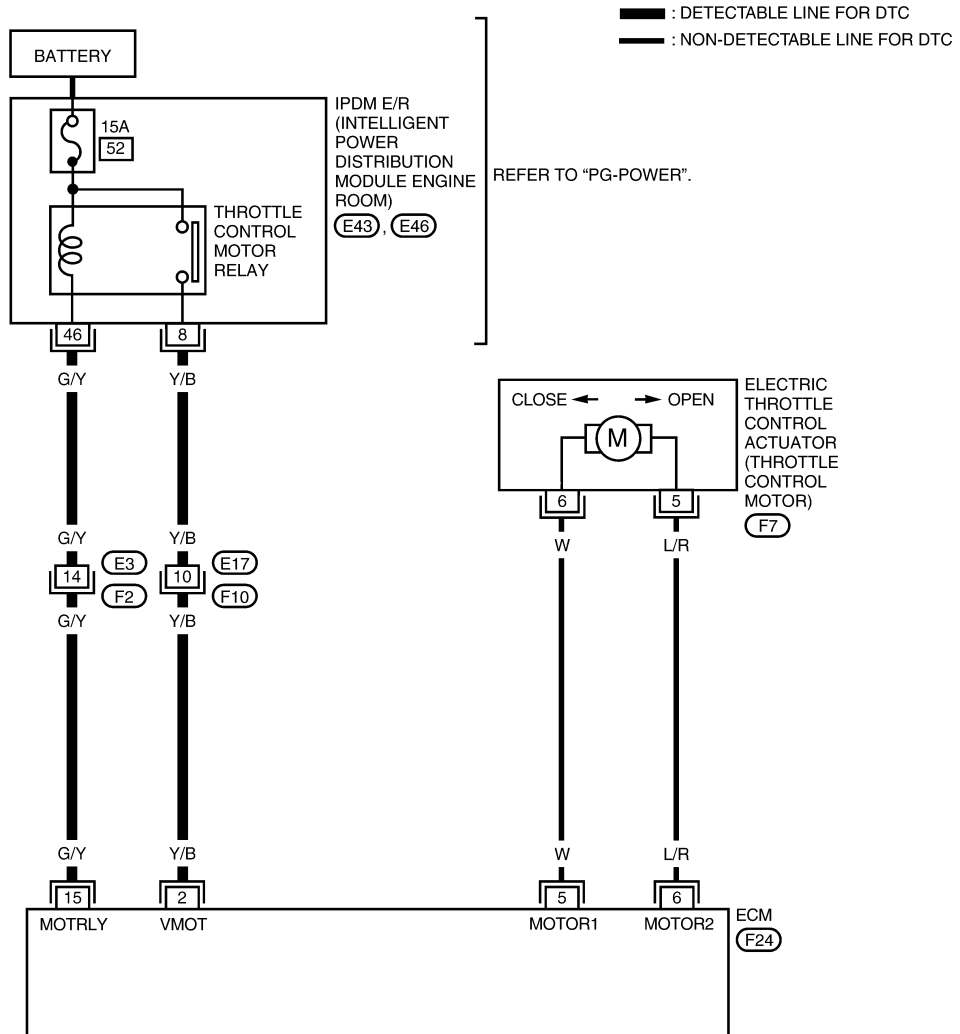
< SERVICE INFORMATION >

[QR25DE]

Wiring Diagram

INFOID:000000006150819

EC-ETC2-01



BBWA3054E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

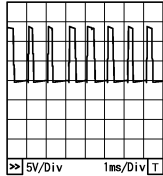
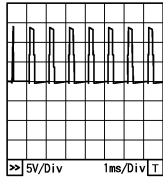
CAUTION:

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

[QR25DE]

< SERVICE INFORMATION >

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
5	W	Throttle control motor (Open)	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	0 - 14 V★  PBIAB150J
6	L/R	Throttle control motor (Close)	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	0 - 14 V★  PBIAB149J
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150820

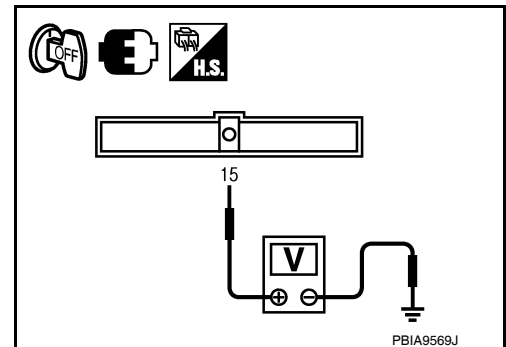
1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

- Turn ignition switch OFF.
- Check voltage between ECM terminal 15 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
NG >> GO TO 2.



2. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

- Disconnect ECM harness connector.
- Disconnect IPDM E/R harness connector E46.
- Check continuity between ECM terminal 15 and IPDM E/R terminal 46. Refer to Wiring Diagram.

Continuity should exist.

- Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.

DTC P2100, P2103 THROTTLE CONTROL MOTOR RELAY

[QR25DE]

< SERVICE INFORMATION >

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUSE

1. Disconnect 15 A fuse. For the fuse number, refer to [EC-1573, "Wiring Diagram"](#). For the fuse arrangement, refer to [PG-24, "IPDM E/R Terminal Arrangement"](#).
2. Check 15 A fuse for blown.

OK or NG

- OK >> GO TO 8.
- NG >> Replace 15 A fuse.

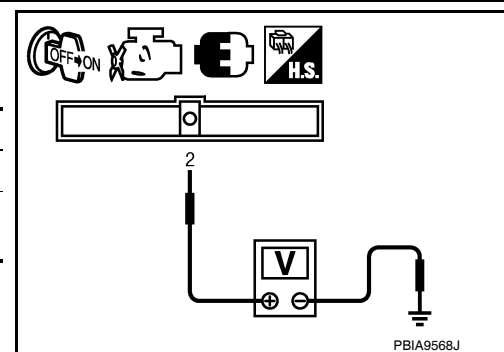
5. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

Check voltage between ECM terminal 2 and ground under the following conditions with CONSULT-III or tester.

Ignition switch	Voltage
OFF	Approximately 0 V
ON	Battery voltage (11 - 14 V)

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 6.



6. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E43.
4. Check continuity between ECM terminal 2 and IPDM E/R terminal 8. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-18](#).
- NG >> Repair or replace harness or connectors.

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[QR25DE]

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

Description

INFOID:000000006150821

NOTE:

If DTC P2101 is displayed with DTC P2100 or P2119, first perform the trouble diagnosis for DTC P2100 or P2119. Refer to [EC-1572](#) or [EC-1586](#).

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.

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. The throttle position sensor provides feedback to the ECM when opens/closes the throttle valve in response to driving conditions via the throttle control motor.

On Board Diagnosis Logic

INFOID:000000006150822

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2101 2101	Electric throttle control performance	Electric throttle control function does not operate properly.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor circuit is open or shorted)• Electric throttle control actuator

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL illuminates.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006150823

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V when engine is running.

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.
4. If DTC is detected, go to [EC-1578, "Diagnosis Procedure"](#).

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[QR25DE]

Wiring Diagram

INFOID:000000006150824

EC-ETC1-01

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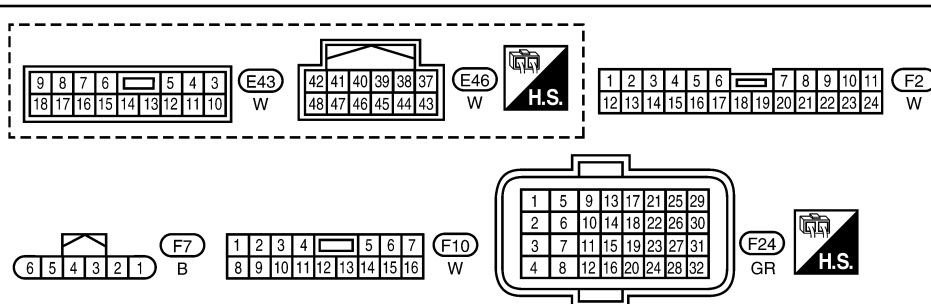
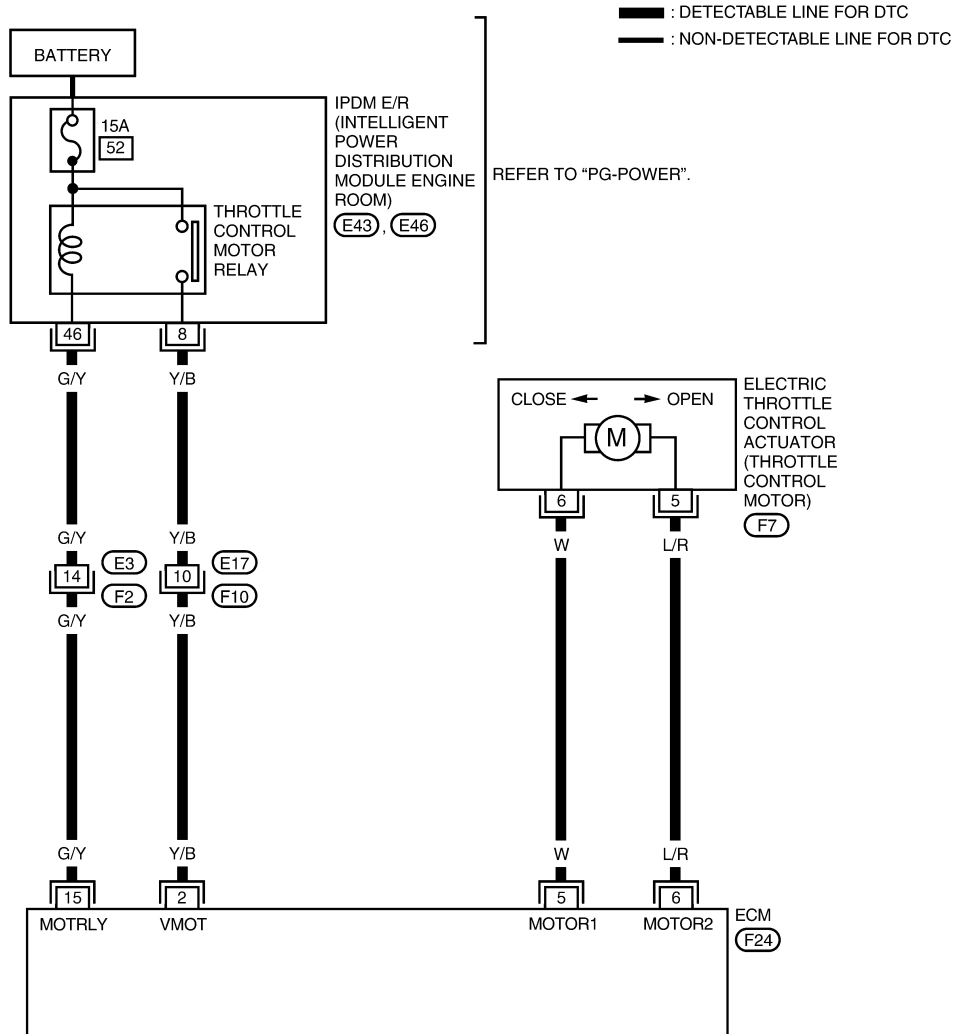
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Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

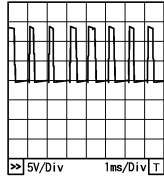
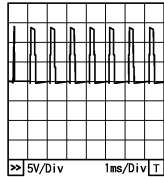
CAUTION:

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
5	W	Throttle control motor (Open)	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	0 - 14 V★  PBIA8150J
6	L/R	Throttle control motor (Close)	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	0 - 14 V★  PBIA8149J
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

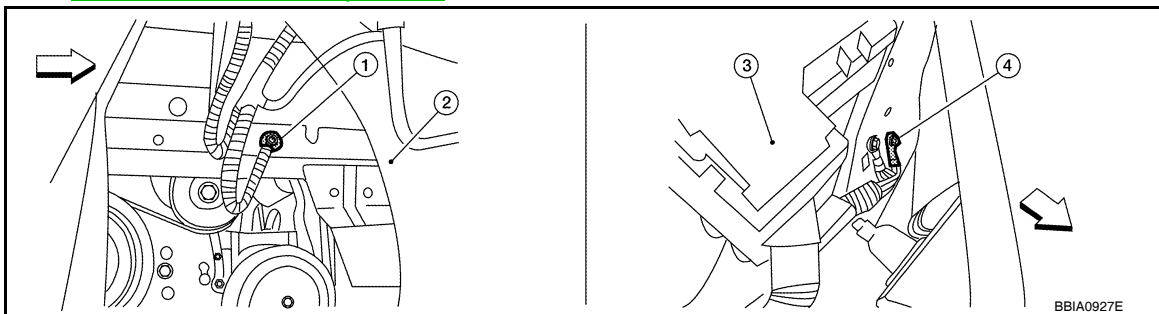
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150825

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

[QR25DE]

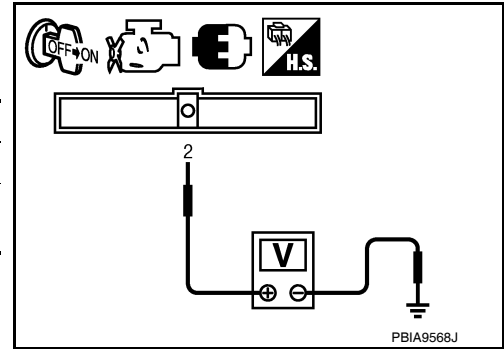
< SERVICE INFORMATION >

Check voltage between ECM terminal 2 and ground under the following conditions with CONSULT-III or tester.

Ignition switch	Voltage
OFF	Approximately 0 V
ON	Battery voltage (11 - 14 V)

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 3.



3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E43.
4. Check continuity between ECM terminal 2 and IPDM E/R terminal 8. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

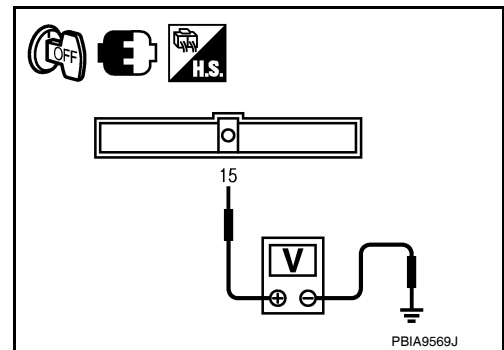
5. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Reconnect all harness connectors disconnected.
2. Check voltage between ECM terminal 15 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 6.



6. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E46.
3. Check harness continuity between ECM terminal 15 and IPDM E/R terminal 46. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

< SERVICE INFORMATION >

[QR25DE]

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK FUSE

1. Disconnect 15 A fuse. For the fuse number, refer to [EC-1577, "Wiring Diagram"](#). For the fuse arrangement, refer to [PG-24, "IPDM E/R Terminal Arrangement"](#).
2. Check if 15 A fuse is blown.

OK or NG

- OK >> GO TO 9.
- NG >> Replace 15A fuse.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

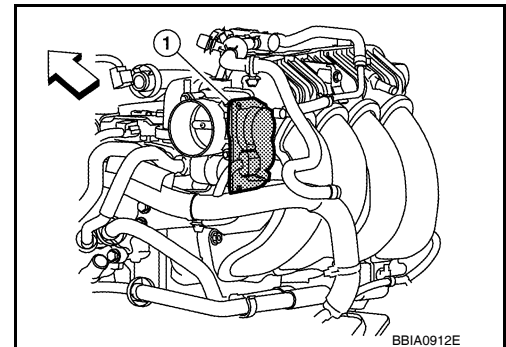
OK or NG

- OK >> Replace IPDM E/R. Refer to [PG-18](#).
- NG >> Repair or replace harness or connectors.

10. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator (1) harness connector.
 - ↖: Vehicle front
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
5	5	Should not exist.
	6	Should exist.
6	5	Should exist.
	6	Should not exist.



5. Also check harness for short to ground and short to power.

OK or NG

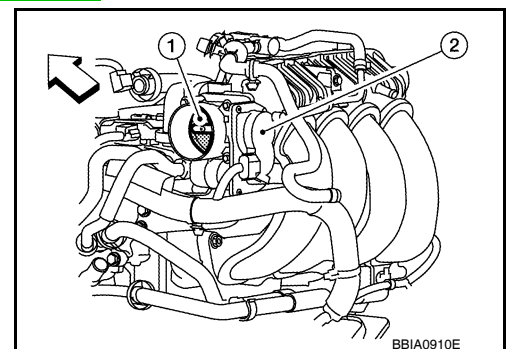
- OK >> GO TO 11.
- NG >> Repair or replace.

11. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct. Refer to [EM-133, "Removal and Installation"](#).
2. Check if foreign matter is caught between the throttle valve (1) and the housing.
 - ↖: Vehicle front
 - Electric throttle control actuator (2)

OK or NG

- OK >> GO TO 12.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EC-1183, "Throttle Valve Closed Position Learning"](#).



12. CHECK THROTTLE CONTROL MOTOR

DTC P2101 ELECTRIC THROTTLE CONTROL FUNCTION

[QR25DE]

< SERVICE INFORMATION >

Refer to [EC-1581](#), "Component Inspection".

OK or NG

- OK >> GO TO 13.
- NG >> GO TO 14.

13. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

OK or NG

- OK >> GO TO 14.
- NG >> Repair or replace harness or connectors.

14. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-135](#), "Removal and Installation".

>> INSPECTION END

Component Inspection

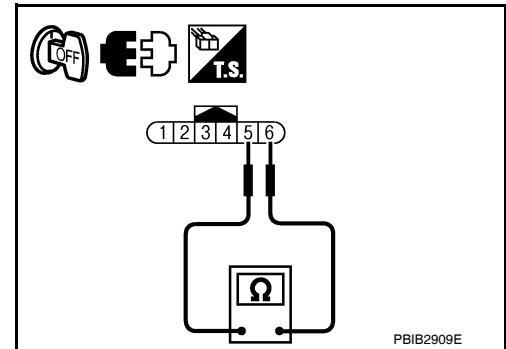
INFOID:000000006150826

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 5 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]

3. If NG, replace electric throttle control actuator. Refer to [EM-135](#), "Removal and Installation".



DTC P2118 THROTTLE CONTROL MOTOR

< SERVICE INFORMATION >

[QR25DE]

DTC P2118 THROTTLE CONTROL MOTOR

Component Description

INFOID:000000006150828

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. The throttle position sensor provides feedback to the ECM when opens/closes the throttle valve in response to driving conditions via the throttle control motor.

On Board Diagnosis Logic

INFOID:000000006150829

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2118 2118	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	<ul style="list-style-type: none">• Harness or connectors (Throttle control motor circuit is shorted.)• Electric throttle control actuator (Throttle control motor)

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL illuminates.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

INFOID:000000006150830

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Check DTC.
4. If DTC is detected, go to [EC-1584, "Diagnosis Procedure"](#).

DTC P2118 THROTTLE CONTROL MOTOR

< SERVICE INFORMATION >

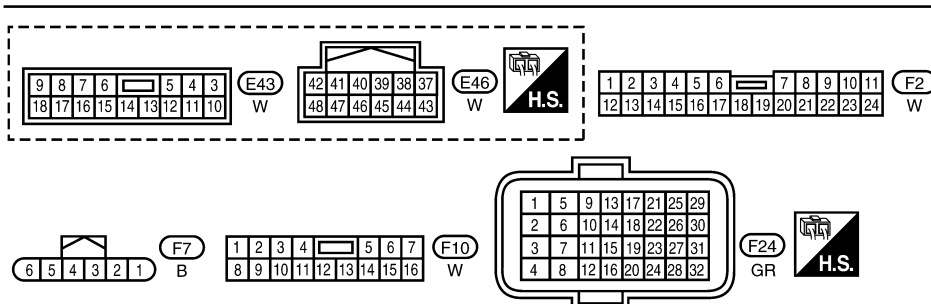
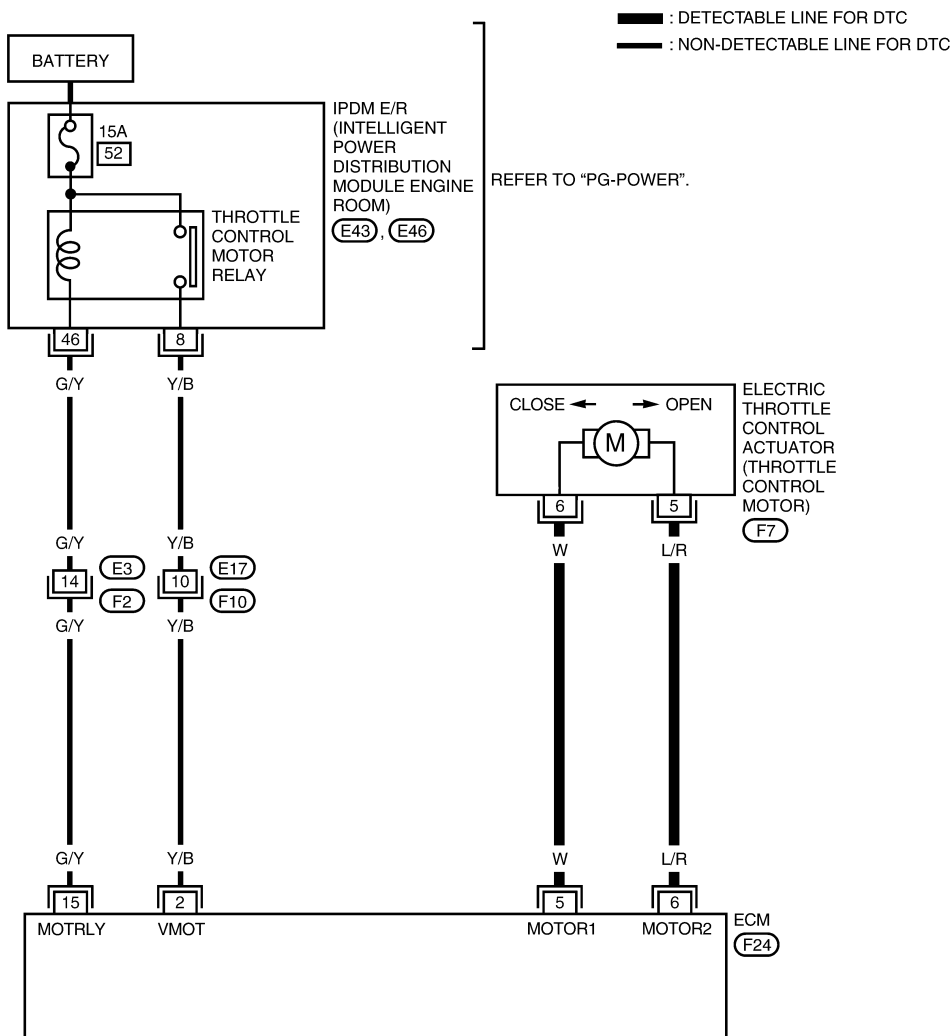
[QR25DE]

Wiring Diagram

INFOID:000000006150831

EC-ETC3-01

A
EC
C
D
E
F
G
H
I
J
K
L
M
N
O
P



BBWA3055E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

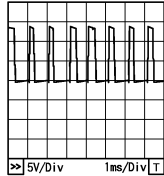
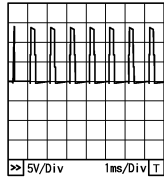
CAUTION:

DTC P2118 THROTTLE CONTROL MOTOR

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	Y/B	Throttle control motor power supply	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
5	W	Throttle control motor (Open)	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	0 - 14 V★  PBIA8150J
6	L/R	Throttle control motor (Close)	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	0 - 14 V★  PBIA8149J
15	G/Y	Throttle control motor relay	[Ignition switch: OFF]	BATTERY VOLTAGE (11 - 14 V)
			[Ignition switch: ON]	0 - 1.0 V

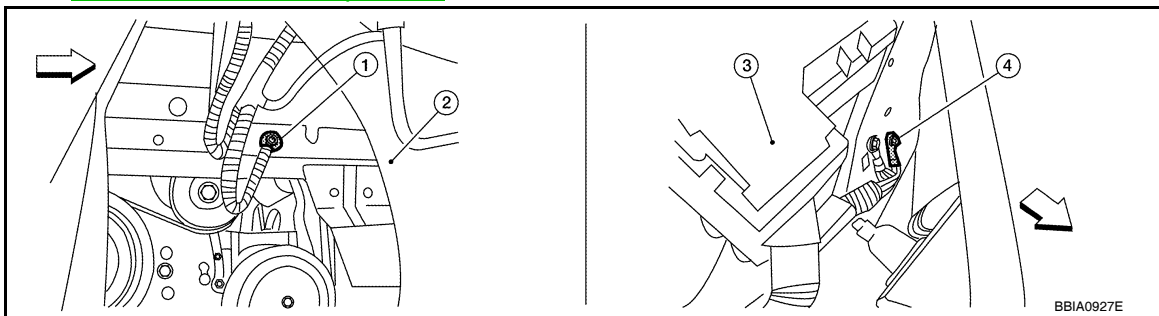
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150832

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten engine screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace ground connections.

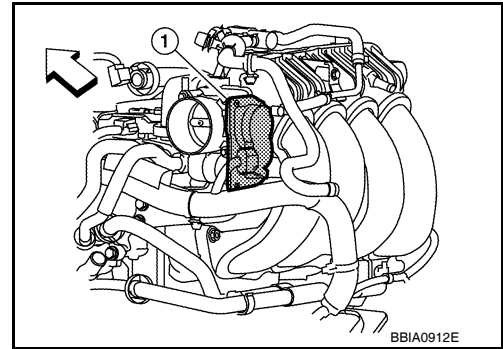
2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

DTC P2118 THROTTLE CONTROL MOTOR

[QR25DE]

< SERVICE INFORMATION >

1. Disconnect electric throttle control actuator (1) harness connector.
 - ⇐: Vehicle front
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.



Electric throttle control actuator terminal	ECM terminal	Continuity
5	5	Should not exist.
	6	Should exist.
6	5	Should exist.
	6	Should not exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-1585, "Component Inspection"](#).

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 5.

4. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace harness or connectors.

5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-135, "Removal and Installation"](#).

>> **INSPECTION END**

Component Inspection

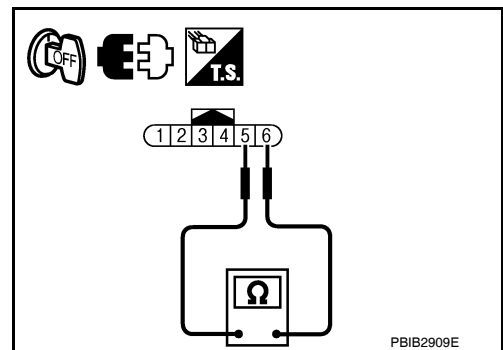
INFOID:000000006150833

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 5 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]

3. If NG, replace electric throttle control actuator. Refer to [EM-135, "Removal and Installation"](#).



DTC P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

< SERVICE INFORMATION >

[QR25DE]

DTC P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

Component Description

INFOID:000000006150835

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and open/closes the throttle valve in response to driving conditions via the throttle control motor.

On Board Diagnosis Logic

INFOID:000000006150836

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P2119 2119	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	• Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detects the throttle valve is stuck open.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL illuminates.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	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.
Malfunction B	ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
Malfunction C	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P position (CVT), neutral (M/T), and engine speed will not exceed 1,000 rpm or more.

DTC Confirmation Procedure

INFOID:000000006150837

NOTE:

- Perform **PROCEDURE FOR MALFUNCTION A AND B** first. If the DTC cannot be confirmed, perform **PROCEDURE FOR MALFUNCTION C**.
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A AND B

1. Turn ignition switch ON and wait at least 1 second.
2. Set selector lever to D position (CVT) or 1st position (M/T), and wait at least 3 seconds.
3. Set selector lever to P or N position (CVT) or Neutral position (M/T).
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition switch ON and wait at least 1 second.
6. Set selector lever to D position (CVT) or 1st position (M/T), and wait at least 3 seconds.
7. Set selector lever to P or N position (CVT) or Neutral position (M/T).
8. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
9. Check DTC.
10. If DTC is detected, go to [EC-1587. "Diagnosis Procedure"](#).

PROCEDURE FOR MALFUNCTION C

1. Turn ignition switch ON and wait at least 1 second.
2. Set selector lever to D position (CVT) or 1st position (M/T) and wait at least 3 seconds.

DTC P2119 ELECTRIC THROTTLE CONTROL ACTUATOR

[QR25DE]

< SERVICE INFORMATION >

3. Set selector lever to P or N position (CVT) or Neutral (M/T) position.
4. Start engine and let it idle for 3 seconds.
5. Check DTC.
6. If DTC is detected, go to [EC-1587. "Diagnosis Procedure"](#).

Diagnosis Procedure

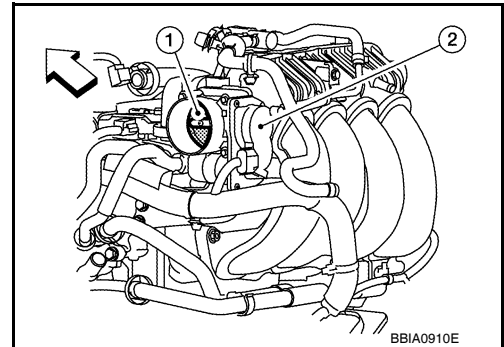
INFOID:000000006150838

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct. Refer to [EM-133. "Removal and Installation"](#).
3. Check if a foreign matter is caught between the throttle valve (1) and the housing.
 - ↖: Vehicle front
 - Electric throttle control actuator (2)

OK or NG

- OK >> GO TO 2.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside, and then perform throttle valve closed position learning. Refer to [EC-1183. "Throttle Valve Closed Position Learning"](#).



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-135. "Removal and Installation"](#).

>> INSPECTION END

DTC P2122, P2123 APP SENSOR

< SERVICE INFORMATION >

[QR25DE]

DTC P2122, P2123 APP SENSOR

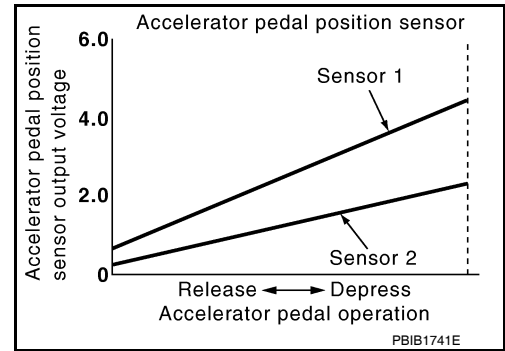
Component Description

INFOID:000000006150839

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 potentiometer 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 sends 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 engine operations such as fuel cut.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150840

Specification data are reference values.

Monitor item	Condition	Specification
ACCEL SEN 1	• Ignition switch: ON (Engine stopped) • Selector lever: D (CVT), 1st (M/T) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	• Ignition switch: ON (Engine stopped) • Selector lever: D (CVT), 1st (M/T) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	ON
	Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:000000006150841

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EC-1520](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122 2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (APP sensor 1 circuit is open or shorted.) • Accelerator pedal position sensor (APP sensor 1)
P2123 2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL illuminates.

Engine operating condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006150842

NOTE:

DTC P2122, P2123 APP SENSOR

[QR25DE]

< SERVICE INFORMATION >

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

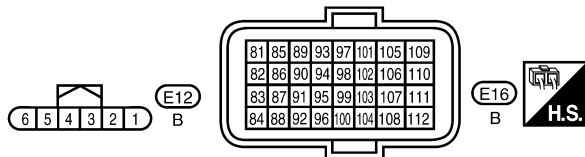
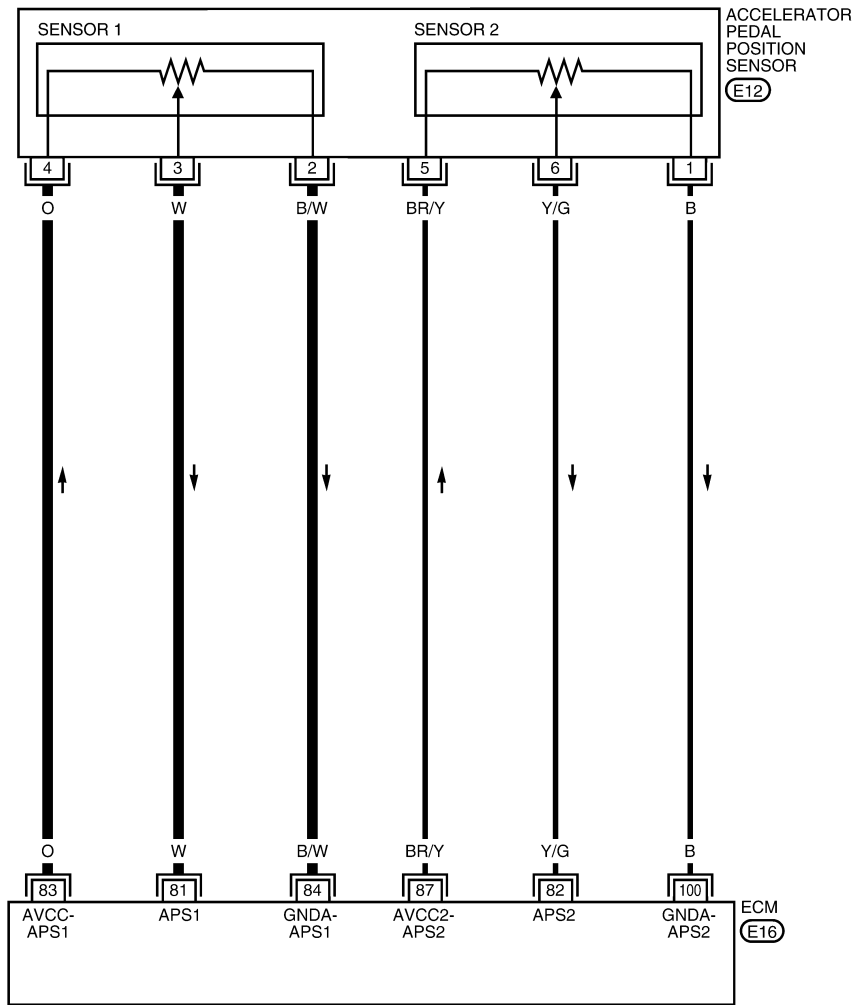
1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1590. "Diagnosis Procedure"](#).

Wiring Diagram

INFOID:000000006150843

EC-APPS1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



DTC P2122, P2123 APP SENSOR

< SERVICE INFORMATION >

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

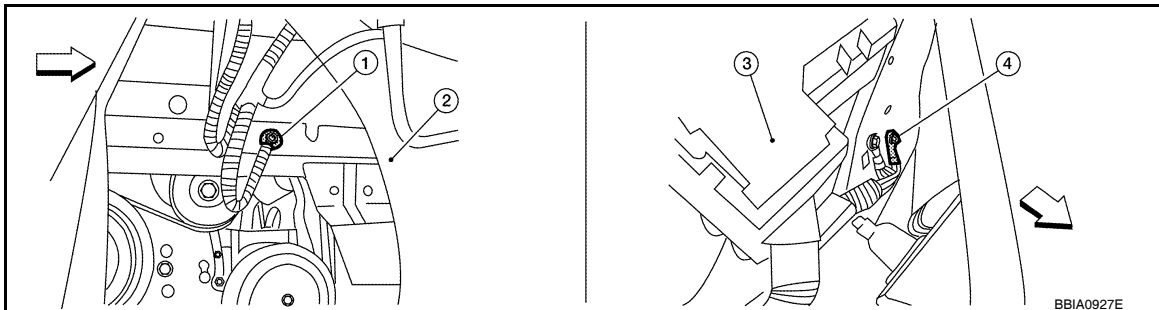
TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
81	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
82	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
83	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
84	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
87	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
100	B	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006150844

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



←: Vehicle front

- | | | |
|---|----------------|------------------------------|
| 1. Body ground E9 (view with front wheel RH and fender protector RH removed.) | 2. Washer tank | 3. Fuse and fusible link box |
| 4. Body ground E15 | | |

OK or NG

DTC P2122, P2123 APP SENSOR

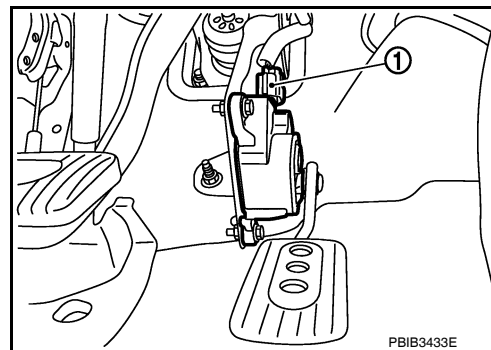
[QR25DE]

< SERVICE INFORMATION >

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.

2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

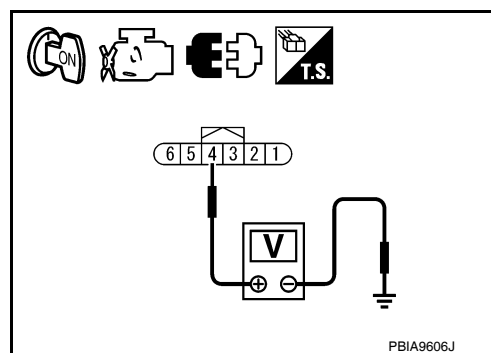


3. Check voltage between APP sensor terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3.CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 84 and APP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4.CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 81 and APP sensor terminal 3. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5.CHECK APP SENSOR

Refer to [EC-1592, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6.REPLACE ACCELERATOR PEDAL ASSEMBLY

DTC P2122, P2123 APP SENSOR

[QR25DE]

< SERVICE INFORMATION >

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

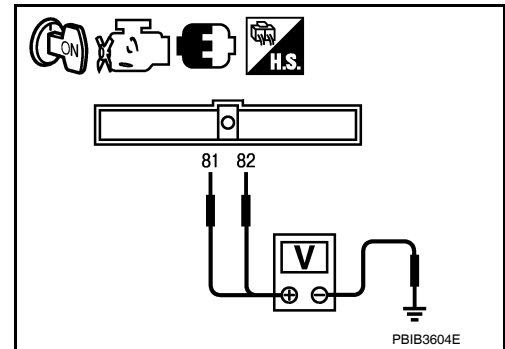
Component Inspection

INFOID:000000006150845

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 81 (APP sensor 1 signal), 82 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
81 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
82 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V



4. If NG, replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[QR25DE]

DTC P2127, P2128 APP SENSOR

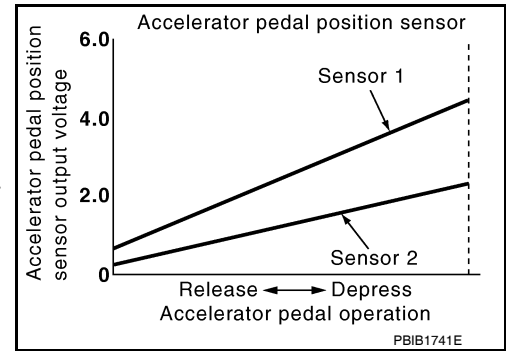
Component Description

INFOID:000000006150847

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 potentiometer 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 sends 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 engine operations such as fuel cut.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150848

Specification data are reference values.

Monitor item	Condition	Specification
ACCEL SEN 1	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	ON
	Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:000000006150849

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127 2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (APP sensor 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • EVAP control system pressure sensor
P2128 2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL illuminates.

Engine operating condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[QR25DE]

DTC Confirmation Procedure

INFOID:000000006150850

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1596, "Diagnosis Procedure"](#).

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

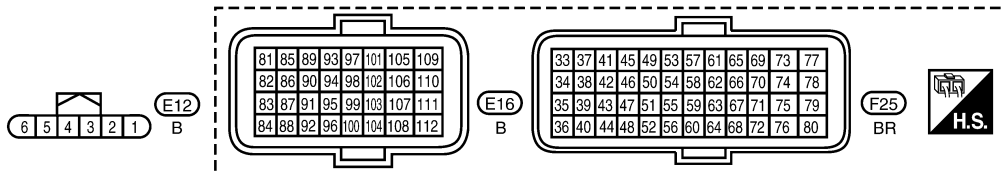
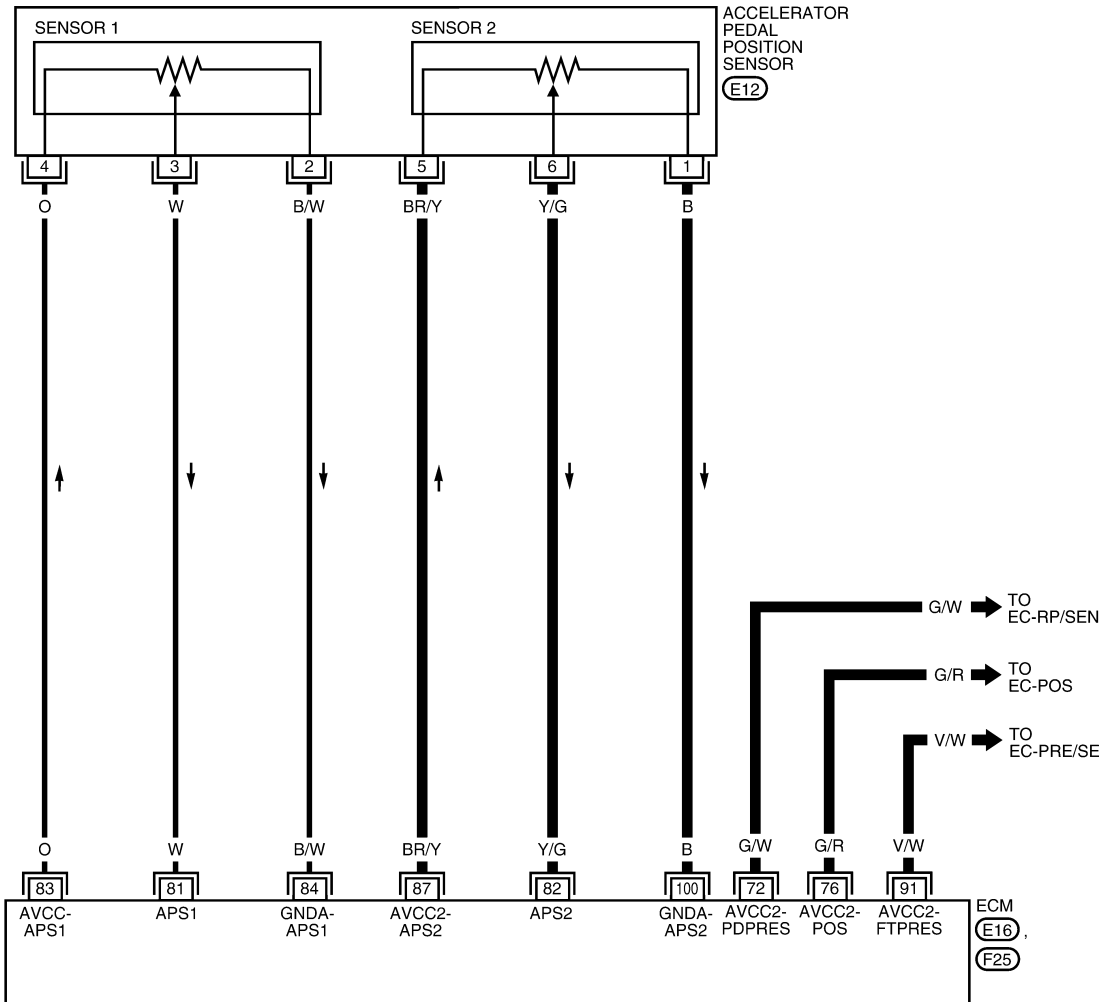
[QR25DE]

Wiring Diagram

INFOID:000000006150851

EC-APPS2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA3057E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P2127, P2128 APP SENSOR

< SERVICE INFORMATION >

[QR25DE]

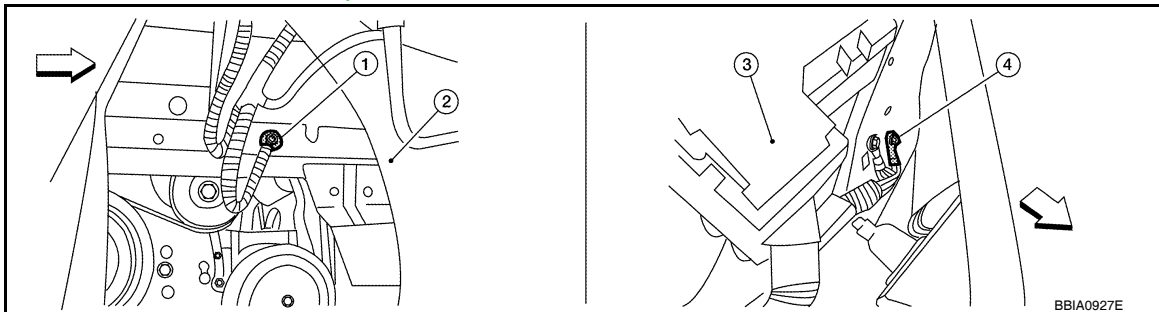
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
72	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
76	G/R	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
81	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
82	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
83	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
84	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
87	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
91	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
100	B	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006150852

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



↔: Vehicle front

- | | | |
|---|----------------|------------------------------|
| 1. Body ground E9 (view with front wheel RH and fender protector RH removed.) | 2. Washer tank | 3. Fuse and fusible link box |
| 4. Body ground E15 | | |

DTC P2127, P2128 APP SENSOR

[QR25DE]

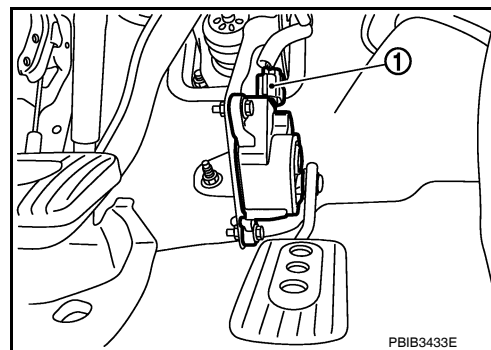
< SERVICE INFORMATION >

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.

2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

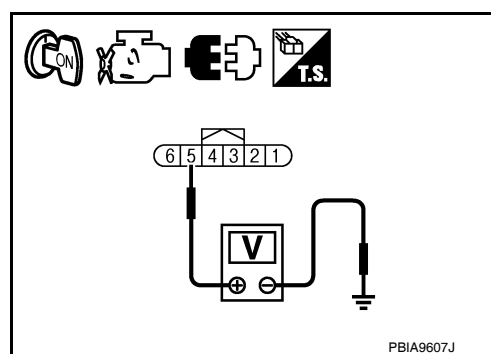


3. Check voltage between APP sensor terminal 5 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 3.



3. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 5 and ECM terminal 87. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit.

4. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
72	Refrigerant pressure sensor terminal 3	EC-1654, "Wiring Diagram"
76	Crankshaft position sensor (POS) terminal 1	EC-1416, "Wiring Diagram"
87	APP sensor terminal 5	EC-1595, "Wiring Diagram"
91	EVAP control system pressure sensor terminal 3	EC-1474, "Wiring Diagram"

OK or NG

- OK >> GO TO 5.
- NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-1420, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [MTC-28](#).)

DTC P2127, P2128 APP SENSOR

[QR25DE]

< SERVICE INFORMATION >

- EVAP control system pressure (Refer to [EC-1478. "Component Inspection".](#))

OK or NG

- OK >> GO TO 10.
- NG >> Replace malfunctioning component.

6. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 100 and APP sensor terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 82 and APP sensor terminal 6.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to [EC-1598. "Component Inspection".](#)

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 9.

9. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4. "Removal and Installation".](#)

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236.](#)

>> **INSPECTION END**

Component Inspection

INFOID:000000006150853

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.

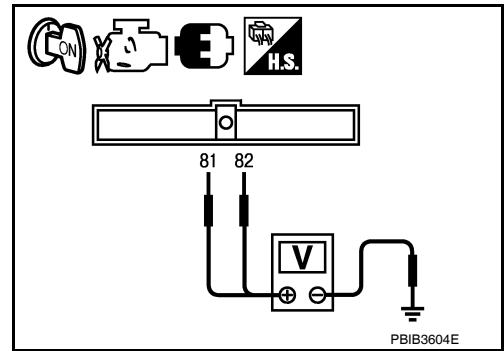
DTC P2127, P2128 APP SENSOR

[QR25DE]

< SERVICE INFORMATION >

3. Check voltage between ECM terminals 81 (APP sensor 1 signal), 82 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
81 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
82 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V



4. If NG, replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

DTC P2135 TP SENSOR

< SERVICE INFORMATION >

[QR25DE]

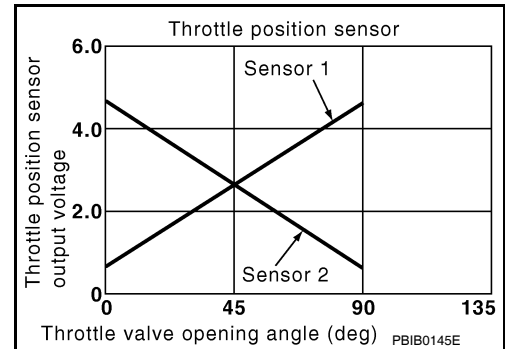
DTC P2135 TP SENSOR

Component Description

INFOID:000000006150855

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. 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. The ECM judges the current opening angle of the throttle valve from these signals and controls the throttle valve opening signal in response to driving conditions via the throttle control motor.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150856

Specification data are reference values.

Monitor item	Condition	Specification
TP SEN 1-B1 TP SEN 2-B2*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	More than 0.36 V
	• Selector lever: D (CVT), 1st (M/T) Accelerator pedal: Fully depressed	Less than 4.75 V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

INFOID:000000006150857

This self-diagnosis has the one trip detection logic.

NOTE:

If DTC P2135 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.

Refer to [EC-1520](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135 2135	Throttle position sensor circuit range/performance	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	<ul style="list-style-type: none"> • Harness or connector (TP sensor 1 or 2 circuit is open or shorted.) • Electric throttle control actuator (TP sensor 1 or 2)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL illuminates.

Engine operation condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006150858

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1602, "Diagnosis Procedure"](#).

DTC P2135 TP SENSOR

< SERVICE INFORMATION >

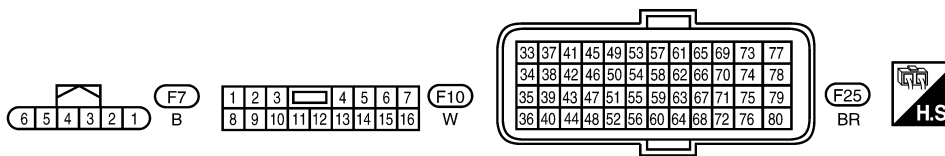
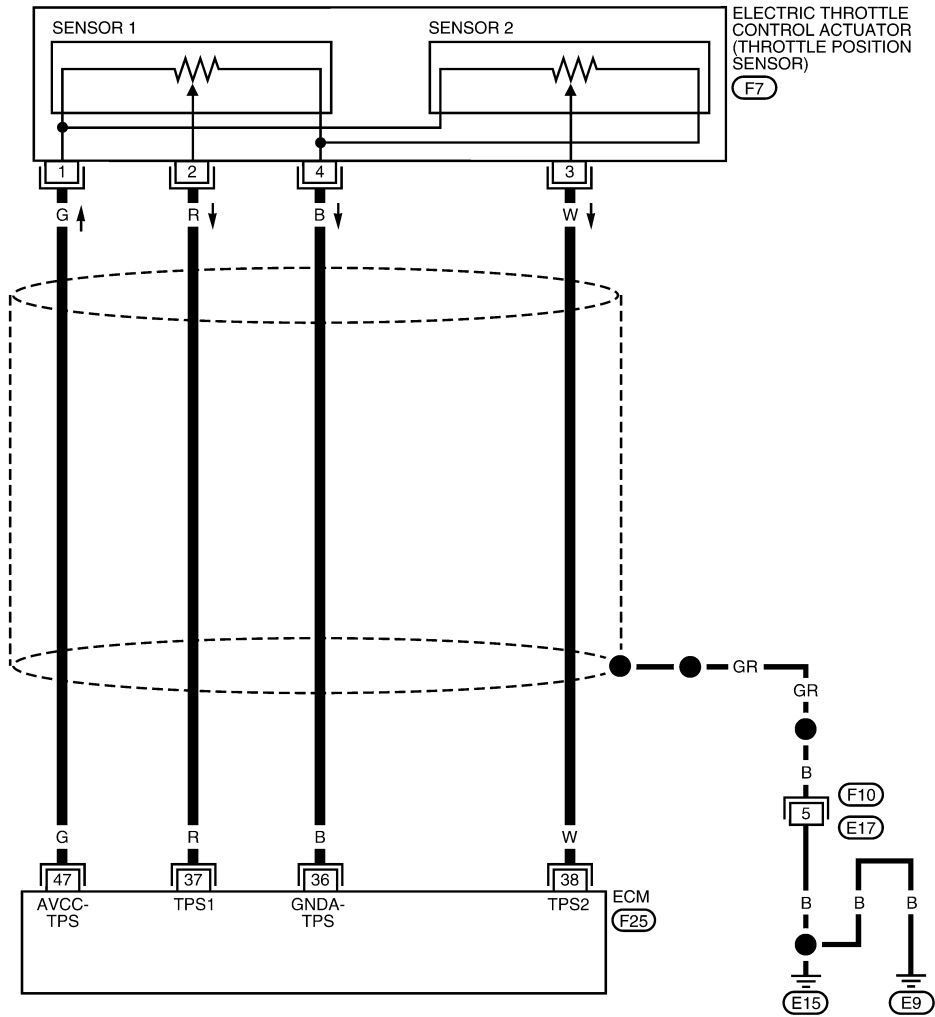
[QR25DE]

Wiring Diagram

INFOID:000000006150859

EC-TPS3-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P2135 TP SENSOR

< SERVICE INFORMATION >

[QR25DE]

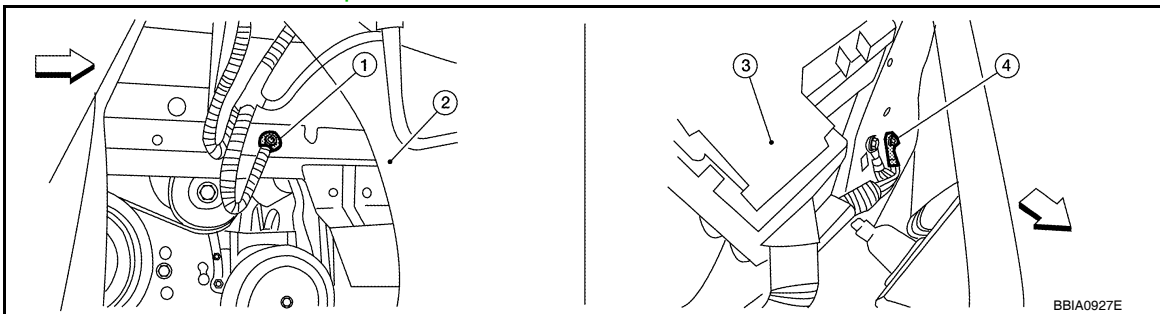
TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
36	B	Sensor ground (Throttle position sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
37	R	Throttle position sensor 1	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	More than 0.36 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	Less than 4.75 V
38	W	Throttle position sensor 2	[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully released	Less than 4.75 V
			[Ignition switch: ON] • Engine stopped • Selector lever: D (CVT), 1st (M/T) • Accelerator pedal: Fully depressed	More than 0.36 V
47	G	Sensor power supply (Throttle position sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

INFOID:000000006150860

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242. "Ground Inspection"](#).



←: Vehicle front

- | | | |
|---|----------------|------------------------------|
| 1. Body ground E9 (view with front wheel RH and fender protector RH removed.) | 2. Washer tank | 3. Fuse and fusible link box |
| 4. Body ground E15 | | |

OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

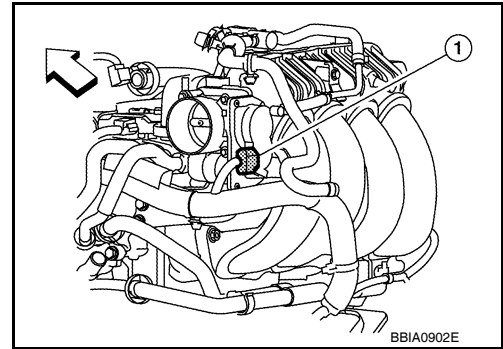
2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

DTC P2135 TP SENSOR

[QR25DE]

< SERVICE INFORMATION >

1. Disconnect electric throttle control actuator harness connector (1).
 - ⇐: Vehicle front
2. Turn ignition switch ON.

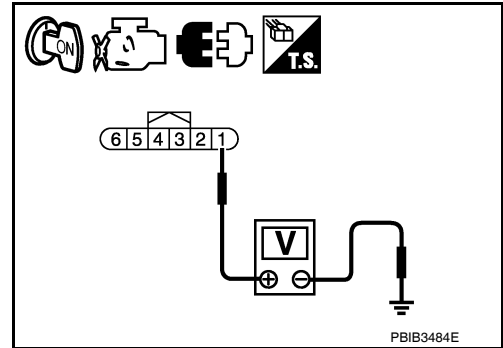


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 4 and ECM terminal 36. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following;
 - electric throttle control actuator terminal 2 and ECM terminal 37,
 - electric throttle control actuator terminal 3 and ECM terminal 38.Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-1604, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

Replace the electric throttle control actuator. Refer to [EM-135, "Removal and Installation"](#).

DTC P2135 TP SENSOR

[QR25DE]

< SERVICE INFORMATION >

>> INSPECTION END

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

Component Inspection

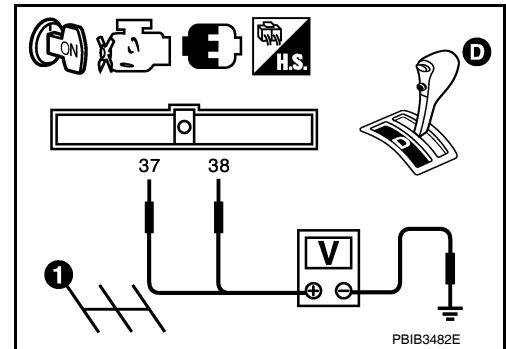
INFOID:000000006150861

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform [EC-1183](#). "Throttle Valve Closed Position Learning".
3. Turn ignition switch ON.
4. Set selector lever to D position (CVT) or 1st position (M/T).
5. Check voltage between ECM terminals 37 (TP sensor 1 signal), 38 (TP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
37 (Throttle position sensor 1)	Fully released	More than 0.36 V
	Fully depressed	Less than 4.75 V
38 (Throttle position sensor 2)	Fully released	Less than 4.75 V
	Fully depressed	More than 0.36 V

6. If NG, replace electric throttle control actuator. Refer to [EM-135](#). "Removal and Installation".



DTC P2138 APP SENSOR

< SERVICE INFORMATION >

[QR25DE]

DTC P2138 APP SENSOR

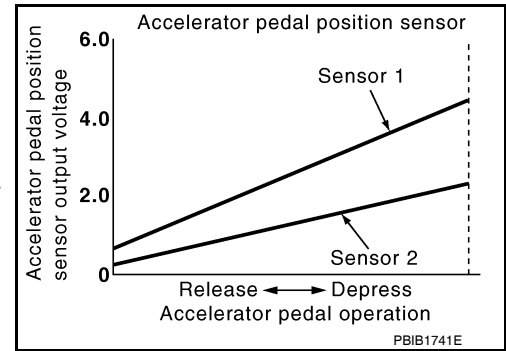
Component Description

INFOID:000000006150863

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150864

Specification data are reference values.

Monitor item	Condition	Specification
ACCEL SEN 1	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	4.0 - 4.8 V
ACCEL SEN 2*	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	0.6 - 0.9 V
	Accelerator pedal: Fully depressed	3.9 - 4.8 V
CLSD THL POS	• Ignition switch: ON (Engine stopped) Accelerator pedal: Fully released	ON
	Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

INFOID:000000006150865

This self-diagnosis has the one trip detection logic.

NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643.

Refer to [EC-1520](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138 2138	Accelerator pedal position sensor circuit range/performance	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	<ul style="list-style-type: none"> • Harness or connector (APP sensor 1 and 2 circuit is open or shorted.) [Crankshaft position sensor (POS) circuit is shorted.] (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) • Accelerator pedal position sensor (APP sensor 1 and 2) • Crankshaft position sensor (POS) • Refrigerant pressure sensor • EVAP control system pressure sensor

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL illuminates.

DTC P2138 APP SENSOR

< SERVICE INFORMATION >

[QR25DE]

Engine operating condition in fail-safe mode

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.

So, the acceleration will be poor.

DTC Confirmation Procedure

INFOID:000000006150866

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8 V at idle.

1. Start engine and let it idle for 1 second.
2. Check DTC.
3. If DTC is detected, go to [EC-1608, "Diagnosis Procedure"](#).

DTC P2138 APP SENSOR

< SERVICE INFORMATION >

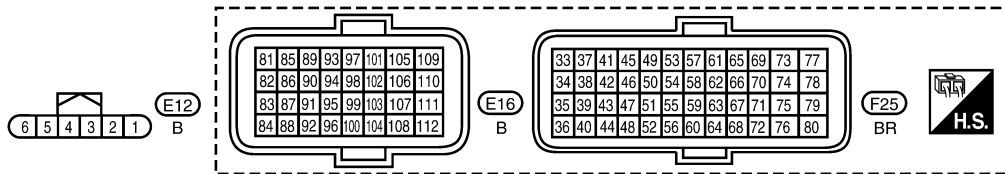
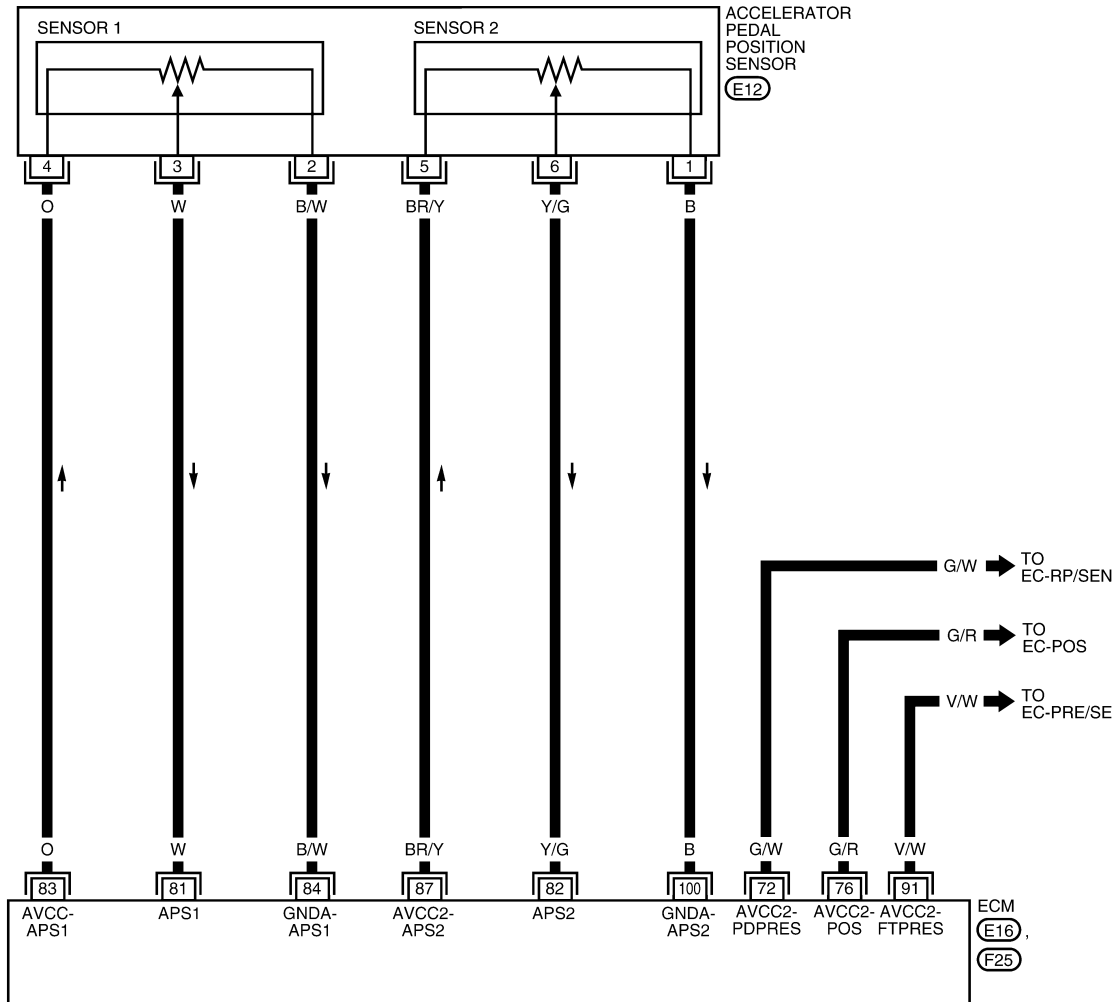
[QR25DE]

Wiring Diagram

INFOID:000000006150867

EC-APPS3-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA3058E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P2138 APP SENSOR

< SERVICE INFORMATION >

[QR25DE]

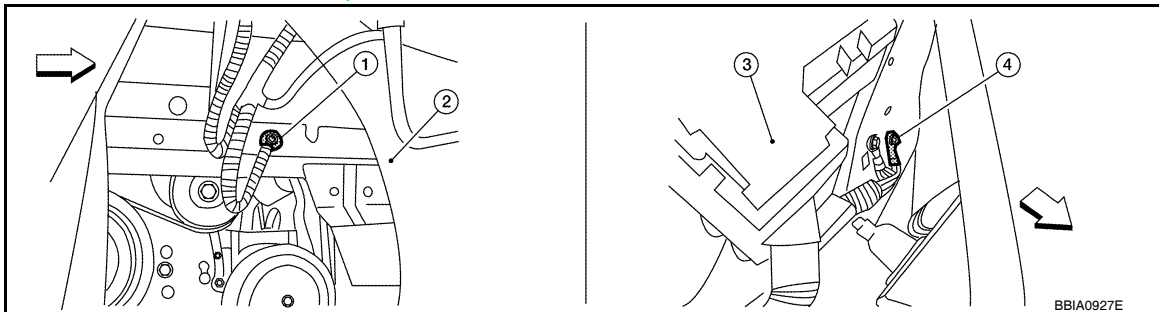
TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
72	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V
76	G/R	Sensor power supply [Crankshaft position sensor (POS)]	[Ignition switch: ON]	Approximately 5 V
81	W	Accelerator pedal position sensor 1	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.6 - 0.9 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	3.9 - 4.7 V
82	Y/G	Accelerator pedal position sensor 2	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.3 - 0.6 V
			[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	1.95 - 2.4 V
83	O	Sensor power supply (APP sensor 1)	[Ignition switch: ON]	Approximately 5 V
84	B/W	Sensor ground (APP sensor 1)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
87	BR/Y	Sensor power supply (APP sensor 2)	[Ignition switch: ON]	Approximately 5 V
91	V/W	EVAP control system pressure sensor power supply	[Ignition switch: ON]	Approximately 5 V
100	B	Sensor ground (APP sensor 2)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V

Diagnosis Procedure

INFOID:000000006150868

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



↔: Vehicle front

- | | | |
|---|----------------|------------------------------|
| 1. Body ground E9 (view with front wheel RH and fender protector RH removed.) | 2. Washer tank | 3. Fuse and fusible link box |
| 4. Body ground E15 | | |

DTC P2138 APP SENSOR

[QR25DE]

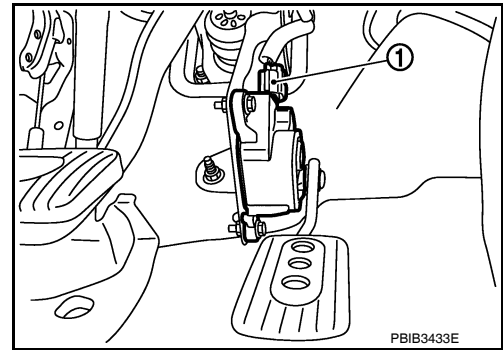
< SERVICE INFORMATION >

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.

2.CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor (1) harness connector.
2. Turn ignition switch ON.

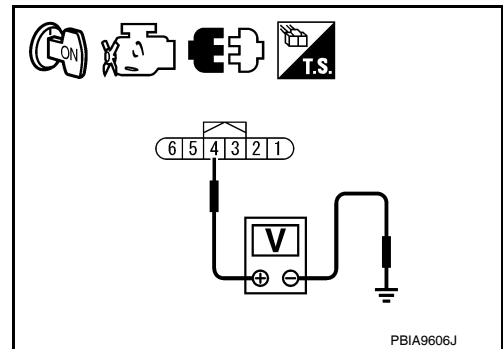


3. Check voltage between APP sensor terminal 4 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



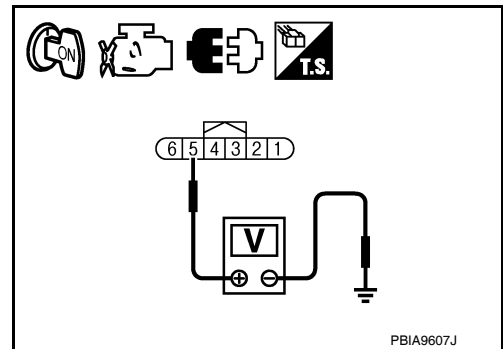
3.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between APP sensor terminal 5 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 4.



4.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 5 and ECM terminal 87. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit.

5.CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

DTC P2138 APP SENSOR

[QR25DE]

< SERVICE INFORMATION >

ECM terminal	Sensor terminal	Reference Wiring Diagram
72	Refrigerant pressure sensor terminal 3	EC-1654, "Wiring Diagram"
76	Crankshaft position sensor (POS) terminal 1	EC-1416, "Wiring Diagram"
87	APP sensor terminal 5	EC-1595, "Wiring Diagram"
91	EVAP control system pressure sensor terminal 3	EC-1474, "Wiring Diagram"

OK or NG

OK >> GO TO 6.

NG >> Repair short to ground or short to power in harness or connectors.

6. CHECK COMPONENTS

Check the following.

- Crankshaft position sensor (POS) (Refer to [EC-1420, "Component Inspection"](#).)
- Refrigerant pressure sensor (Refer to [MTC-28](#).)
- EVAP control system pressure (Refer to [EC-1478, "Component Inspection"](#).)

OK or NG

OK >> GO TO 11.

NG >> Replace malfunctioning component.

7. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following;
ECM terminal 84 and APP sensor terminal 2,
ECM terminal 100 and APP sensor terminal 1.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following;
ECM terminal 81 and APP sensor terminal 3,
ECM terminal 82 and APP sensor terminal 6.
Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK APP SENSOR

Refer to [EC-1611, "Component Inspection"](#).

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

Replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

>> INSPECTION END

DTC P2138 APP SENSOR

< SERVICE INFORMATION >

[QR25DE]

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

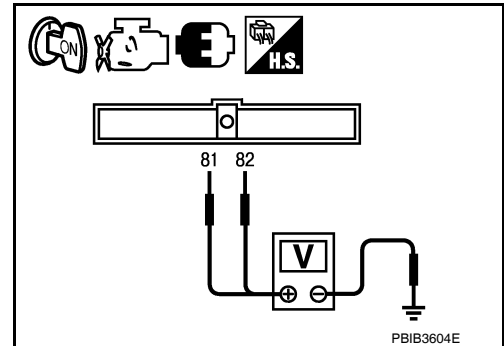
Component Inspection

INFOID:000000006150869

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 81 (APP sensor 1 signal), 82 (APP sensor 2 signal) and ground under the following conditions.

Terminal	Accelerator pedal	Voltage
81 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9 V
	Fully depressed	3.9 - 4.7 V
82 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6 V
	Fully depressed	1.95 - 2.4 V



4. If NG, replace accelerator pedal assembly. Refer to [ACC-4, "Removal and Installation"](#).

DTC P2A00, P2A03 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

DTC P2A00, P2A03 A/F SENSOR 1

Component Description

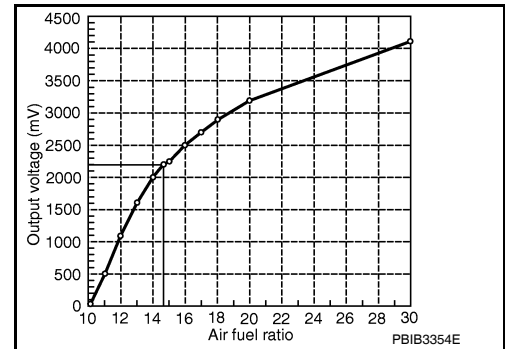
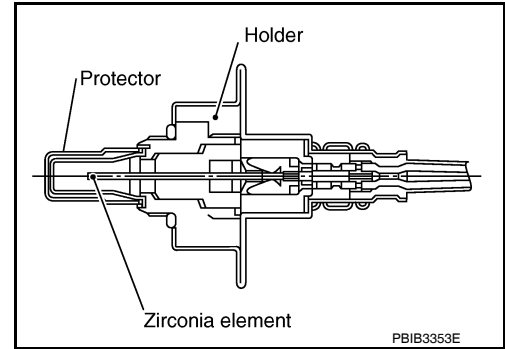
INFOID:000000006150871

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 λ 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).



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150872

Specification data are reference values.

Monitor item	Condition	Specification
A/F SEN1 (B1) A/F SEN1 (B2)	• Engine: After warming up Maintaining engine speed at 2,000 rpm	Fluctuates around 2.2 V

On Board Diagnosis Logic

INFOID:000000006150873

To judge the malfunction, the A/F signal computed by ECM from the A/F sensor 1 signal is monitored not to be shifted to LEAN side or RICH side.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P2A00 2A00 (Bank 1)	Air fuel ratio (A/F) sensor 1 circuit range/performance	• The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period.	<ul style="list-style-type: none"> • Air fuel ratio (A/F) sensor 1 • Air fuel ratio (A/F) sensor 1 heater • Fuel pressure • Fuel injector • Intake air leaks
P2A03 2A03 (Bank 2)		• The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period.	

DTC Confirmation Procedure

INFOID:000000006150874

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11 V at idle.

Ⓟ WITH CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.


DTC P2A00, P2A03 A/F SENSOR 1

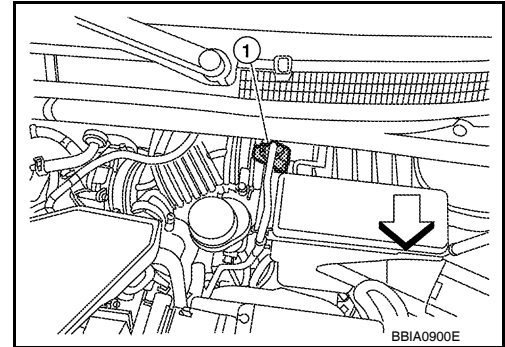
[QR25DE]

< SERVICE INFORMATION >

3. Turn ignition switch ON and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
4. Clear the self-learning coefficient by touching "CLEAR".
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 1 minute under no load.
7. Let engine idle for 1 minute.
8. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
9. Check 1st trip DTC.
10. If 1st trip DTC is detected, go to [EC-1617, "Diagnosis Procedure"](#).

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. Disconnect mass air flow sensor (1) harness connector.
 -  Vehicle front
4. Start engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select Service \$03 with GST and check that DTC P0102 is detected.
7. Select Service \$04 with GST and erase the DTC P0102.
8. Start engine and keep the engine speed between 3,500 and 4,000 rpm for 1 minute under no load.
9. Let engine idle for 1 minute.
10. Keep engine speed between 2,500 and 3,000 rpm for 20 minutes.
11. Select Service \$07 with GST.
 - If 1st trip DTC is detected, go to [EC-1617, "Diagnosis Procedure"](#).



DTC P2A00, P2A03 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

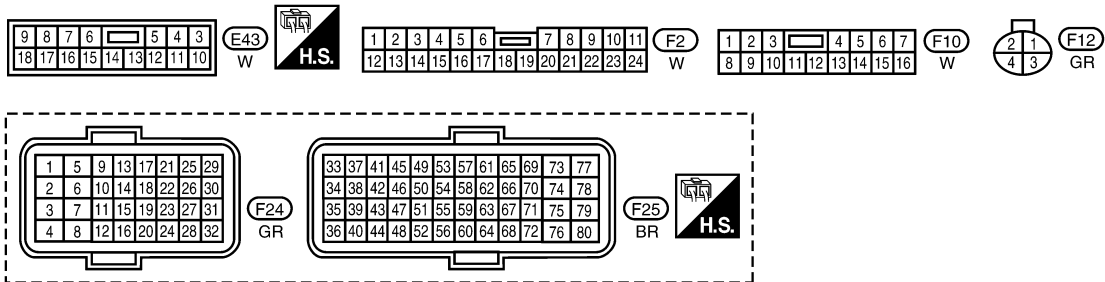
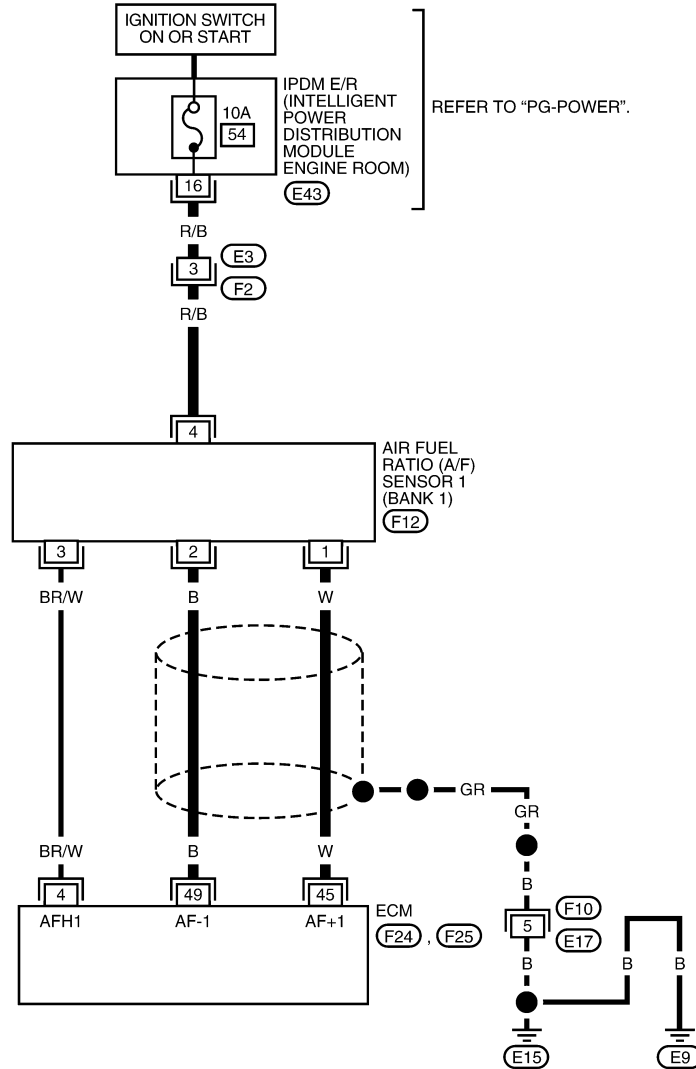
INFOID:000000006150875

Wiring Diagram

BANK 1

EC-AF1B1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0175GB

Specification data are reference values and are measured between each terminal and ground.
 Pulse signal is measured by CONSULT-III.

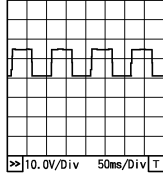
CAUTION:

DTC P2A00, P2A03 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	BR/W	A/F sensor 1 heater (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed (More than 140 seconds after starting engine) 	Approximately 2.9 - 8.8 V★  PBIAB148J
45	W	A/F sensor 1 (Bank 1)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	Approximately 1.8 V Output voltage varies with air fuel ratio.
49	B	A/F sensor 1 (Bank 1)	[Ignition switch: ON]	Approximately 2.2 V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

DTC P2A00, P2A03 A/F SENSOR 1

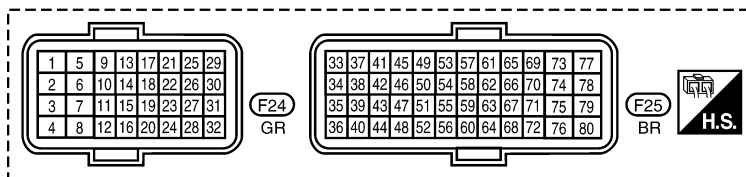
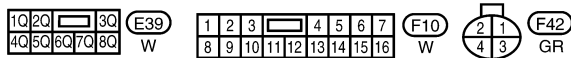
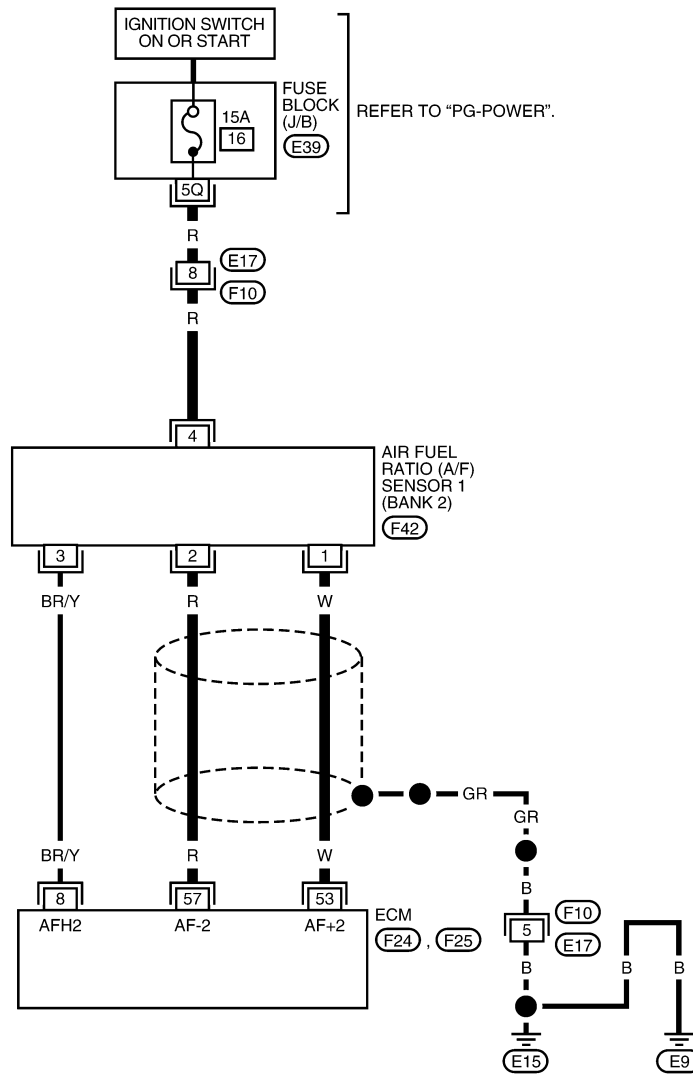
< SERVICE INFORMATION >

[QR25DE]

BANK 2

EC-AF1B2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



ABBWA0176GB

Specification data are reference values and are measured between each terminal and ground.
 Pulse signal is measured by CONSULT-III.

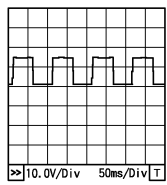
CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

DTC P2A00, P2A03 A/F SENSOR 1

< SERVICE INFORMATION >

[QR25DE]

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	BR/Y	A/F sensor 1 heater (Bank 2)	[Engine is running] • Warm-up condition • Idle speed (More than 140 seconds after starting engine)	Approximately 2.9 - 8.8 V★ 
53	W	A/F sensor 1 (Bank 2)	[Engine is running] • Warm-up condition • Engine speed: 2,000 rpm	Approximately 1.8 V Output voltage varies with air fuel ratio.
57	R	A/F sensor 1 (Bank 2)	[Ignition switch: ON]	Approximately 2.2 V

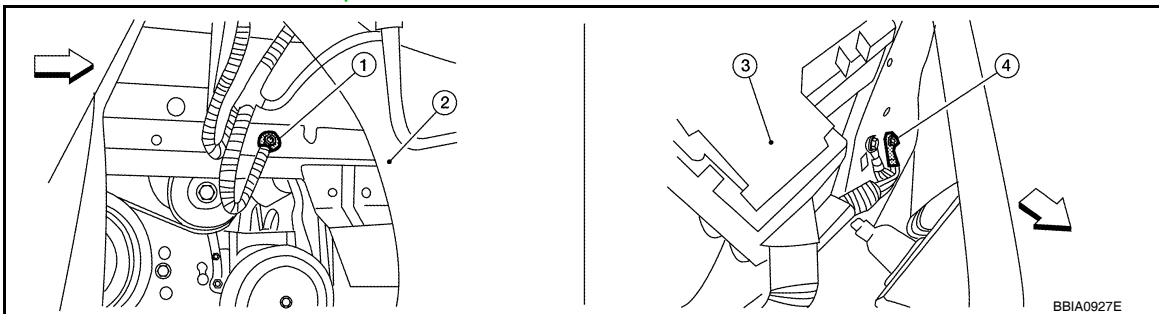
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150876

1. CHECK GROUND CONNECTIONS

- Turn ignition switch OFF.
- Loosen and retighten ground screws on the body.
Refer to [EC-1242. "Ground Inspection"](#).



↙: Vehicle front

- Body ground E9 (view with front wheel RH and fender protector RH removed.)
- Washer tank
- Fuse and fusible link box
- Body ground E15

OK or NG

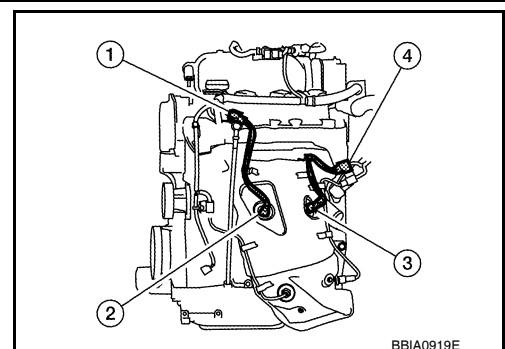
- OK >> GO TO 2.
 NG >> Repair or replace ground connections.

2. RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1

Loosen and retighten the air fuel ratio (A/F) sensor 1 (2). Refer to [EM-140. "Removal and Installation"](#).

- Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector (1)
- Air fuel ratio (A/F) sensor 1 (Bank 1) (2)
- Air fuel ratio (A/F) sensor 1 (Bank 2) (3)
- Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector (4)

>> GO TO 3.



DTC P2A00, P2A03 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

3. CHECK FOR INTAKE AIR LEAK

1. Start engine and run it at idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace.

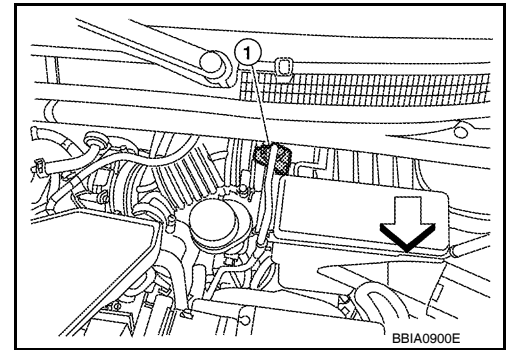
4. CLEAR THE SELF-LEARNING DATA.

Ⓜ With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
5. Check 1st trip DTC.
**Is the 1st trip DTC P0171, P0172, P0174 or P0175 detected? Is it difficult to start engine?
Is it difficult to start engine?**

⊗ Without CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor (1) harness connector.
- ⇐: Vehicle front
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Check that DTC P0102 is displayed.
7. Erase the DTC memory. Refer to [EC-1144. "Emission-related Diagnostic Information"](#).
8. Check that DTC P0000 is displayed.
9. 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?
Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0174 or P0172, P0175. Refer to [EC-1375](#) or [EC-1384](#).
No >> GO TO 5.

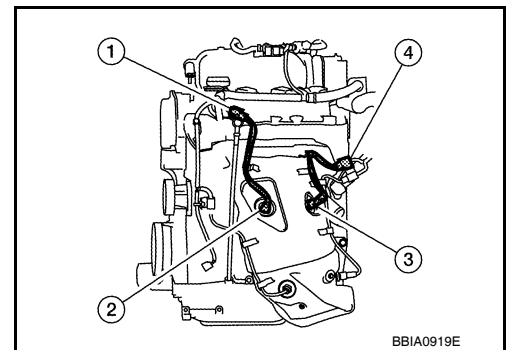
5. CHECK HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect air fuel ratio (A/F) sensor 1 harness connector.
- Air fuel ratio (A/F) sensor 1 (Bank 1) harness connector (1)
- Air fuel ratio (A/F) sensor 1 (Bank 1) (2)
- Air fuel ratio (A/F) sensor 1 (Bank 2) (3)
- Air fuel ratio (A/F) sensor 1 (Bank 2) harness connector (4)
3. Check harness connector for water.

Water should no exist.

OK or NG

- OK >> GO TO 6.
NG >> Repair or replace harness connector.



6. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.

DTC P2A00, P2A03 A/F SENSOR 1

[QR25DE]

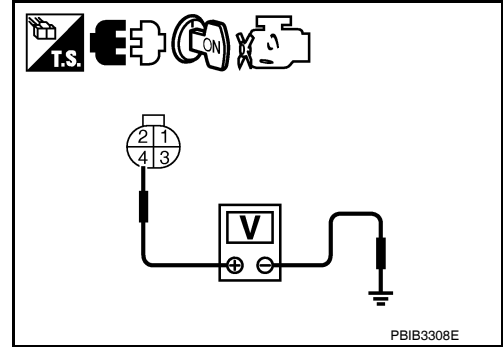
< SERVICE INFORMATION >

- Check voltage between A/F sensor 1 terminal 4 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.



7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2 (Bank 1)
- Harness connectors E17, F10 (Bank 2)
- Fuse block (J/B) connector E43 (Bank 1)
- Fuse block (J/B) connector E39 (Bank 2)
- 10 A fuse (Bank 1)
- 15 A fuse (Bank 2)
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

8. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Check harness continuity between the following terminals. Refer to Wiring Diagram.

Bank	A/F sensor 1 terminal	ECM terminal
1	1	45
	2	49
2	1	53
	2	57

Continuity should exist.

- Check harness continuity between the following terminals and ground. Refer to Wiring Diagram.

Bank 1		Bank 2	
A/F sensor terminal	ECM terminal	A/F sensor terminal	ECM terminal
1	45	1	53
2	49	2	57

Continuity should not exist.

- Also check harness for short to power.

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK A/F SENSOR 1 HEATER

Refer to [EC-1258. "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.

DTC P2A00, P2A03 A/F SENSOR 1

[QR25DE]

< SERVICE INFORMATION >

NG >> GO TO 11.

10. CHECK INTERMITTENT INCIDENT

Perform [EC-1236](#).

OK or NG

OK >> GO TO 11.

NG >> Repair or replace.

11. REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace malfunctioning air fuel ratio (A/F) sensor 1. Refer to [EM-140, "Removal and Installation"](#).

CAUTION:

- Discard any air fuel ratio (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 air fuel ratio (A/F) sensor, clean exhaust system threads using heated oxygen sensor thread cleaner [commercial service tool (J-43897-18 or J-43897-12)] and approved anti-seize lubricant (commercial service tool).

>> GO TO 12.

12. CONFIRM A/F ADJUSTMENT DATA

1. Turn ignition switch ON.
2. Select "A/F ADJ-B1" and "A/F ADJ-B2" in "DATA MONITOR" mode with CONSULT-III.
3. Check that "0.000" is displayed on CONSULT-III screen.

OK or NG

OK >> **INSPECTION END**


NG >> GO TO 13.

13. CLEAR THE SELF-LEARNING DATA

With CONSULT-III

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-III.
3. Clear the self-learning control coefficient by touching "CLEAR".

Without CONSULT-III

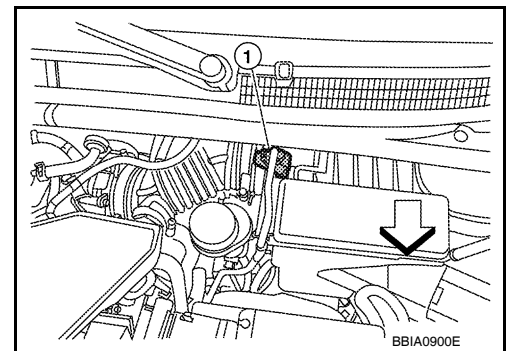
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness (1) connector.
 -  Vehicle front
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Check that DTC P0102 is displayed.
7. Erase the DTC memory. Refer to [EC-1144, "Emission-related Diagnostic Information"](#).
8. Check that DTC P0000 is displayed.

>> GO TO 14.

14. CONFIRM A/F ADJUSTMENT DATA

1. Turn ignition switch OFF and then ON.
2. Select "A/F ADJ-B1" and "A/F ADJ-B2" in "DATA MONITOR" mode with CONSULT-III.
3. Check that "0.000" is displayed on CONSULT-III screen.

>> **INSPECTION END**



ASCD BRAKE SWITCH

< SERVICE INFORMATION >

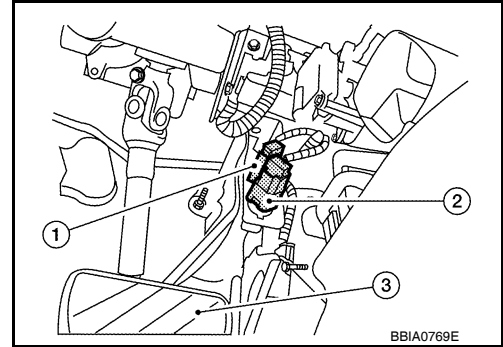
[QR25DE]

ASCD BRAKE SWITCH

Component Description

INFOID:000000006150878

When depress on the brake pedal, ASCD brake switch (1) is turned OFF and stop lamp switch (2) is turned ON. ECM detects the state of the brake pedal (3) by this input of two kinds (ON/OFF signal)
Refer to [EC-1124](#) for the ASCD function.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150879

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	ON
	• Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	OFF
BRAKE SW2 (Stop lamp switch)	• Ignition switch: ON	OFF
	• Brake pedal: Fully released • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	ON

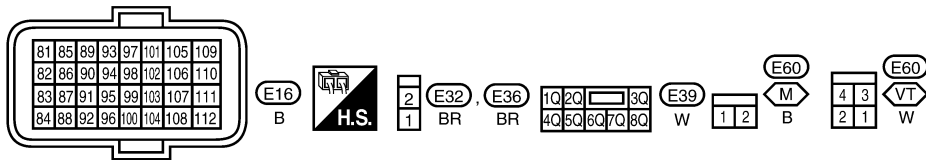
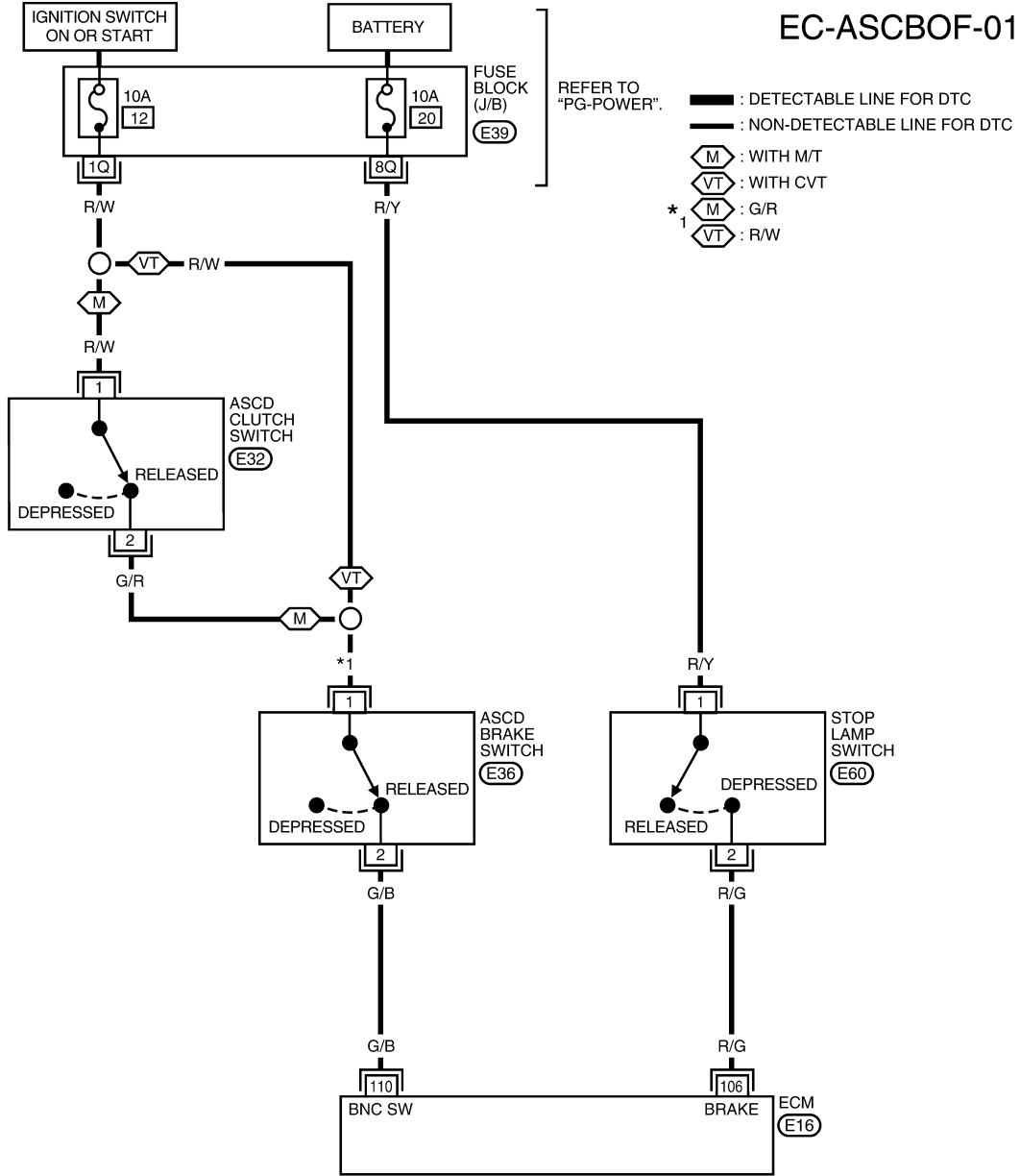
ASC D BRAKE SWITCH

< SERVICE INFORMATION >

[QR25DE]

INFOID:000000006150880

Wiring Diagram



BBWA3060E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
106	R/G	Stop lamp switch	[Ignition switch: ON] • Brake pedal: Fully released	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)
110	G/B	ASCD brake switch	[Ignition switch: ON] • Brake pedal: Slightly depressed (CVT) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0 V
			[Ignition switch: ON] • Brake pedal: Fully released (CVT) • Brake pedal and clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006150881

1. CHECK OVERALL FUNCTION-I

With CONSULT-III

- Turn ignition switch ON.
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-III.
- Check "BRAKE SW1" indication under the following conditions.

M/T models

CONDITION	INDICATION
Clutch pedal and/or brake pedal: Slightly depressed	OFF
Clutch pedal and brake pedal: Fully released	ON

CVT models

CONDITION	INDICATION
Brake pedal: Slightly depressed	OFF
Brake pedal: Fully released	ON

Without CONSULT-III

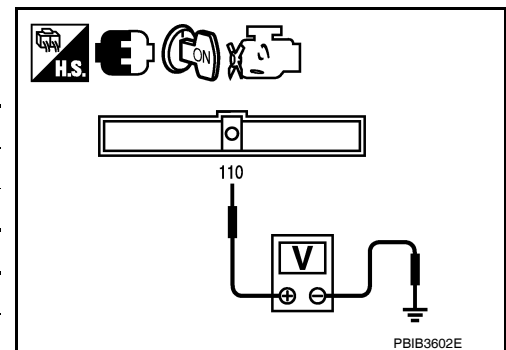
- Turn ignition switch ON.
- Check voltage between ECM terminal 110 and ground under the following conditions.

M/T models

CONDITION	VOLTAGE
Clutch pedal and/or brake pedal: Slightly depressed	Approximately 0 V
Clutch pedal and brake pedal: Fully released	Battery voltage

CVT models

CONDITION	VOLTAGE
Brake pedal: Slightly depressed	Approximately 0 V
Brake pedal: Fully released	Battery voltage



OK or NG

- OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK OVERALL FUNCTION-II

With CONSULT-III

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

ASCD BRAKE SWITCH

[QR25DE]

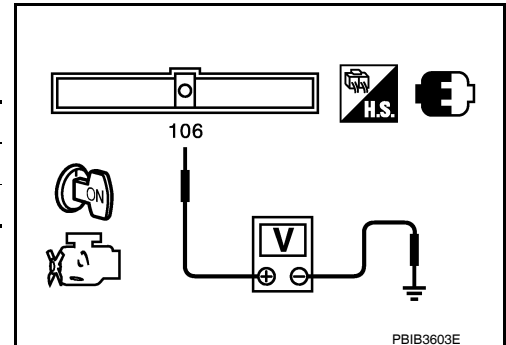
< SERVICE INFORMATION >

CONDITION	INDICATION
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON

⊗ Without CONSULT-III

Check voltage between ECM terminal 106 and ground under the following conditions.

CONDITION	VOLTAGE
Brake pedal: Fully released	Approximately 0 V
Brake pedal: Slightly depressed	Battery voltage

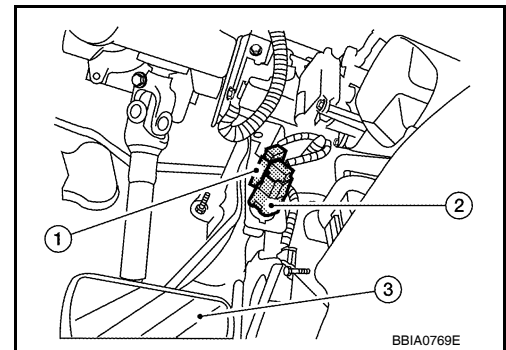


OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 11.

3. CHECK ASCD BRAKE SWITCH POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch (1) harness connector.
 - Stop lamp switch (2)
 - Brake pedal (3)
3. Turn ignition switch ON.

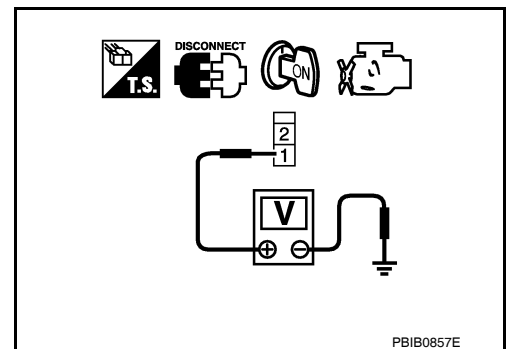


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-III or tester.

Voltage : Battery voltage

OK or NG

- OK >> GO TO 8.
- NG (M/T models) >>GO TO 4.
- NG (CVT models)>>GO TO 6.



4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

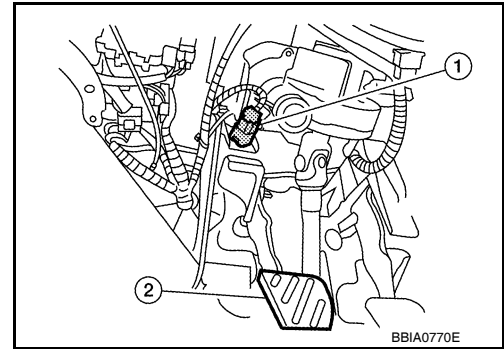
1. Turn ignition switch OFF.

ASCD BRAKE SWITCH

[QR25DE]

< SERVICE INFORMATION >

2. Disconnect ASCD clutch switch (1) harness connector.
 - Clutch pedal (2)
3. Turn ignition switch ON.

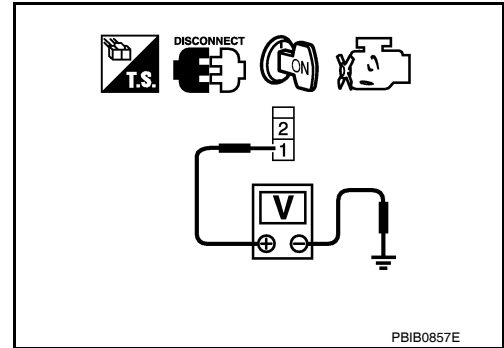


4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Harness for open or short between ASCD clutch switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD brake switch terminal 1 and ASCD clutch switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 10.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 110 and ASCD brake switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

ASCD BRAKE SWITCH

[QR25DE]

< SERVICE INFORMATION >

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK ASCD BRAKE SWITCH

Refer to [EC-1562, "Component Inspection"](#).

OK or NG

OK >> GO TO 15.

NG >> Replace ASCD brake switch. Refer to [BR-8, "Removal and Installation"](#).

10. CHECK ASCD CLUTCH SWITCH

Refer to [EC-1562, "Component Inspection"](#)

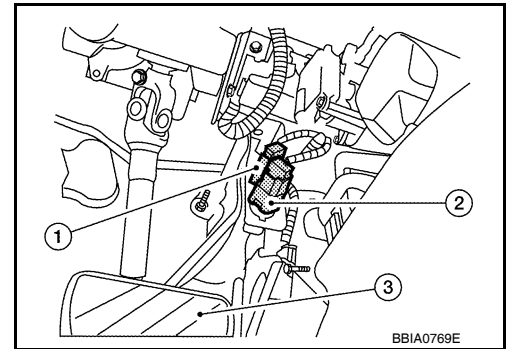
OK or NG

OK >> GO TO 15.

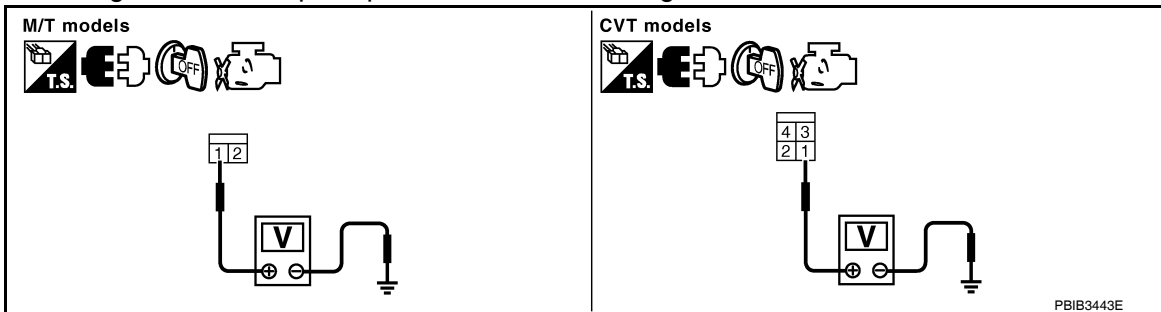
NG >> Replace ASCD clutch switch. Refer to [CL-7, "Removal and Installation"](#).

11. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch (2) harness connector.
 - ASCD brake switch (1)
 - Brake pedal (3)



3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -III or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 13.

NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Harness for open or short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 106 and stop lamp switch terminal 2.
Refer to Wiring Diagram.

ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[QR25DE]

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK STOP LAMP SWITCH

Refer to [EC-1562, "Component Inspection"](#)

OK or NG

OK >> GO TO 15.

NG >> Replace stop lamp switch. Refer to [BR-8, "Removal and Installation"](#).

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

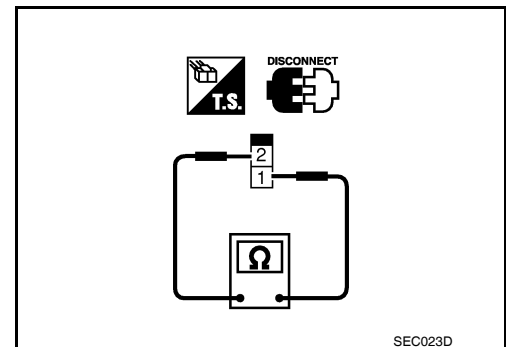
INFOID:000000006150882

ASCD BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Brake pedal: Fully released.	Should exist.
Brake pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-7](#), and perform step 3 again.

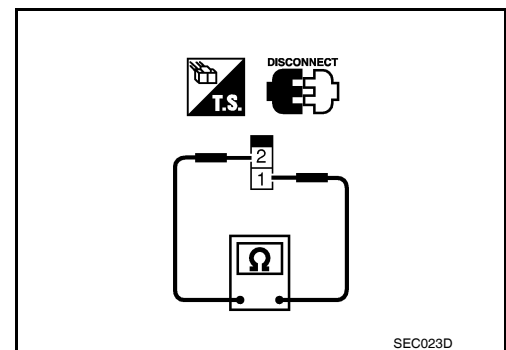


ASCD CLUTCH SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Clutch pedal: Fully released.	Should exist.
Clutch pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-6](#), and perform step 3 again.



STOP LAMP SWITCH

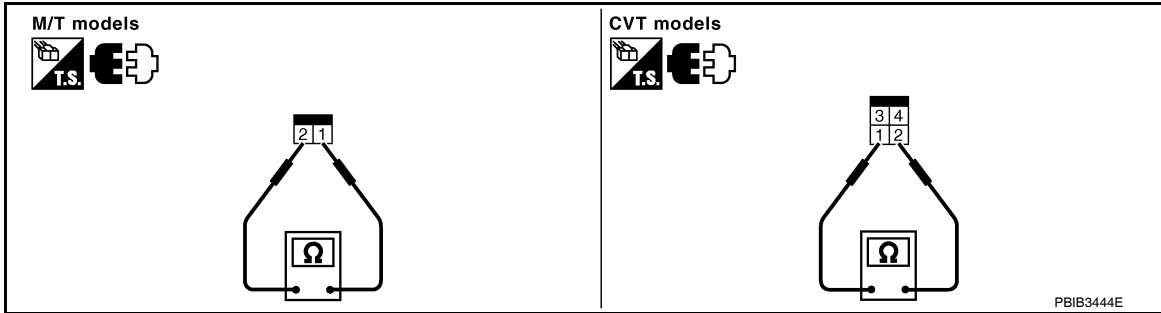
1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.

ASCD BRAKE SWITCH

< SERVICE INFORMATION >

[QR25DE]

3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-7](#), and perform step 3 again.

ASC D INDICATOR

< SERVICE INFORMATION >

[QR25DE]

ASC D INDICATOR

Component Description

INFOID:000000006150883

ASC D indicator lamp illuminates to indicate ASC D operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE indicator illuminates when MAIN switch on ASC D steering switch is turned ON to indicate that ASC D system is ready for operation.

SET indicator illuminates when following conditions are met.

- CRUISE indicator is illuminated.
- SET/COAST switch on ASC D steering switch is turned ON while vehicle speed is within the range of ASC D setting.

SET indicator remains lit during ASC D control.

Refer to [EC-1124](#) for the ASC D function.

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150884

Specification data are reference value.

Monitor item	Condition		Specification
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at 1st time → 2nd	ON → OFF
SET LAMP	• MAIN switch: ON • Vehicle: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASC D: Operating	ON
		ASC D: Not operating	OFF

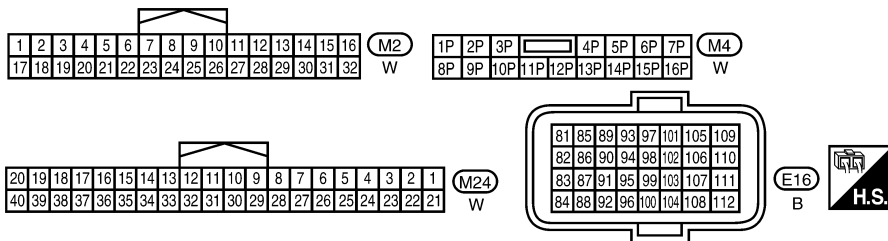
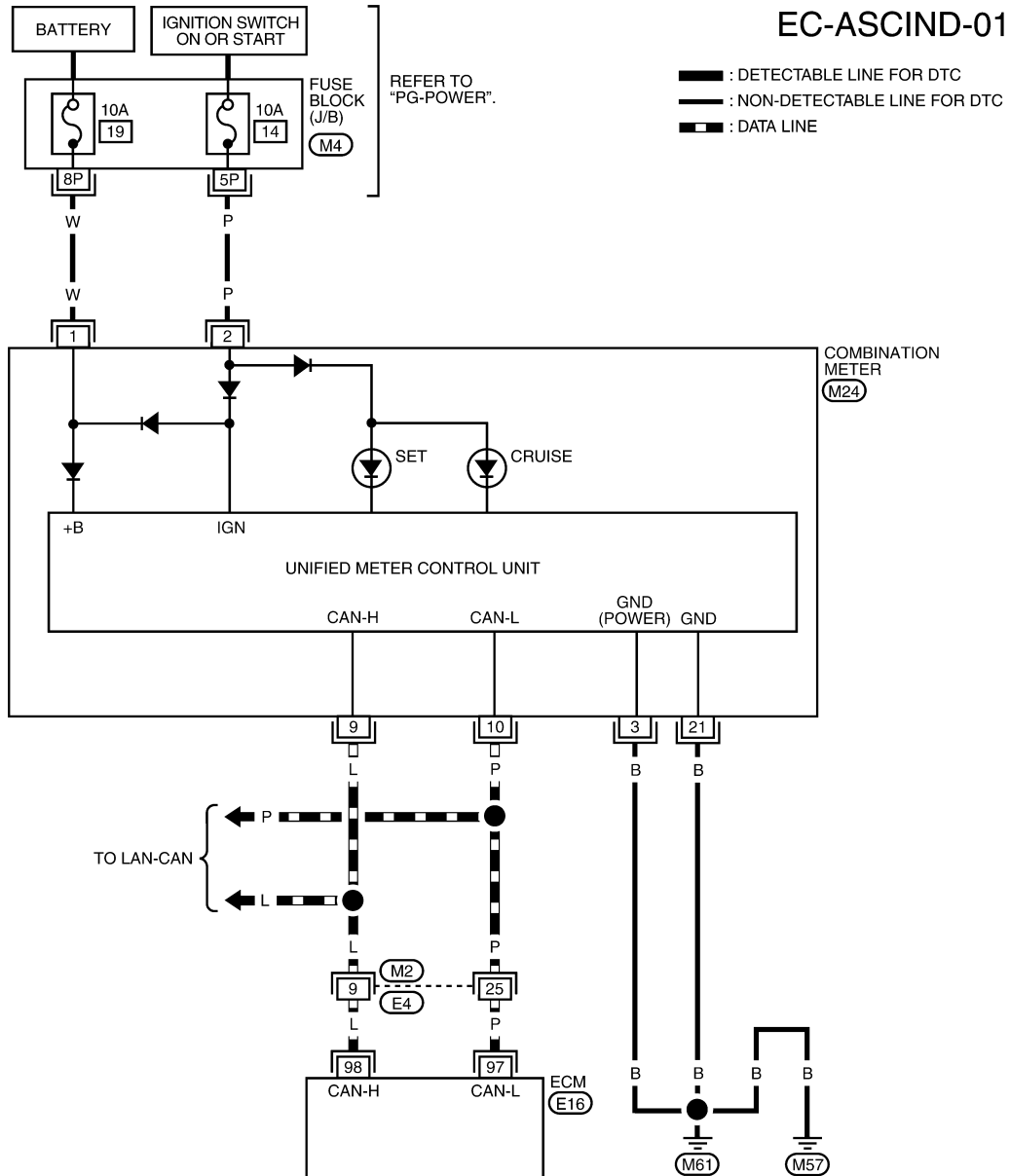
ASC D INDICATOR

< SERVICE INFORMATION >

[QR25DE]

Wiring Diagram

INFOID:000000006150885



ABBWA0182GB

Diagnosis Procedure

INFOID:000000006150886

1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR

< SERVICE INFORMATION >

[QR25DE]

ASCD indicator	Condition		Specification
CRUISE LAMP	• Ignition switch: ON	MAIN switch: Pressed at 1st time → 2nd	ON → OFF
SET LAMP	• MAIN switch: ON • Vehicle: Between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 2.

2.CHECK DTC

Check that DTC UXXXX is not displayed.

Yes or No

Yes >> Perform trouble diagnoses for DTC UXXXX.

No >> GO TO 3.

3.CHECK COMBINATION METER OPERATION

Does combination meter operate normally?

Yes or No

Yes >> GO TO 4.

No >> Check combination meter circuit. Refer to [DI-6](#).

4.CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

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ELECTRICAL LOAD SIGNAL

[QR25DE]

< SERVICE INFORMATION >

ELECTRICAL LOAD SIGNAL

CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150887

Specification data are reference values.

Monitor item	Condition	Specification
LOAD SIGNAL	• Ignition switch: ON Rear window defogger switch is ON and/or lighting switch is in 2nd position.	ON
	Rear window defogger switch is OFF and lighting switch is OFF.	OFF
HEATER FAN SW	• Ignition switch: ON Heater fan: Operating.	ON
	Heater fan: Not operating.	OFF

Diagnosis Procedure

INFOID:000000006150888

1.CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

1. Turn ignition switch ON.
2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-III under the following conditions.

Condition	LOAD SIGNAL
Lighting switch: ON at 2nd position	ON
Lighting switch: OFF	OFF

OK or NG

- OK >> GO TO 2.
NG >> GO TO 4.

2.CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-III under the following conditions.

Condition	LOAD SIGNAL
Rear window defogger switch: ON	ON
Rear window defogger switch: OFF	OFF

OK or NG

- OK >> GO TO 3.
NG >> GO TO 5.

3.CHECK HEATER FAN SIGNAL CIRCUIT OVERALL FUNCTION

Check "HEATER FAN SW" in "DATA MONITOR" mode with CONSULT-III under the following conditions.

Condition	HEATER FAN SW
Heater fan control switch: ON	ON
Heater fan control switch: OFF	OFF

OK or NG

- OK >> **INSPECTION END.**
NG >> GO TO 6.

4.CHECK HEADLAMP SYSTEM

Refer to [LT-5](#) or [LT-26](#).

>> **INSPECTION END**

5.CHECK REAR WINDOW DEFOGGER SYSTEM

ELECTRICAL LOAD SIGNAL

< SERVICE INFORMATION >

[QR25DE]

Refer to [GW-56](#).

A

>> INSPECTION END

6. CHECK HEATER FAN CONTROL SYSTEM

EC

Refer to [MTC-28](#).

>> INSPECTION END

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FUEL INJECTOR

< SERVICE INFORMATION >

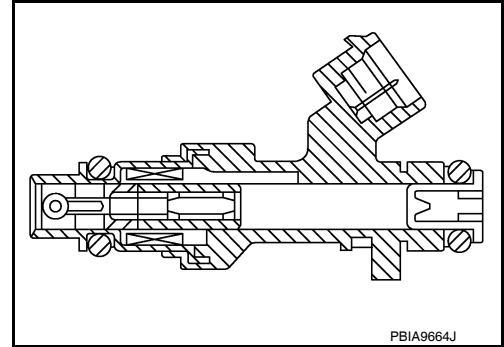
[QR25DE]

FUEL INJECTOR

Component Description

INFOID:000000006150889

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.



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150890

Specification data are reference values.

Monitor item	Condition	Specification
B/FUEL SCHDL	See EC-1228 .	
INJ PULSE-B1	<ul style="list-style-type: none">• Engine: After warming up• Air conditioner switch: OFF Idle	2.0 - 3.0 msec
INJ PULSE-B2	<ul style="list-style-type: none">• Selector lever: P or N (CVT), Neutral (M/T)• No load 2,000 rpm	1.9 - 2.9 msec

FUEL INJECTOR

< SERVICE INFORMATION >

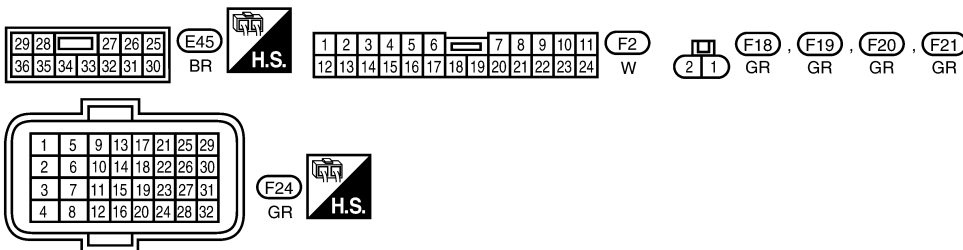
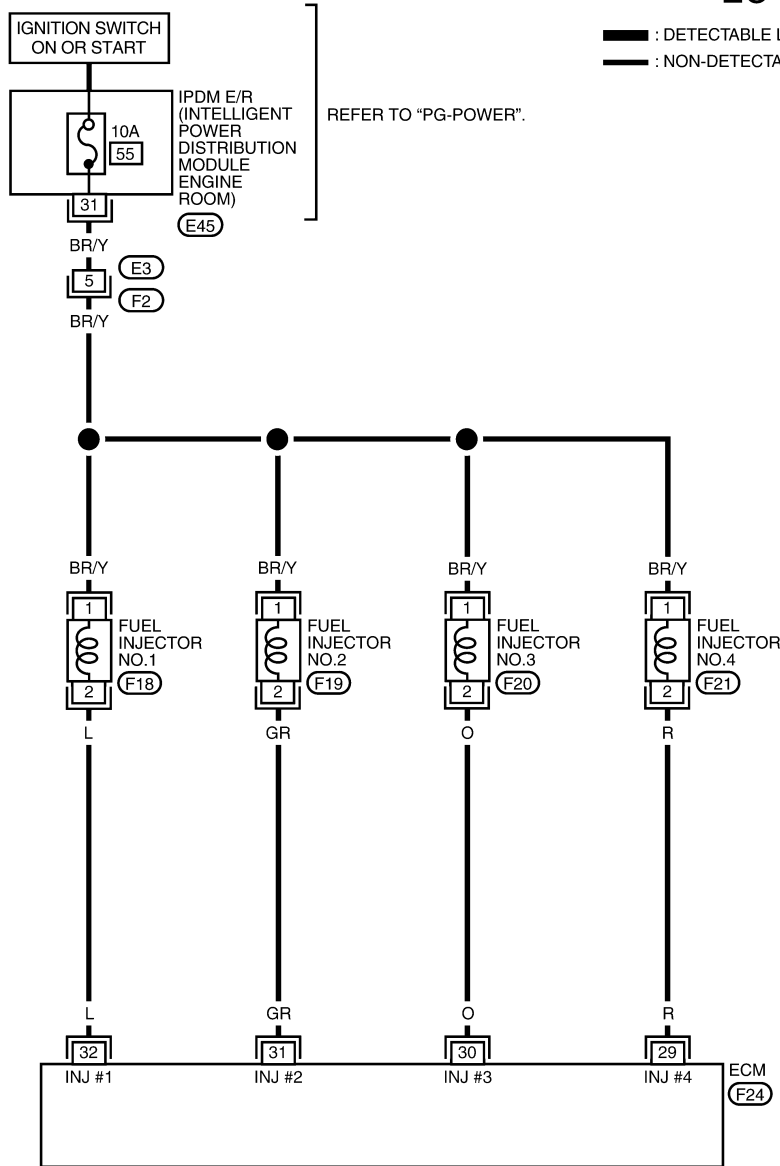
[QR25DE]

Wiring Diagram

INFOID:000000006150891

EC-INJECT-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA3062E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

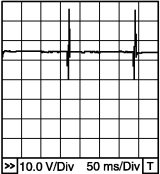
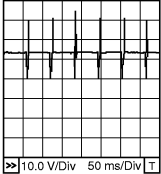
CAUTION:

FUEL INJECTOR

< SERVICE INFORMATION >

[QR25DE]

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
29 30 31 32	R O GR L	Fuel injector No. 4 Fuel injector No. 3 Fuel injector No. 2 Fuel injector No. 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle</p>	<p>BATTERY VOLTAGE (11 - 14 V)★</p>  <p>PBIB0529E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,000 rpm 	<p>BATTERY VOLTAGE (11 - 14 V)★</p>  <p>PBIA4943J</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150892

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

Yes or No

Yes >> GO TO 2.

No >> GO TO 3.

2. CHECK OVERALL FUNCTION

With CONSULT-III

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
3. Check that each circuit produces a momentary engine speed drop.

Without CONSULT-III

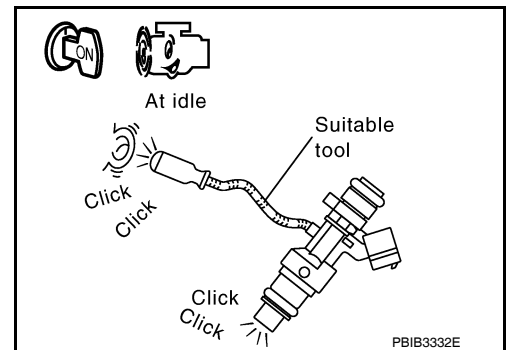
1. Start engine.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 3.



3. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

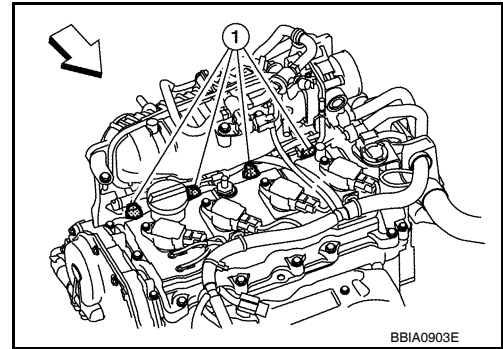
1. Turn ignition switch OFF.

FUEL INJECTOR

[QR25DE]

< SERVICE INFORMATION >

2. Disconnect fuel injector harness connector (1).
 - ⇐: Vehicle front
3. Turn ignition switch ON.

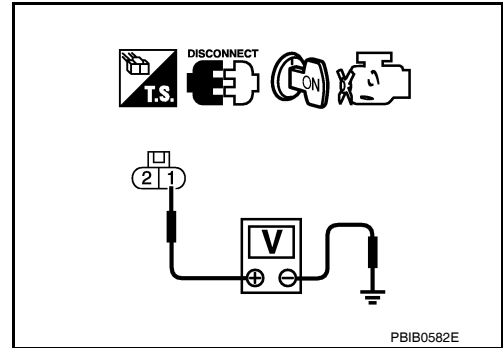


4. Check voltage between fuel injector terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- 10 A fuse
- Harness for open or short between fuel injector and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between fuel injector terminal 2 and ECM terminals 29, 30, 31, 32. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK FUEL INJECTOR

Refer to [EC-1638. "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> Replace malfunctioning fuel injector. Refer to [EM-148. "Removal and Installation"](#).

7. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> INSPECTION END

FUEL INJECTOR

< SERVICE INFORMATION >

[QR25DE]

Component Inspection

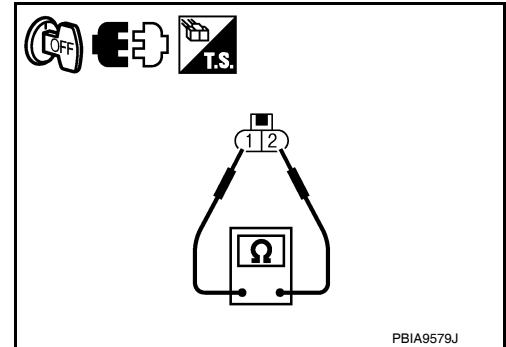
INFOID:000000006150893

FUEL INJECTOR

1. Disconnect fuel injector harness connector.
2. Check resistance between terminals as shown in the figure.

Resistance: 10.4 - 15.3 Ω [at 10 - 60°C (50 - 140°F)]

3. If NG, replace fuel injector. Refer to [EM-148, "Removal and Installation"](#).



FUEL PUMP

< SERVICE INFORMATION >

[QR25DE]

FUEL PUMP

Description

INFOID:000000006150895

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay
Battery	Battery voltage*		

*: ECM determines the start signal status by the signals of engine speed and battery voltage.

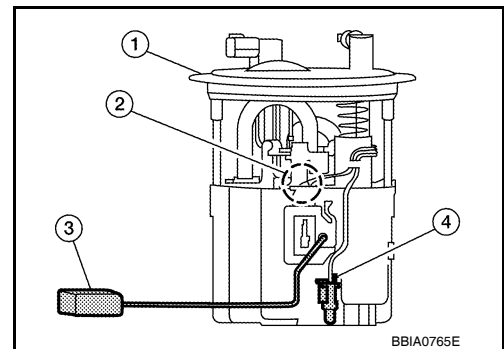
The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine start ability. If the ECM receives a engine speed signal from the crankshaft position sensor (POS) and camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump 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
Engine: Stopped	Stops in 1.5 seconds
Except as shown above	Stops

COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the fuel tank.

- Fuel level sensor unit and fuel pump (1)
- Fuel pressure regulator (2)
- Fuel level sensor (3)
- Fuel tank temperature sensor (4)



CONSULT-III Reference Value in Data Monitor Mode

INFOID:000000006150896

Specification data are reference values.

Monitor item	Condition	Specification
FUEL PUMP RLY	<ul style="list-style-type: none"> • For 1 second after turning ignition switch ON • Engine running or cranking 	ON
	<ul style="list-style-type: none"> • Except above conditions 	OFF

FUEL PUMP

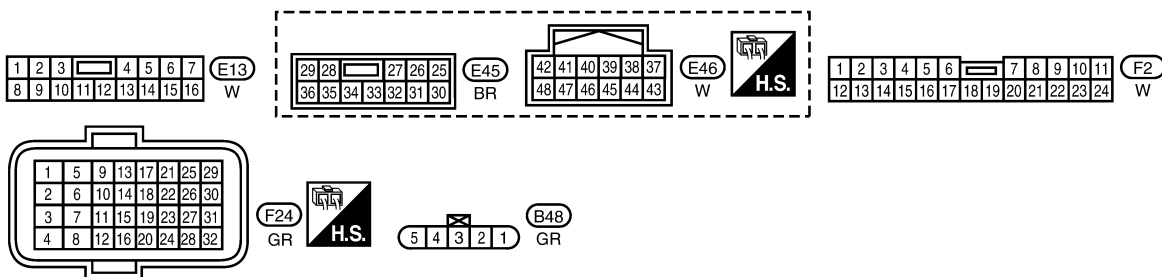
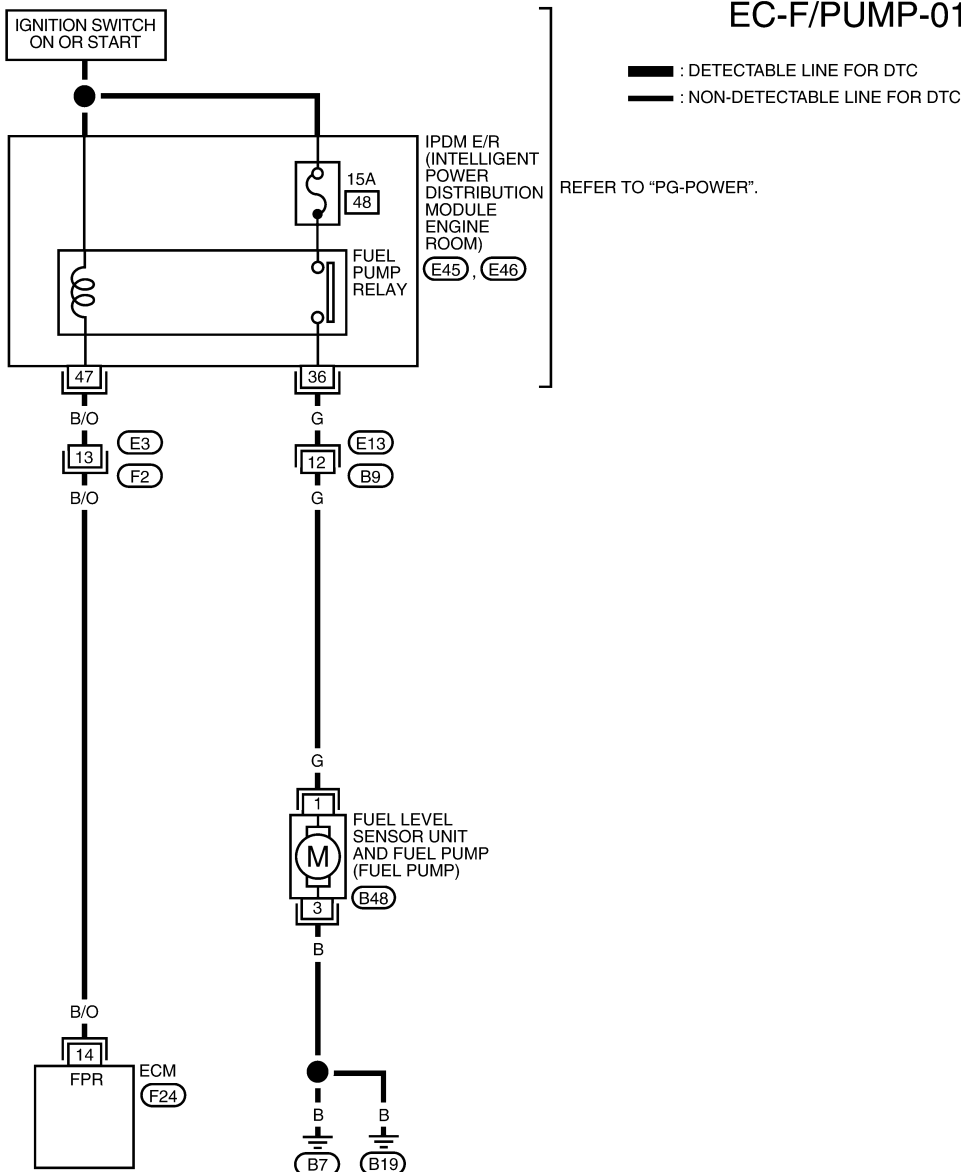
< SERVICE INFORMATION >

[QR25DE]

INFOID:000000006150897

Wiring Diagram

EC-F/PUMP-01



BBWA3063E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

FUEL PUMP

< SERVICE INFORMATION >

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	B/O	Fuel pump relay	[Ignition switch: ON] • For 1 second after turning ignition switch ON [Engine is running]	0 - 1.0 V
			[Ignition switch: ON] • More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14 V)

Diagnosis Procedure

INFOID:000000006150898

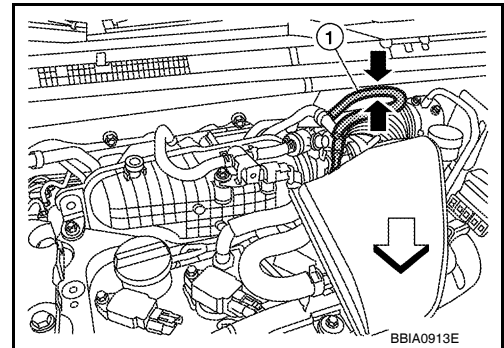
1. CHECK OVERALL FUNCTION

- Turn ignition switch ON.
 - Pinch fuel feed hose (1) with two fingers.
- ↶: Vehicle front

Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned ON.

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 2.



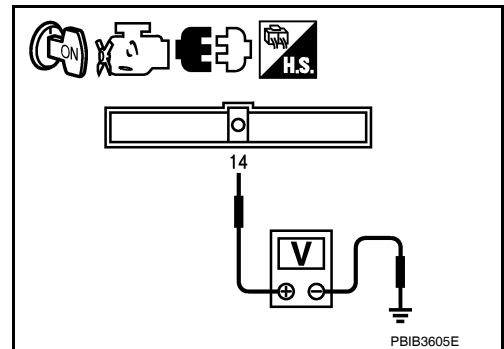
2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

- Turn ignition switch OFF.
- Disconnect ECM harness connector.
- Turn ignition switch ON.
- Check voltage between ECM terminal 14 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
NG >> GO TO 3.



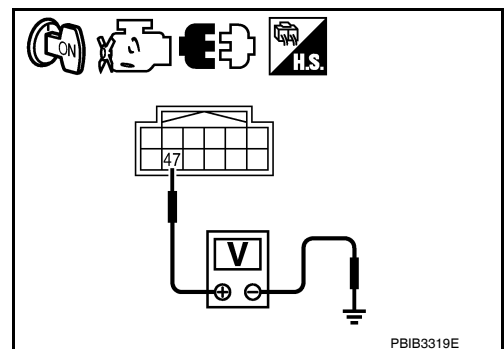
3. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-II

- Turn ignition switch OFF.
- Disconnect IPDM E/R harness connector E46.
- Turn ignition switch ON.
- Check voltage between IPDM E/R terminal 47 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 4.
NG >> GO TO 11.



FUEL PUMP

[QR25DE]

< SERVICE INFORMATION >

4. DETECT MALFUNCTIONING PART

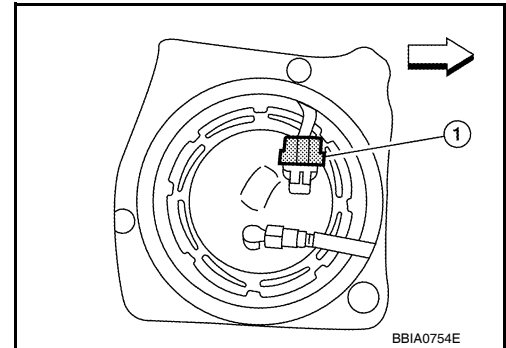
Check the following.

- Harness connectors E3, F2
- Harness for open or short between IPDM E/R and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect "fuel level sensor unit and fuel pump" harness connector (1).
 - This illumination is shows the view with inspection hole cover removed.
4. Turn ignition switch ON.

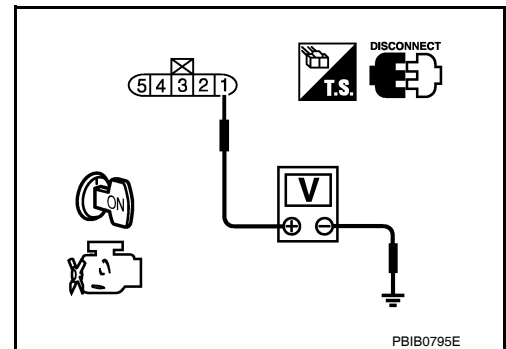


5. Check voltage between "fuel level sensor unit and fuel pump" terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage should exist for 1 second after ignition switch is turned ON.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 6.



6. CHECK 15A FUSE

1. Turn ignition switch OFF.
2. Disconnect 15A fuse. For the fuse number, refer to [EC-1640, "Wiring Diagram"](#). For the fuse arrangement, refer to [PG-24, "IPDM E/R Terminal Arrangement"](#).
3. Check 15A fuse.

OK or NG

- OK >> GO TO 7.
- NG >> Replace fuse.

7. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-IV

1. Disconnect IPDM E/R harness connector E45.
2. Check harness continuity between IPDM E/R terminal 36 and "fuel level sensor unit and fuel pump" terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 11.
- NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E13, B9

FUEL PUMP

< SERVICE INFORMATION >

[QR25DE]

- Harness for open or short between IPDM E/R and “fuel level sensor unit and fuel pump”

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK FUEL PUMP GROUND CIRCUIT

1. Check harness continuity between “fuel level sensor unit and fuel pump” terminal 3 and ground. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to power.

OK or NG

OK >> GO TO 10.

NG >> Repair or replace harness or connectors.

10. CHECK FUEL PUMP

Refer to [EC-1643. "Component Inspection"](#).

OK or NG

OK >> GO TO 11.

NG >> Replace fuel pump. Refer to [FL-6. "Removal and Installation"](#).

11. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

OK or NG

OK >> Replace IPDM E/R. Refer to [PG-18](#).

NG >> Repair or replace harness or connectors.

Component Inspection

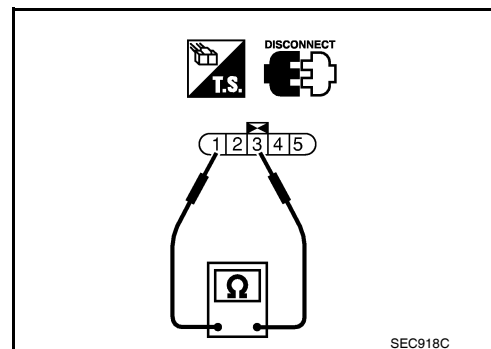
INFOID:000000006150899

FUEL PUMP

1. Disconnect “fuel level sensor unit and fuel pump” harness connector.
2. Check resistance between “fuel level sensor unit and fuel pump” terminals 1 and 3.

Resistance: Approximately 0.2 - 5.0 Ω [at 25°C (77°F)]

3. If NG, replace “fuel level sensor unit and fuel pump”. Refer to [FL-6. "Removal and Installation"](#).



IGNITION SIGNAL

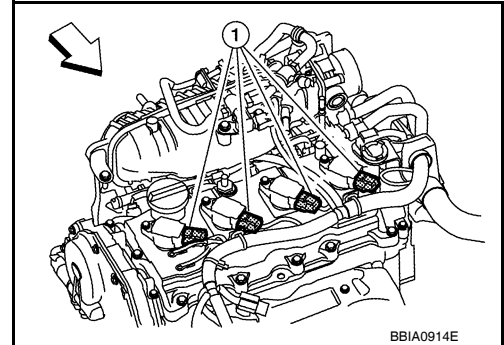
Component Description

INFOID:000000006150901

IGNITION COIL & 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.

- Ignition coil harness connector (1)
- ↙: Vehicle front



IGNITION SIGNAL

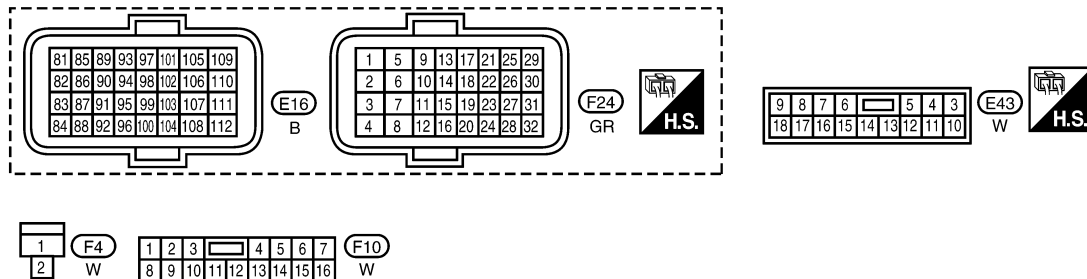
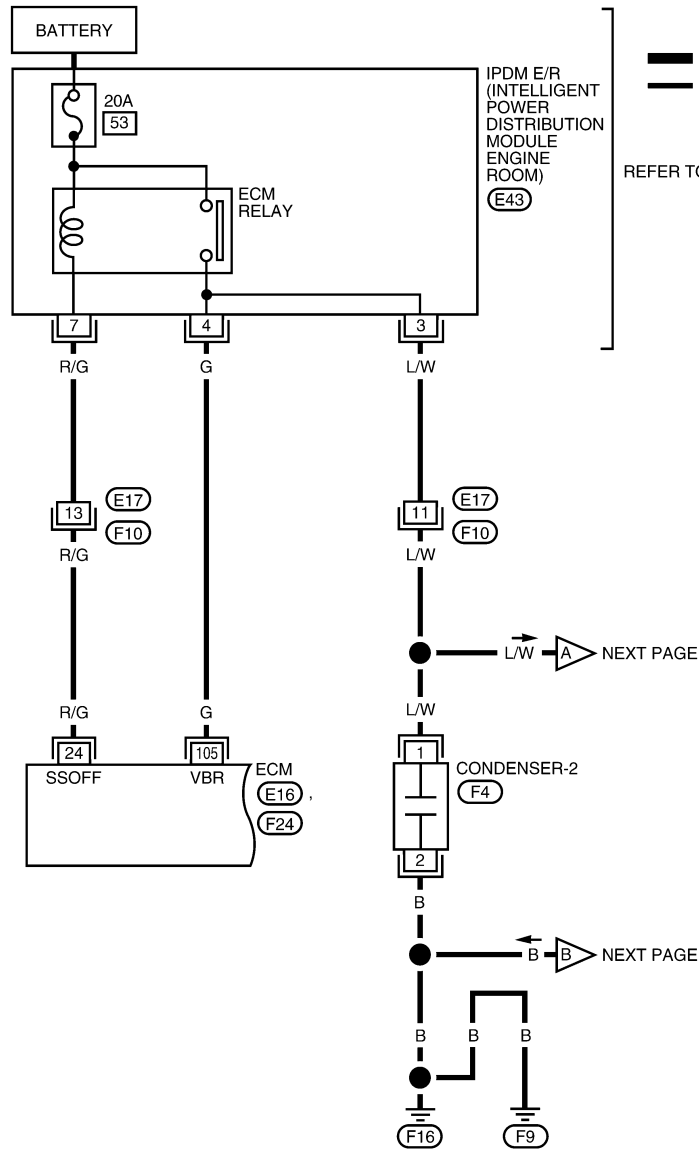
< SERVICE INFORMATION >

[QR25DE]

Wiring Diagram

INFOID:000000006150902

EC-IGNSYS-01



AABWA0271GB

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

IGNITION SIGNAL

< SERVICE INFORMATION >

[QR25DE]

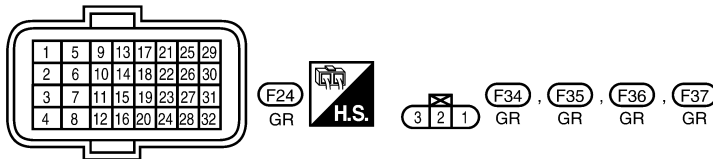
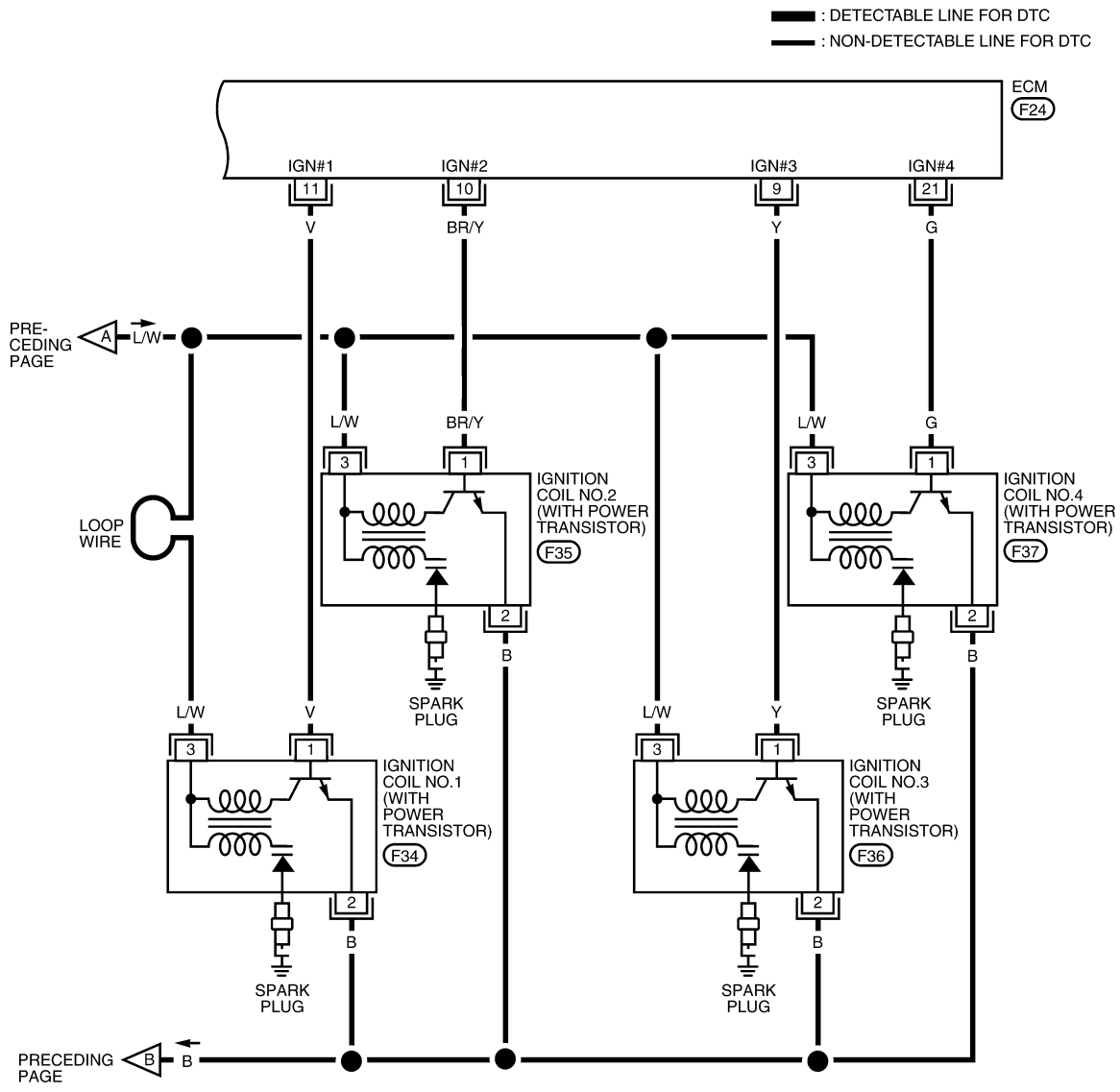
TER- MI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	R/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch: OFF] <ul style="list-style-type: none"> • For a few seconds after turning ignition switch OFF 	0 - 1.0 V
			[Ignition switch: OFF] <ul style="list-style-type: none"> • More than a few seconds after turning ignition switch OFF 	BATTERY VOLTAGE (11 - 14 V)
105	G	Power supply for ECM	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

IGNITION SIGNAL

< SERVICE INFORMATION >

[QR25DE]

EC-IGNSYS-02



BBWA3065E

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-III.

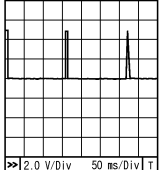
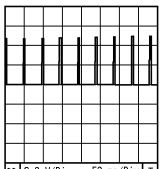
CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

IGNITION SIGNAL

< SERVICE INFORMATION >

[QR25DE]

TER-MI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
9 10 11 21	Y BR/Y V G	Ignition signal No. 3 Ignition signal No. 2 Ignition signal No. 1 Ignition signal No. 4	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed <p>NOTE: The pulse cycle changes depending on rpm at idle</p>	<p>0 - 0.1 V★</p>  <p>PBIA9265J</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Engine speed: 2,500 rpm 	<p>0 - 0.2 V★</p>  <p>PBIA9266J</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnosis Procedure

INFOID:000000006150903

1. CHECK ENGINE START

Turn ignition switch OFF, and restart engine.

Is engine running?

Yes or No

- Yes (With CONSULT-III)>>GO TO 2.
- Yes (Without CONSULT-III)>>GO TO 3.
- No >> GO TO 4.

2. CHECK OVERALL FUNCTION

With CONSULT-III

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-III.
2. Check that each circuit produces a momentary engine speed drop.

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 10.

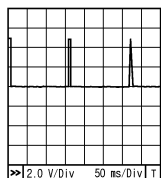
3. CHECK OVERALL FUNCTION

Without CONSULT-III

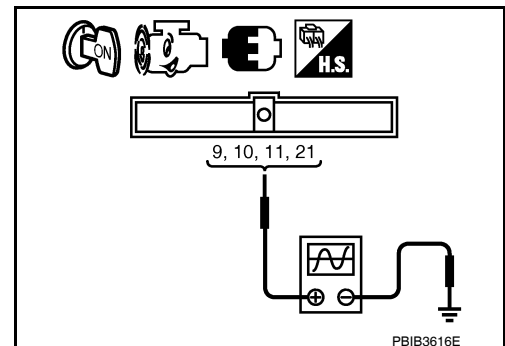
1. Let engine idle.
2. Read the voltage signal between ECM terminals 9, 10, 11, 21 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.

NOTE:

The pulse cycle changes depending on rpm at idle.



PBIA9265J



PBIB3616E

OK or NG

IGNITION SIGNAL

[QR25DE]

< SERVICE INFORMATION >

- OK >> **INSPECTION END**
- NG >> GO TO 10.

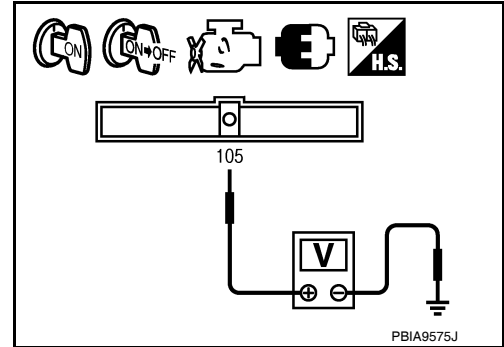
4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check voltage between ECM terminal 105 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> Go to [EC-1237](#).



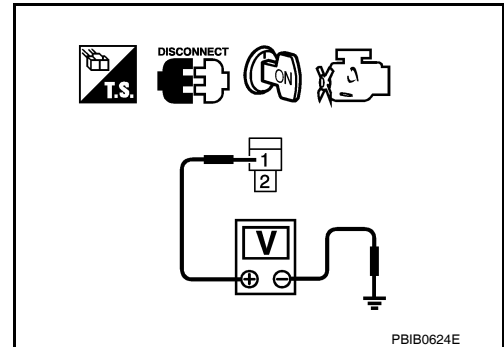
5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser-2 harness connector.
3. Turn ignition switch ON.
4. Check voltage between condenser-2 terminal 1 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 6.



6. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E43.
3. Check harness continuity between IPDM E/R terminal 3 and condenser-2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> Go to [EC-1237](#).
- NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E17, F10
- Harness for open or short between IPDM E/R and condenser-2

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK CONDENSER-2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between condenser-2 terminal 2 and ground. Refer to Wiring Diagram.

Continuity should exist.

IGNITION SIGNAL

[QR25DE]

< SERVICE INFORMATION >

3. Also check harness for short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to power in harness or connectors.

9. CHECK CONDENSER-2

Refer to [EC-1651, "Component Inspection"](#)

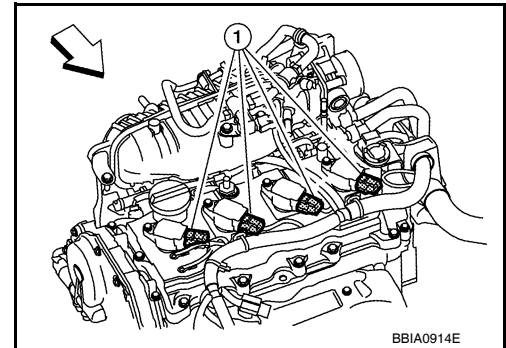
OK or NG

OK >> GO TO 10.

NG >> Replace condenser-2.

10. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil harness connector (1).
4. Turn ignition switch ON.



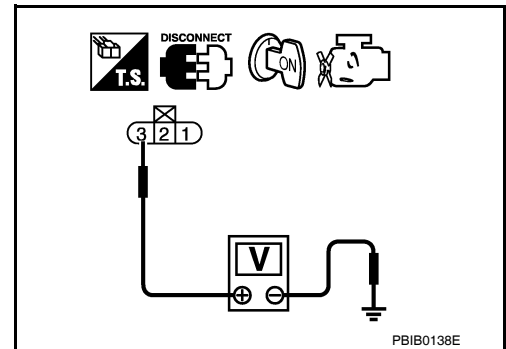
5. Check voltage between ignition coil terminal 3 and ground with CONSULT-III or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 12.

NG >> GO TO 11.



11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connector F10
- Harness for open or short between ignition coil and harness connector F10

>> Repair or replace harness or connectors.

12. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ignition coil terminal 2 and ground.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 13.

NG >> Repair open circuit or short to power in harness or connectors.

13. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

IGNITION SIGNAL

[QR25DE]

< SERVICE INFORMATION >

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 9, 10, 11, 21 and ignition coil terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-1651. "Component Inspection"](#).

OK or NG

OK >> GO TO 15.

NG >> Replace malfunctioning ignition coil with power transistor. Refer to [EM-145. "Removal and Installation"](#).

15. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

>> **INSPECTION END**

Component Inspection

INFOID:000000006150904

IGNITION COIL WITH POWER TRANSISTOR

CAUTION:

Perform the following procedure in a place with no combustible objects and good ventilation.

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 and 2	Except 0 or ∞
1 and 3	Except 0
2 and 3	

4. If NG, replace ignition coil with power transistor. Refer to [EM-145. "Removal and Installation"](#).
If OK, go to next step.

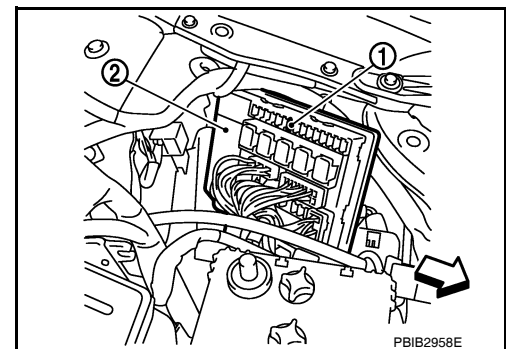
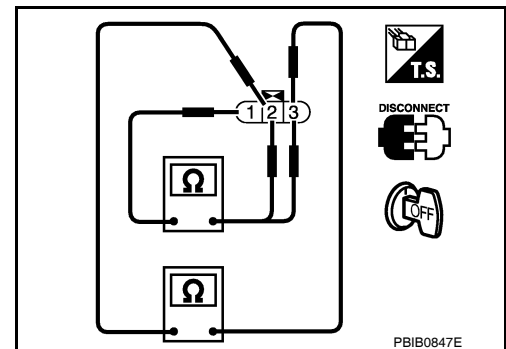
5. Turn ignition switch OFF.
6. Reconnect all harness connectors disconnected.
7. Remove fuel pump fuse (1) in IPDM E/R (2) to release fuel pressure.

NOTE:

Do not use CONSULT-III to release fuel pressure, or fuel pressure applies again during the following procedure.

- \leftarrow : Vehicle front

8. Start engine.
9. After engine stalls, crank it two or three times to release all fuel pressure.
10. Turn ignition switch OFF.
11. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
12. Remove ignition coil and spark plug of the cylinder to be checked. Refer to [EM-145. "Removal and Installation"](#).
13. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
14. Connect spark plug and harness connector to ignition coil.



IGNITION SIGNAL

[QR25DE]

< SERVICE INFORMATION >

15. Fix ignition coil using a rope etc. with gap of 13 - 17 mm (0.52 – between the edge of the spark plug and grounded metal portion as shown in the figure.
16. 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 made.

NOTE:

When the gap is less than 13 mm (0.52 in), a the spark might be generated even if the coil is malfunctioning.

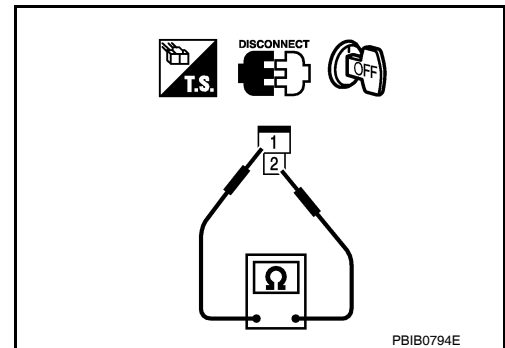
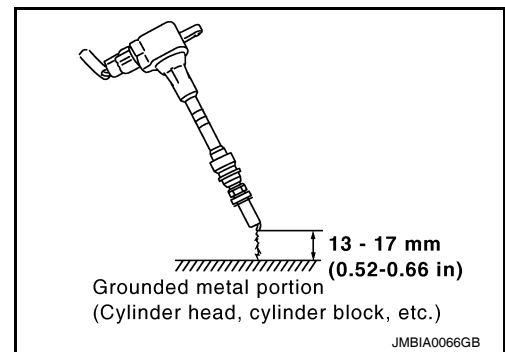
17. If NG, replace ignition coil with power transistor. Refer to [EM-145. "Removal and Installation"](#).

CONDENSER-2

1. Turn ignition switch OFF.
2. Disconnect condenser-2 harness connector. For the condenser number, refer to [EC-1645. "Wiring Diagram"](#). For the condenser layout, refer to [PG-38. "Harness Layout"](#).
3. Check resistance between condenser-2 terminals 1 and 2.

Resistance: Above 1 MΩ [at 25°C (77°F)]

4. If NG, replace condenser-2.



REFRIGERANT PRESSURE SENSOR

< SERVICE INFORMATION >

[QR25DE]

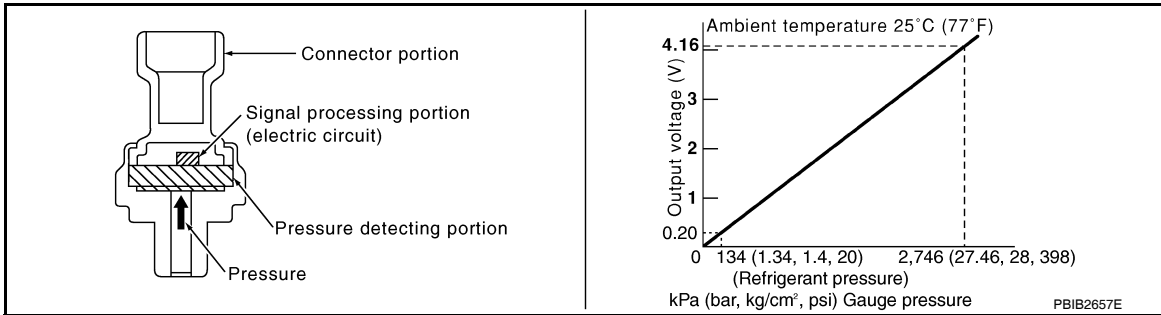
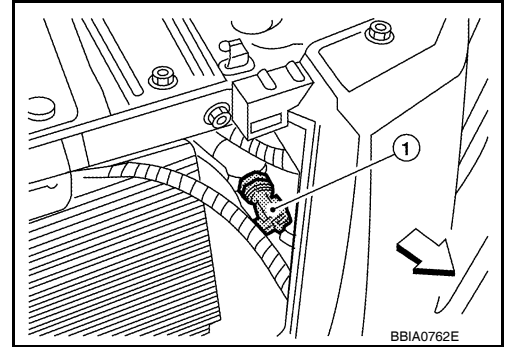
REFRIGERANT PRESSURE SENSOR

Component Description

INFOID:000000006150906

The refrigerant pressure sensor (1) 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.

- ←: Vehicle front



REFRIGERANT PRESSURE SENSOR

< SERVICE INFORMATION >

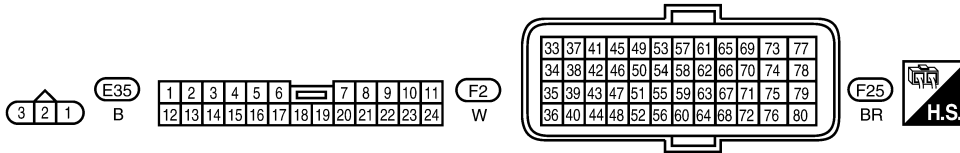
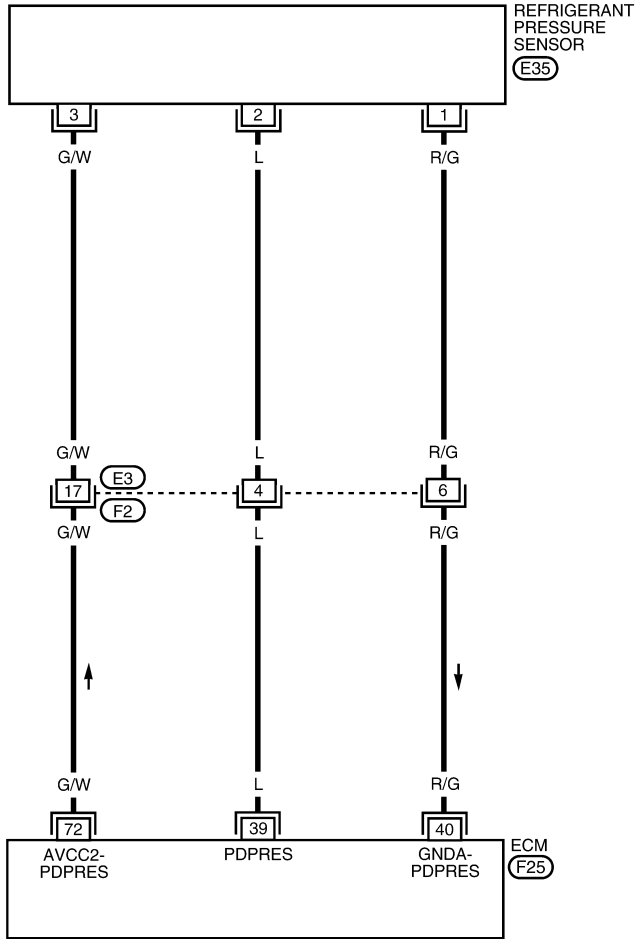
[QR25DE]

Wiring Diagram

INFOID:000000006150907

EC-RP/SEN-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



BBWA3066E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Never use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

REFRIGERANT PRESSURE SENSOR

< SERVICE INFORMATION >

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
39	L	Refrigerant pressure sensor	[Engine is running] • Warm-up condition • Both A/C switch and blower fan switch: ON (Compressor operates)	1.0 - 4.0 V
40	R/G	Sensor ground (Refrigerant pressure sensor)	[Engine is running] • Warm-up condition • Idle speed	Approximately 0 V
72	G/W	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch: ON]	Approximately 5 V

Diagnosis Procedure

INFOID:000000006150908

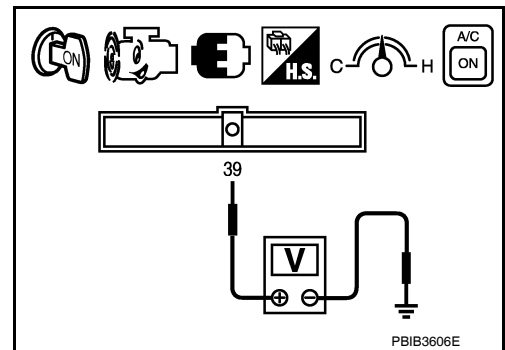
1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower fan switch ON.
3. Check voltage between ECM terminal 39 and ground with CONSULT-III or tester.

Voltage: 1.0 - 4.0 V

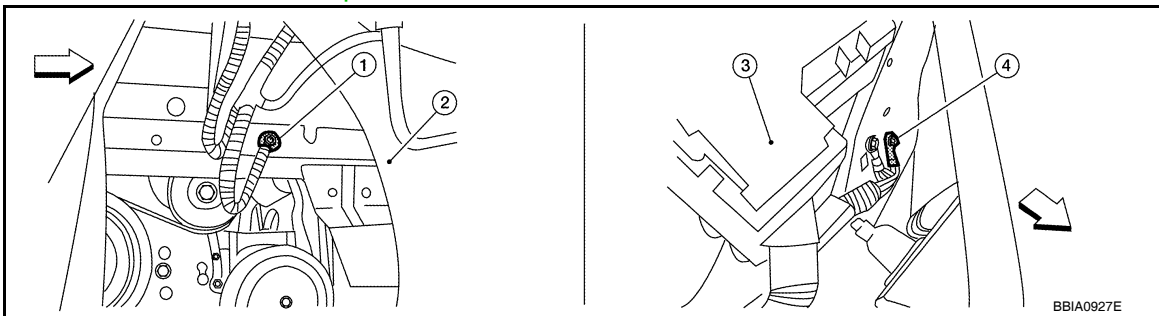
OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 2.



2. CHECK GROUND CONNECTIONS

1. Turn A/C switch and blower fan switch OFF.
2. Stop engine and turn ignition switch OFF.
3. Loosen and retighten ground screws on the body.
Refer to [EC-1242, "Ground Inspection"](#).



↔ Vehicle front

1. Body ground E9 (view with front wheel RH and fender protector RH removed.)
2. Washer tank
3. Fuse and fusible link box
4. Body ground E15

OK or NG

- OK >> GO TO 3.
 NG >> Repair or replace ground connections.

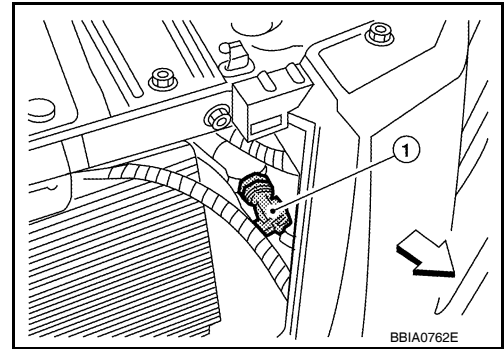
3. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

REFRIGERANT PRESSURE SENSOR

[QR25DE]

< SERVICE INFORMATION >

1. Disconnect refrigerant pressure sensor (1) harness connector.
 - ⇐: Vehicle front
2. Turn ignition switch ON.

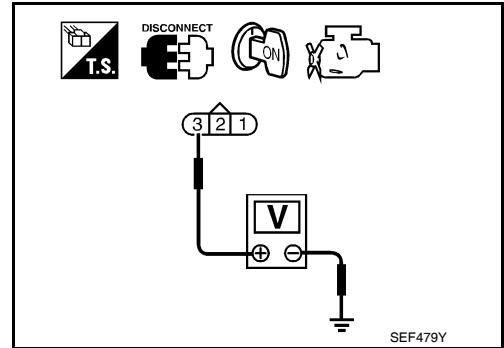


3. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-III or tester.

Voltage: Approximately 5 V

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between refrigerant pressure sensor terminal 1 and ECM terminal 40. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between refrigerant pressure sensor terminal 2 and ECM terminal 39. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

REFRIGERANT PRESSURE SENSOR

[QR25DE]

< SERVICE INFORMATION >

- OK >> GO TO 9.
- NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E3, F2
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1236](#).

OK or NG

- OK >> Replace refrigerant pressure sensor. Refer to [MTC-92. "Removal and Installation for Refrigerant Pressure Sensor"](#).
- NG >> Repair or replace.

A
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MIL AND DATA LINK CONNECTOR

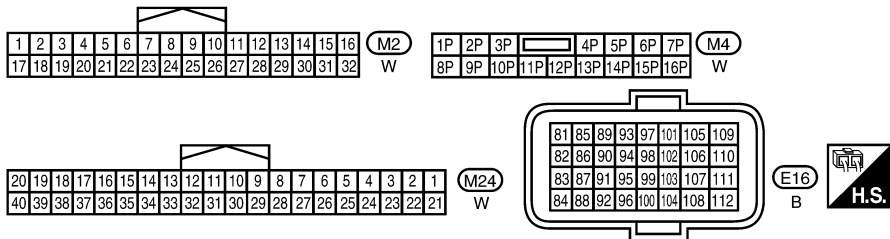
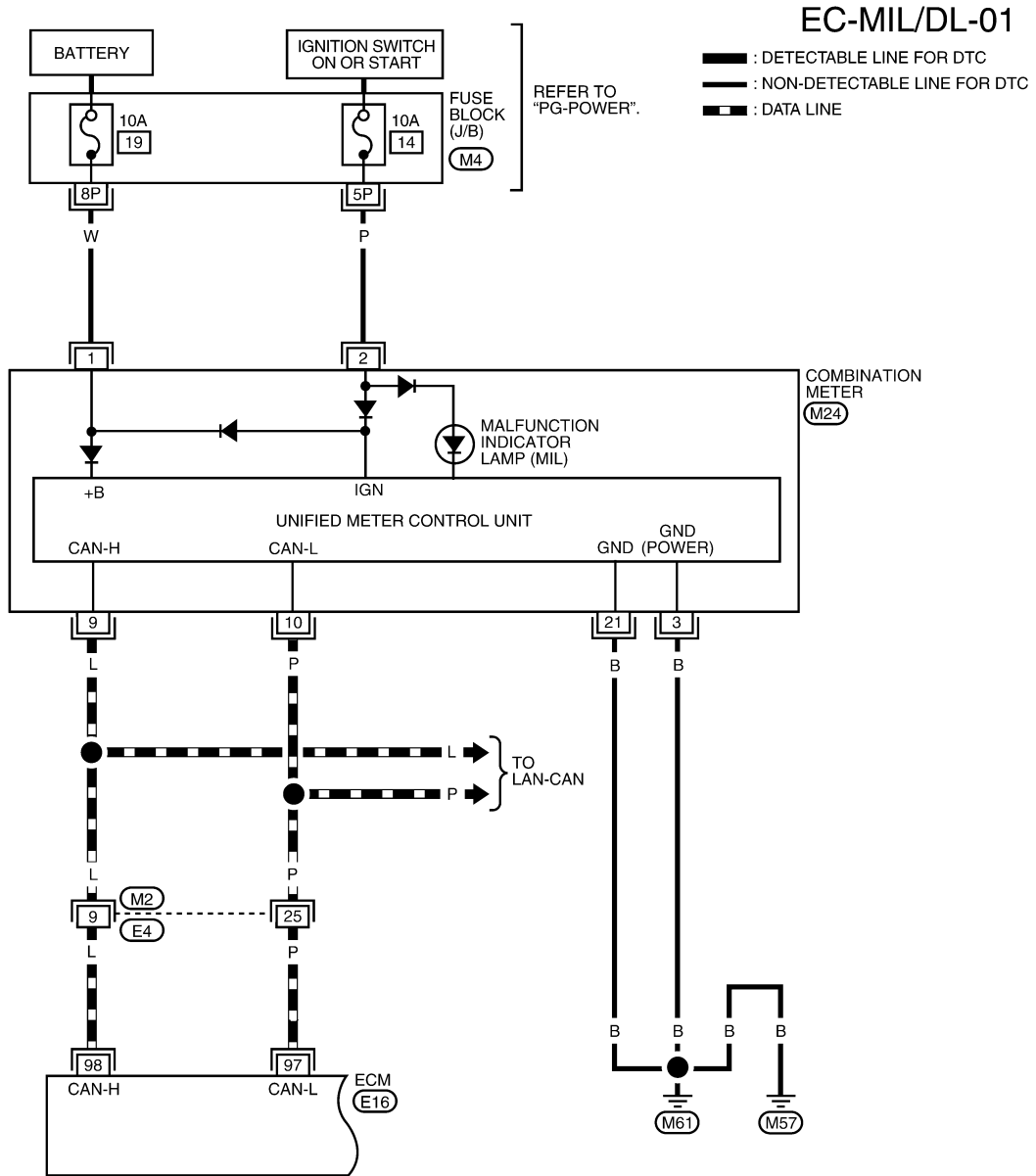
< SERVICE INFORMATION >

[QR25DE]

MIL AND DATA LINK CONNECTOR

Wiring Diagram

INFOID:000000006150910



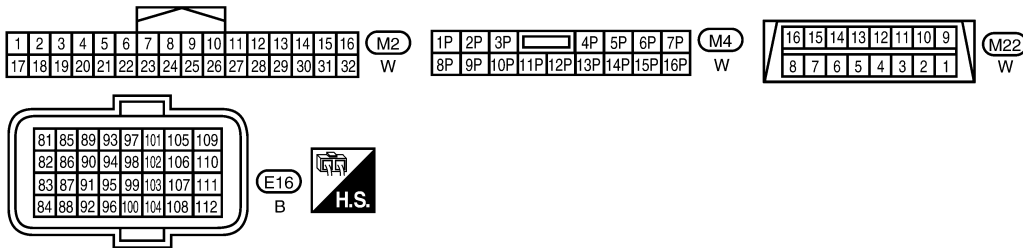
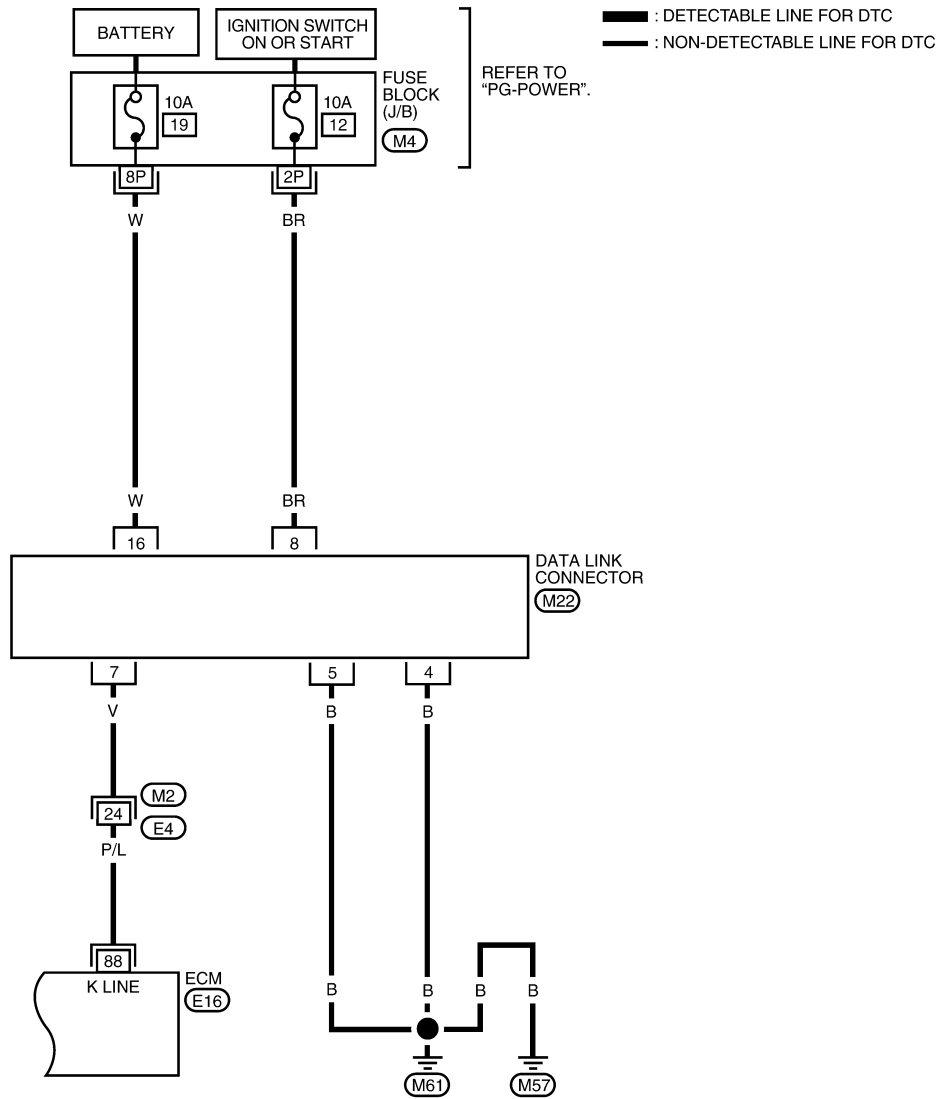
ABBWA0183GB

MIL AND DATA LINK CONNECTOR

< SERVICE INFORMATION >

[QR25DE]

EC-MIL/DL-02



BBWA2913E

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[QR25DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Pressure

INFOID:000000006150911

Fuel pressure at idle	Approximately 350 kPa (3.57 kg/cm ² , 51 psi)
-----------------------	--

Idle Speed and Ignition Timing

INFOID:000000006150912

Target idle speed	CVT	No load* ¹ (In P or N position)	650 ± 50 rpm
	M/T	No load* ¹ (in Neutral position)	800 ± 50 rpm
Air conditioner: ON	CVT	In P or N position	800 rpm or more
	M/T	In Neutral position	
Ignition timing	CVT	In P or N position	10 ± 5° BTDC
	M/T	In Neutral position	

*1: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Calculated Load Value

INFOID:000000006150913

	Calculated load value% (Using CONSULT-III or GST)
At idle	10 - 35
At 2,500 rpm	10 - 35

Mass Air Flow Sensor

INFOID:000000006150914

Supply voltage	Battery voltage (11 - 14 V)
Output voltage at idle	0.9 - 1.1* V
Mass air flow (Using CONSULT-III or GST)	1.0 - 4.0 g/s at idle* 4.0 - 10.0 g/s at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no load.

Intake Air Temperature Sensor

INFOID:000000006150915

Temperature °C (°F)	Resistance (kΩ)
25 (77)	1.800 - 2.200

Engine Coolant Temperature Sensor

INFOID:000000006150916

Temperature °C (°F)	Resistance (kΩ)
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

Air Fuel Ratio (A/F) Sensor 1 Heater

INFOID:000000006150917

Resistance [at 25°C (77°F)]	1.8 - 2.44 Ω
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SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[QR25DE]

Heated Oxygen sensor 2 Heater

INFOID:000000006150918

A

Resistance [at 25°C (77°F)]	3.4 - 4.4 Ω
-----------------------------	-------------

Crankshaft Position Sensor (POS)

INFOID:000000006150919

EC

Refer to [EC-1420](#), "Component Inspection".

Camshaft Position Sensor (PHASE)

INFOID:000000006150920

C

Refer to [EC-1425](#), "Component Inspection".

Throttle Control Motor

INFOID:000000006150921

D

Resistance [at 25°C (77°F)]	Approximately 1 - 15 Ω
-----------------------------	------------------------

E

Fuel Injector

INFOID:000000006150922

F

Resistance [at 10 - 60°C (50 - 140°F)]	10.4 - 15.3 Ω
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Fuel Pump

INFOID:000000006150923

G

Resistance [at 25°C (77°F)]	Approximately 0.2 - 5.0 Ω
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H

I

J

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